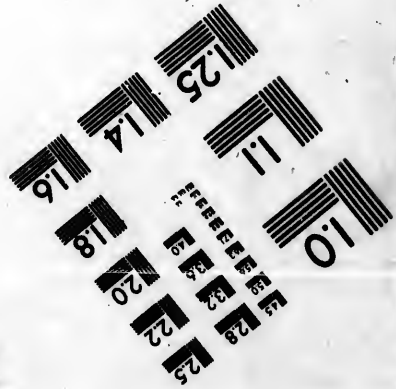
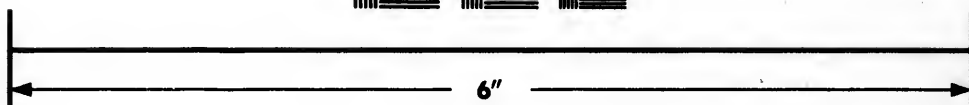
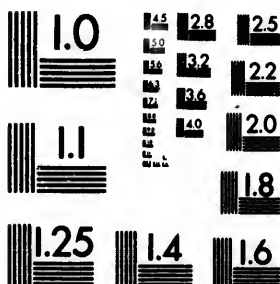


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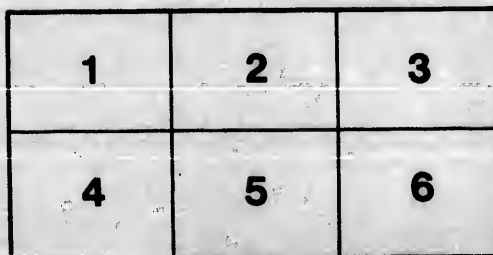
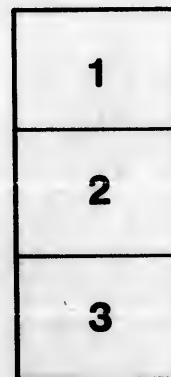
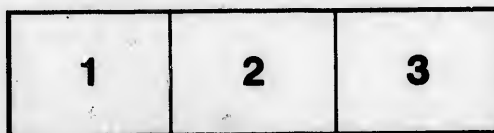
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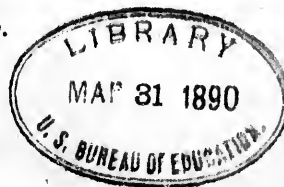
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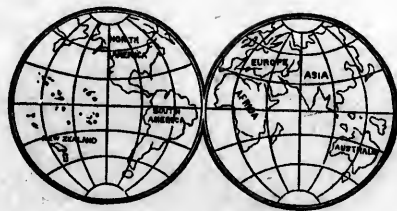
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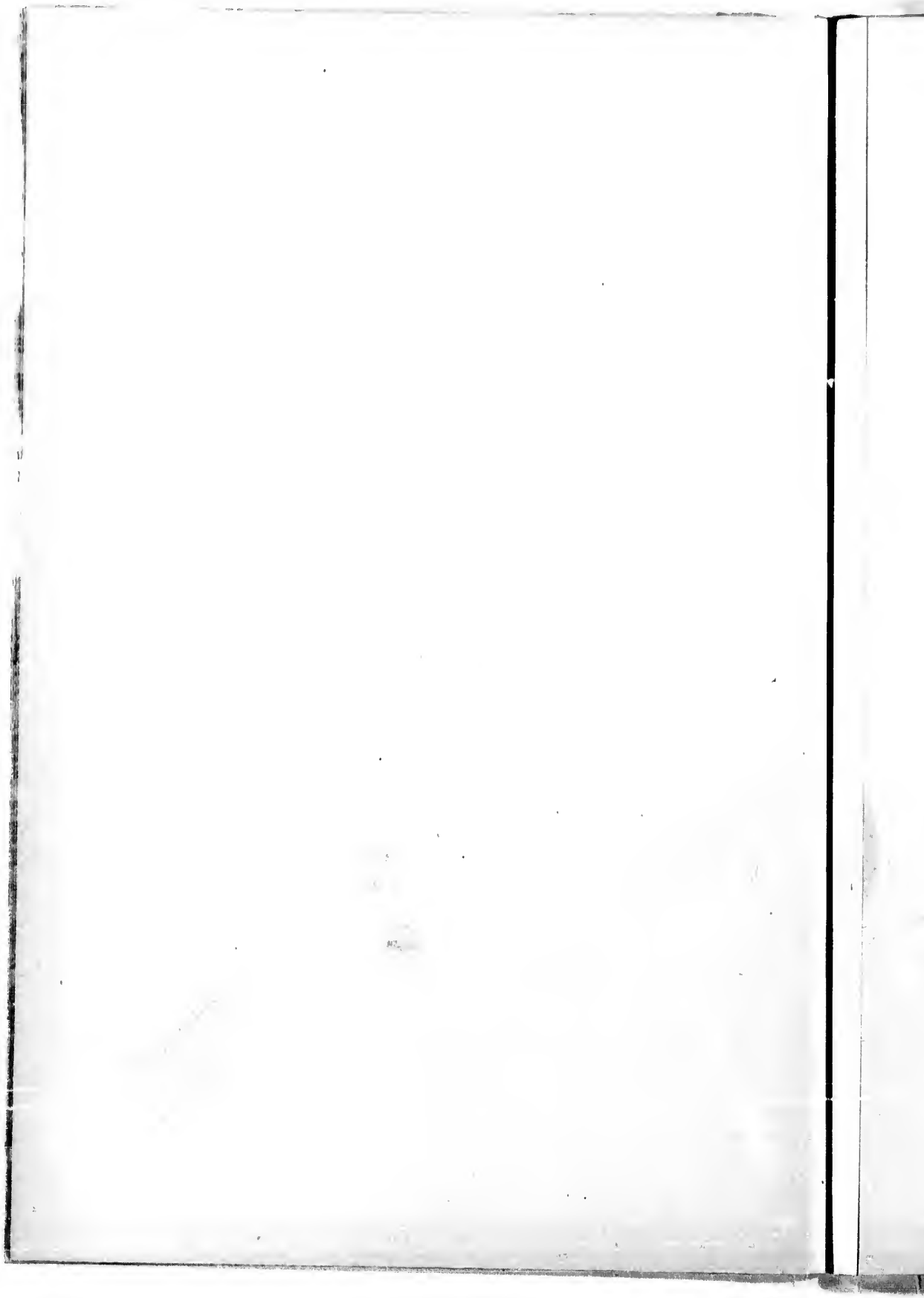
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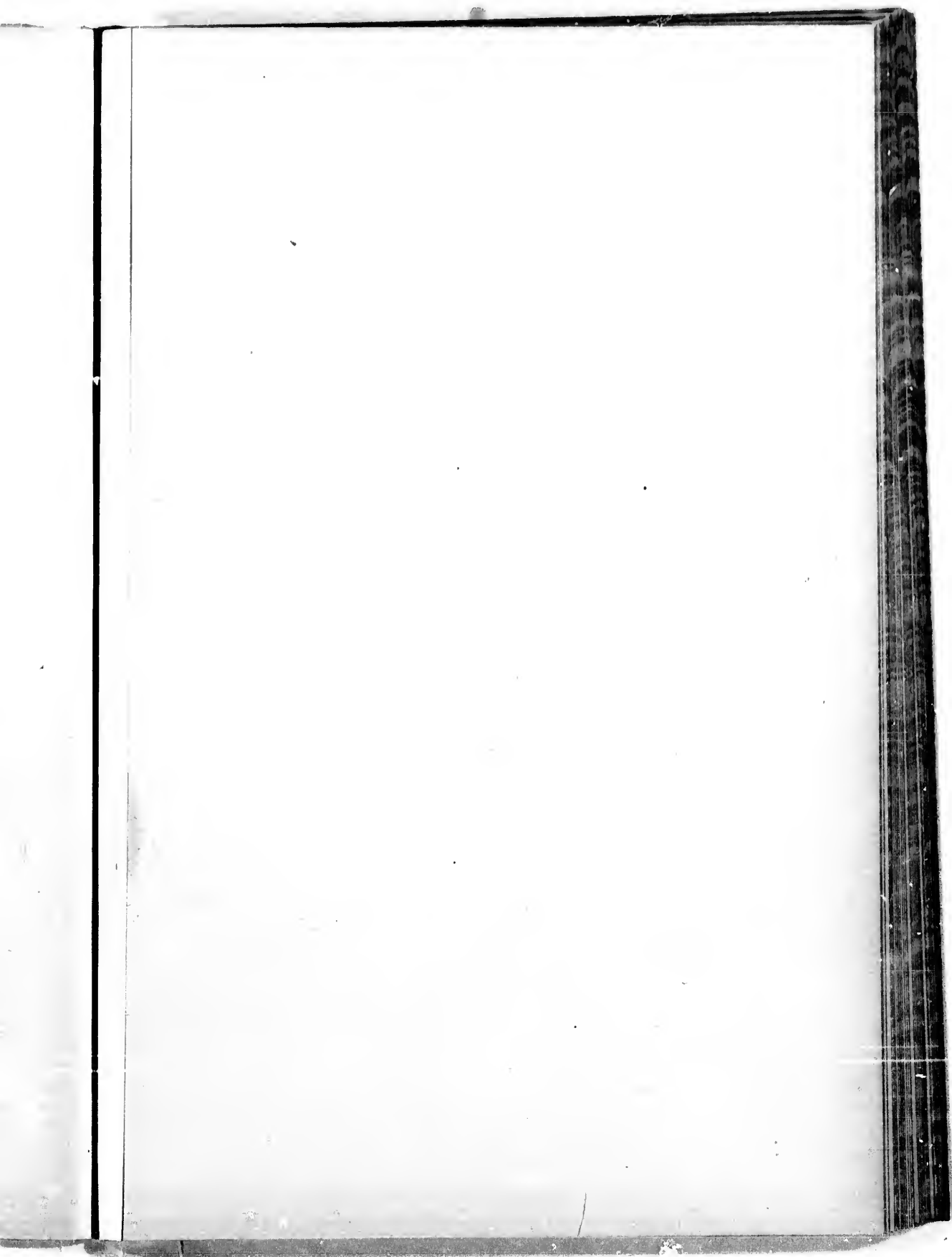
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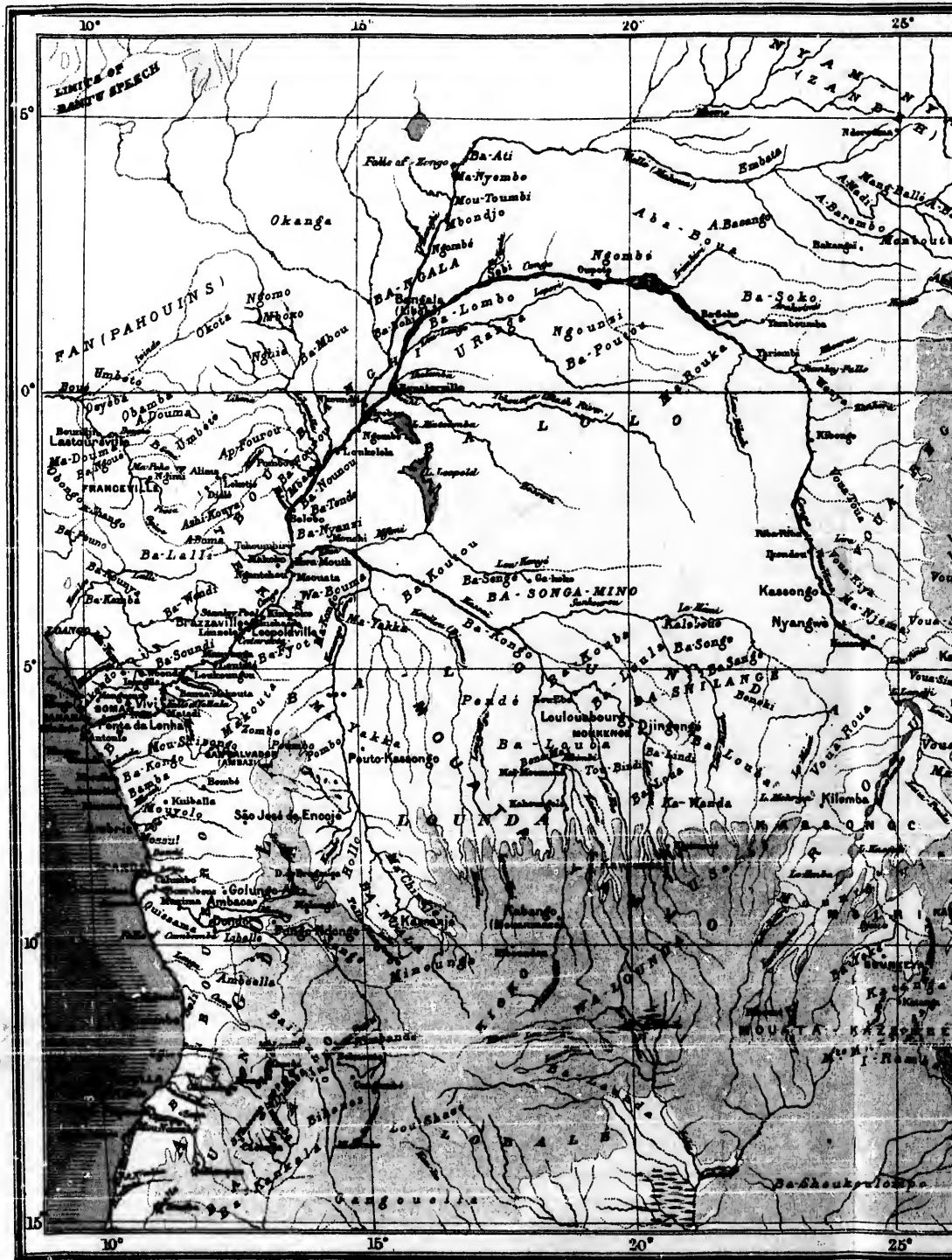
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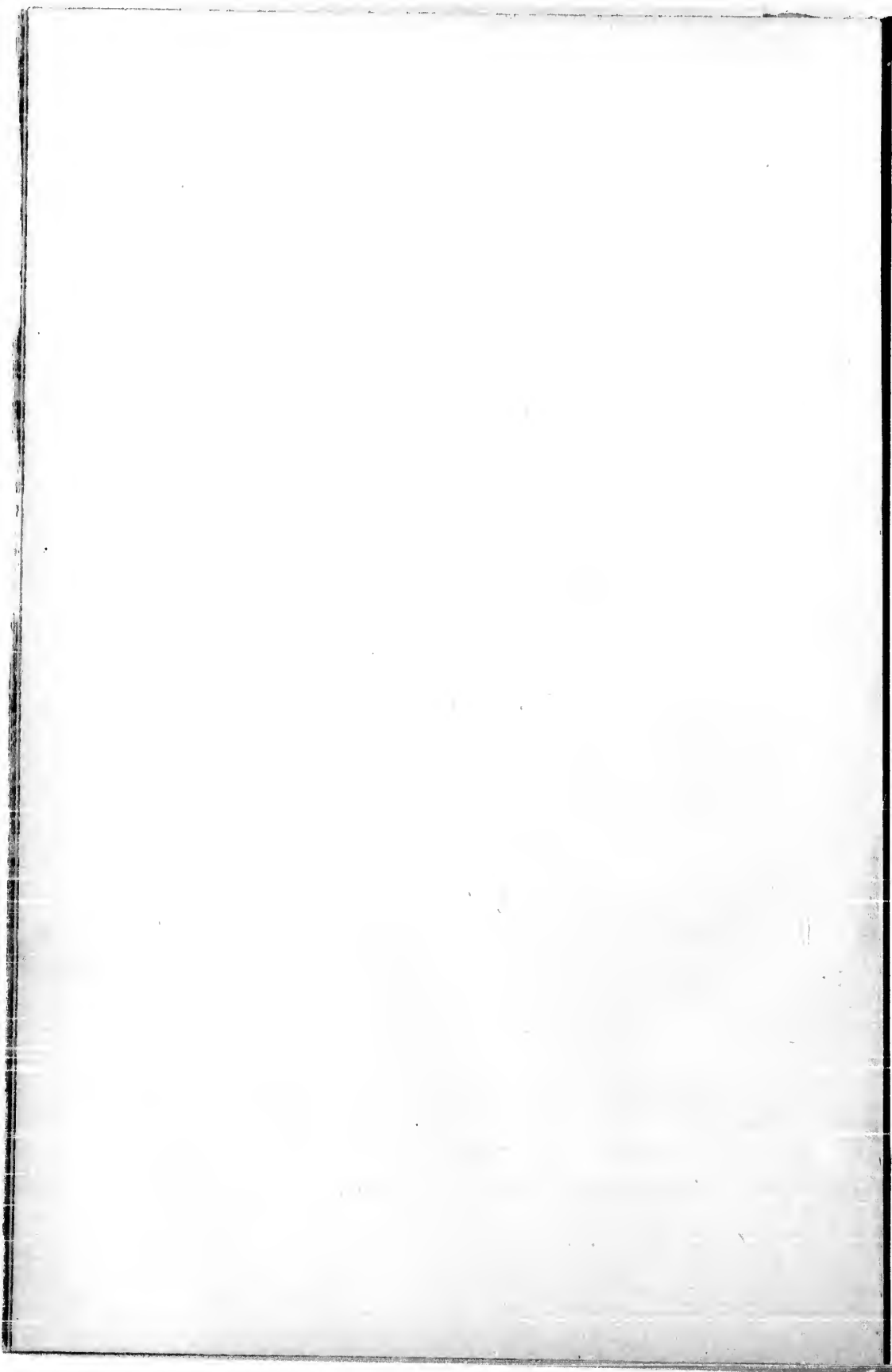




ATORIAL AFRICA.







1



# THE EARTH AND ITS INHABITANTS.

## AUSTRALASIA.

### CHAPTER I.

#### THE OCEANIC HEMISPHERE.



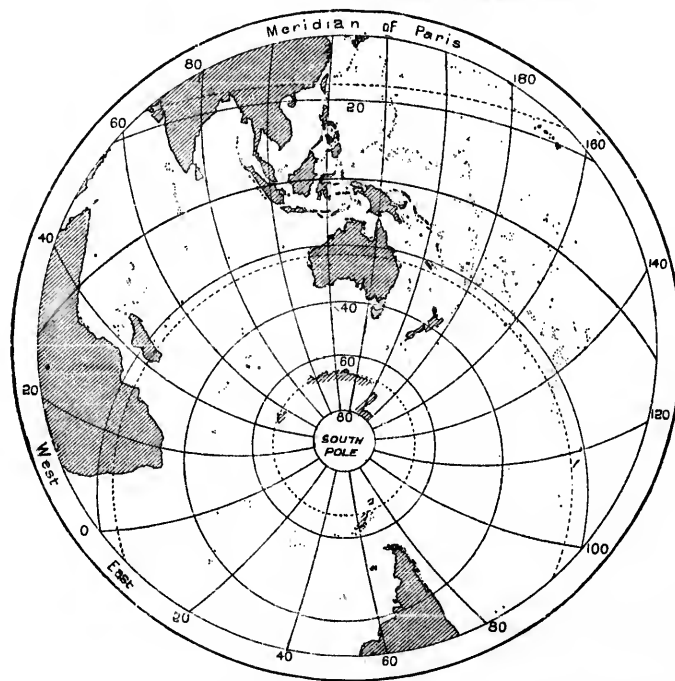
COMPARED with the collective body of marine waters, the Atlantic Ocean may be regarded as a mere "Mediterranean," or Inland Sea. As the "boundless" expanse on which the Greek mariners first timidly ventured was found to be a "closed sea," or simple landlocked basin, according as seafarers gradually explored its contracted seaboard between Europe and Africa, in the same way the more formidable Atlantic itself, only four centuries ago still held to be limitless, has in its turn proved to be a mere winding valley between the two halves of the continental lands constituting the Old and the New Worlds. Northwards this deep trough is separated by Greenland and Iceland from the cavities of the polar waters; east and west the shores of Europe and North America, as well as those of Africa and South America, roughly correspond in the contours and indentations of their coastline, which at the narrowest point, between Carabane and Cape St. Roque, are separated only by an interval of 1,800 miles. But southwards the Atlantic spreads out broadly, here merging in the greater oceanic basin which encompasses the whole periphery of the globe.

#### EXTENT AND FORMATION OF THE OCEANIC BASIN.

Excluding the Atlantic with its lateral inlets and the island-studded and ice-obstructed Arctic waters encircled by the Asiatic and American seabords, the

great oceanic depression covers about one half of the surface of the earth.\* South of the three continental extremities—Cape Horn, Cape of Good Hope, and Tasmania—the belt of waters stretches uninterruptedly in a circuit of 15,000 to 16,000 miles. Moreover, the marine depression extends far to the north beyond the equator, developing to the east of Africa the vast basin of the Indian Ocean, and east of Australia and Asia the still more extensive basin of the Pacific Ocean. If the continental masses, taken collectively, be compared to a half crater, whose contour, beginning at the Cape of Good Hope and terminating at Cape Horn, comprises the Ethiopian highlands, the Himalayas, and the Andes, the "Great

Fig. 1.—THE GREAT OCEANIC HEMISPHERE (WESTERN SECTION).



Ocean," as Fleurieu calls the united Indian and Pacific waters, will be found to completely flood this immense semicircle. The total sweep of this semicircle of inner shores exceeds 24,000 miles, that is to say, the length of the terrestrial circumference at the equator. Edward Suess has brought into full relief the striking contrast presented by the Atlantic and Pacific, the former presenting no lofty coast range round its periphery, while the latter washes with its abyssal waters the very foot of the encircling escarpments. But is this writer not mistaken in

* Total oceanic area, according to Krümmel . . . . .	148,000,000 square miles.
Great ocean, with Atlantic and Arctic Seas . . . . .	112,000,000 " "
Area of dry lands . . . . .	37,000,000 " "

comparing the formation of the Atlantic with that of the Indian Ocean, with its elevated coastlines of Java and Sumatra, of the Arrakan highlands, the submerged chain of the Maldives and Laccadives, the Ghats, the Persian and Madagascar uplands?

The vast oceanic basin is by no means a boundless expanse destitute of reefs, islands, and insular groups. Like the Atlantic it has its upheaved lands, not only such as, lying in the vicinity of the continents, might be regarded as detached fragments of the African, Asiatic, and American mainlands, but also archipelagoes of all sizes strewn over the wide expanse of waters at great distances from the

Fig. 2.—THE GREAT OCEANIC HEMISPHERE (EASTERN SECTION).



surrounding coastlines. Some of the islands scattered over the oceanic hemisphere of the globe are even so extensive that they have been regarded either as the remains of a past or else the first corner-stones of a future continent. Madagascar, the Comoros, and the Seychelles have been treated by many naturalists as the surviving fragments of a vanished world, which from a typical branch of its now dispersed fauna has received the name of "Lemuria." In the great Pacific Ocean farther east, thousands of islands, cone-shaped or disposed in circular groups, seem to form part either of a submerged continent or of a new world in process of formation. The insular region which stretches south-east of Indo-China from

Sumatra to Tasmania, also constitutes, notwithstanding its present fragmentary character, a continental division somewhat analogous to Africa and South America.

The various divisions of the globe are disposed in twos along three parallel axes, an arrangement best seen in the symmetrical disposition of North and South America. But the same dual grouping may also be detected in the great divisions of the Old World. Here Europe, formerly separated from Asia by the Caspian and Aral Seas, and other lacustrine depressions, forms with Africa the western group. The eastern, still more irregular in its general disposition, comprises the vast Asiatic continent and all the innumerable islands which are crowded together in the south-eastern waters between the Indian and Pacific Oceans. These extensive lands are obviously a continent reduced to fragments, and forming an extension of Further India into the southern hemisphere. Hence, not without reason, some writers have suggested the expression "Insul-India" for the equatorial regions which form a southern continuation of Indo-China across the Great Ocean. The vast island of Australia, with continental dimensions, together with the surrounding lands, has similarly received the general designation of "Australasia," and this term itself has been extended by Wallace and others to the whole of the insular world sometimes known as Oceania. Australasia thus comprises the Eastern Archipelago, with the Philippines, Australia, and adjacent islands, New Guinea, New Zealand, and all the South Sea Islands (Melanesia, Micronesia, and Polynesia), and in this wide sense it is taken as the title of the present volume.

#### THE ANTARCTIC LANDS.

Yet another continent probably exists in the immensity of the Southern Ocean. The antarctic polar region, still unexplored for a space of about 6,500,000 square miles, assuredly comprises vast stretches of dry land, which by many geographers have already been traced on the maps as forming a continuous mainland sweeping round the south polar circle. Thus to the "open sea" supposed to encompass the North Pole would correspond an ice-bound continent about the South Pole. But, however this be, the vast masses of ice-floes met by navigators venturing into the antarctic waters attest the existence of high land stretching southwards. Moreover, the sounding instruments have fished up fragments of granites, schists, sandstones, and limestones recently broken off; while at certain isolated points explorers have really seen, or thought they have descried through the mists, the outlines of long, ice-covered southern ranges.

Without including the antarctic lands lying beyond the sixtieth degree south latitude, all the islands and half-continental lands in the Indian and Pacific Oceans comprise a total superficial area far greater than that of Europe. Of the hundreds of scattered insular groups, some are altogether uninhabited, while others are very thinly peopled. Nevertheless, the collective population of Australasia exceeds that of South America, and its average increase is rapid, notwithstanding the depopulation of several oceanic archipelagoes. The total area of all the dry land has been estimated at about 4,600,000 square miles, with a probable popula-

tion of forty-four millions, concentrated chiefly in the Eastern Archipelago and the Philippines.

#### PROGRESS OF OCEANIC EXPLORATION.

With the exception of the islands more contiguous to Asia, all the regions of the oceanic hemisphere remained till the present century almost entirely severed from the economic and commercial life of the civilised world. But the rapid colonisation of Australia and New Zealand, the occupation of the Polynesian archipelagoes, the establishment of a regular system of steam navigation between the chief centres of trade in the Pacific and Indian Oceans have, so to say, annexed this half of the planet to the other half, of which West Europe occupied the central point.

Thus the world, hitherto incomplete, has as it were been suddenly revealed in its entirety, and universal history, in the strict sense of the term, henceforth begins for all the races and peoples of the earth. Nothing is now wanting to the vast stage on which throbs the great heart of humanity, already awakening to self-consciousness and henceforth united, at least in all its material relations. This enlargement of the civilised world cannot fail to be attended by consequences of far-reaching importance. The earliest national cultures, which had been cradled in the great fluvial valleys of Egypt and Mesopotamia, were followed by the more comprehensive culture of the peoples dwelling round about the Mediterranean basin. Then came, with the discovery of the New World, the era of Atlantic civilisation, exceeding that of the Mediterranean "in the same ratio that the square of the axis of the inland exceeds that of the oceanic basin." And now the whole world becomes the theatre of busy life for the civilised peoples. Henceforth the earth knows no limits, for its centre is everywhere or anywhere on the planetary surface, and its circumference nowhere.

At the same time, in the complexity of known and habitable lands, some more favoured regions stand out, which, thanks to the beauty of their scenery, the mildness of their climate, or other physical advantages, have in a special manner attracted the stream of human migration. Amongst these privileged lands can any be named that excel certain Pacific islands in the marvellous harmony of their outlines, the charm of the encompassing waters, the softness of the atmosphere, the fecundity of the soil, the even course of their seasons, the rhythmical movement of all their natural phenomena? The eminent naturalist, Bates, has hazarded the opinion that, if mankind has been able to attain a high degree of culture through its struggle with the inclemency of the cold regions, in the equatorial lands alone the perfect race of the future will enter on the complete fruition of its magnificent inheritance.

For ages Egyptians, Arabs, and Phœnicians were acquainted with the Erythræan Sea, that is, the Indian Ocean. Their ships had even already penetrated in the direction of the coastlands, whence came frankincense, ivory, and gold, when in their turn the Greeks, during the Alexandrian expedition, also found the highway leading to those southern waters. At first following the coastline, and keeping

always within sight of land, they nevertheless advanced far towards the east. But before the first century of the vulgar era, tradition makes no reference to the great discovery of the regularly alternating movement of the trade winds and monsoons, by means of which mariners were first enabled boldly to venture on the high seas, running fearlessly before the wind from the African and Arabian seaboard to that of the Indian peninsula. There can, however, be little doubt that these alternating aërial currents were already well known to the Arab and Phœnician navigators and utilised by them in their distant expeditions to the far east. But the merit of the discovery was attributed to Hippalos, the Greco-Egyptian pilot, whose name was even given to the two regular easterly and westerly winds.

During the Roman epoch the islands and the Asiatic peninsulas of the Indian Ocean were better known than twelve centuries later, that is, on the eve of Vasco de Gama's expedition. The Western traders were well acquainted with Taprobana (Ceylon), and the Golden Chersonese (Malay peninsula), as well as the island of "Barley," the present Java. Their commercial relations reached as far as the Moluccas, for the clove had already made its appearance on the tables of wealthy Romans. During the night watch mariners beguiled the hours with narratives of marvellous adventures, in which the flights of fancy became intermingled with more or less truthful descriptions of peoples, animals, and plants actually seen by the relaters on their travels. From the seafarers of diverse nations, who traded in the service of Rome, these tales passed in a more or less modified form to the Arab mariners of mediæval times, and from this source, with its germ of truth, were developed many of the marvellous stories embodied in the *Thousand and One Nights*.

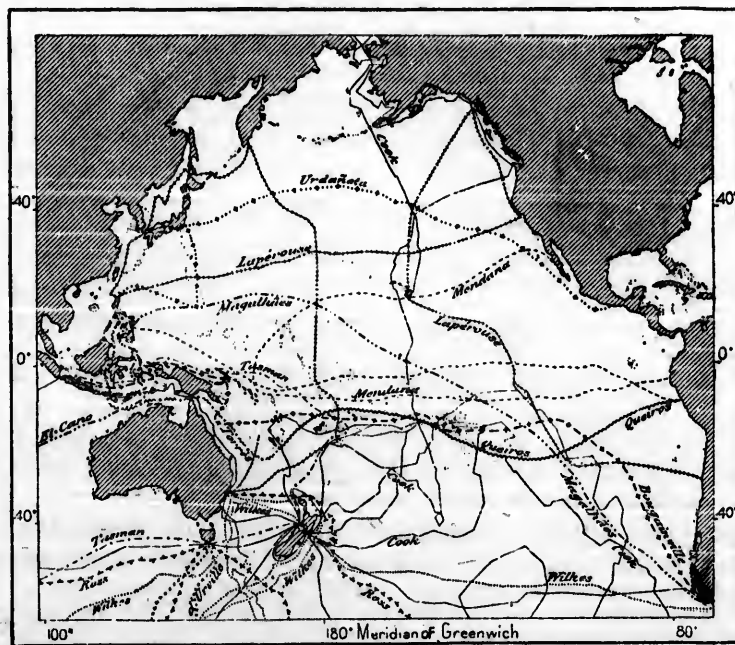
The modern era of exploration for the oceanic regions coincides with that of the New World. In 1498, Vasco de Gama, after rounding the Cape of Good Hope, crossed the Indian Ocean straight to Calicut on the Malabar coast. Two years afterwards Diego Dias, brother of the other Dias who had first doubled the same cape, discovered S. Lourenço (Madagascar), while others, pushing still eastwards, reached the shores of Further India. In 1509 Malacca had already become a centre of Portuguese dominion, and henceforth all the Asiatic vessels calling at that emporium were obliged to accept the services of a Portuguese pilot.

The Eastern Archipelago, which had already been visited by the Italian, Bartema, was soon embraced by the commercial empire of Lisbon; but once masters of the valuable Spice Islands, the Portuguese mariners seldom ventured into the unknown waters farther east. To another nation, represented, however, by the Portuguese, Magellan, fell the glory of first completing the circumnavigation of the globe, across the vast expanse of the Pacific Ocean. Following the western route round South America, instead of the eastern taken by Vasco de Gama, Magellan traversed in 1520 the strait that bears his name, and first of Europeans penetrated into the South Pacific, sailing in search of the easternmost Portuguese factories. By a strange accident his ships traversed an open space of

no less than ten thousand miles, touching only at two uninhabited islets to the east of the yet undiscovered Low Archipelago, thus avoiding all the innumerable clusters strewn over the South Seas. The first group met by them was that of the Ladrones, or Mariannas, in 1521, after which, continuing his westerly course, Magellan reached the Philippines, and perished in an encounter with the natives on the island of Mactan, a small member of that archipelago. The lands discovered by him for a long time justly bore the name of Magellania.

Fig. 3.—EXPLORATIONS OF THE PACIFIC.

Scale 1 : 200 000,000.



The companions of the Portuguese navigator continued their voyage, at first towards Borneo, then to the Moluccas, beyond which, on the homeward journey across the Indian Ocean, the Basque, Sebastian el Cano, in command of the only surviving vessel, discovered an islet by him named San-Pablo, but at present known as Amsterdam. Of the two hundred and thirty-seven men who had started from Seville, eighteen only returned, amongst them Pigafetta, historian of the memorable voyage of circumnavigation. "I do not think," he wrote, "that anyone will in future undertake a similar journey." Nevertheless, within six months of Magellan's expedition, another Spanish squadron, commanded by Loyasa, also penetrated through Tierra del Fuego into the Southern Ocean, and



on the long route to the Ladrões Archipelago met only a single island of insignificant size. One of the ships, driven by a storm to the coast of Mexico, was the first to circumnavigate South America.

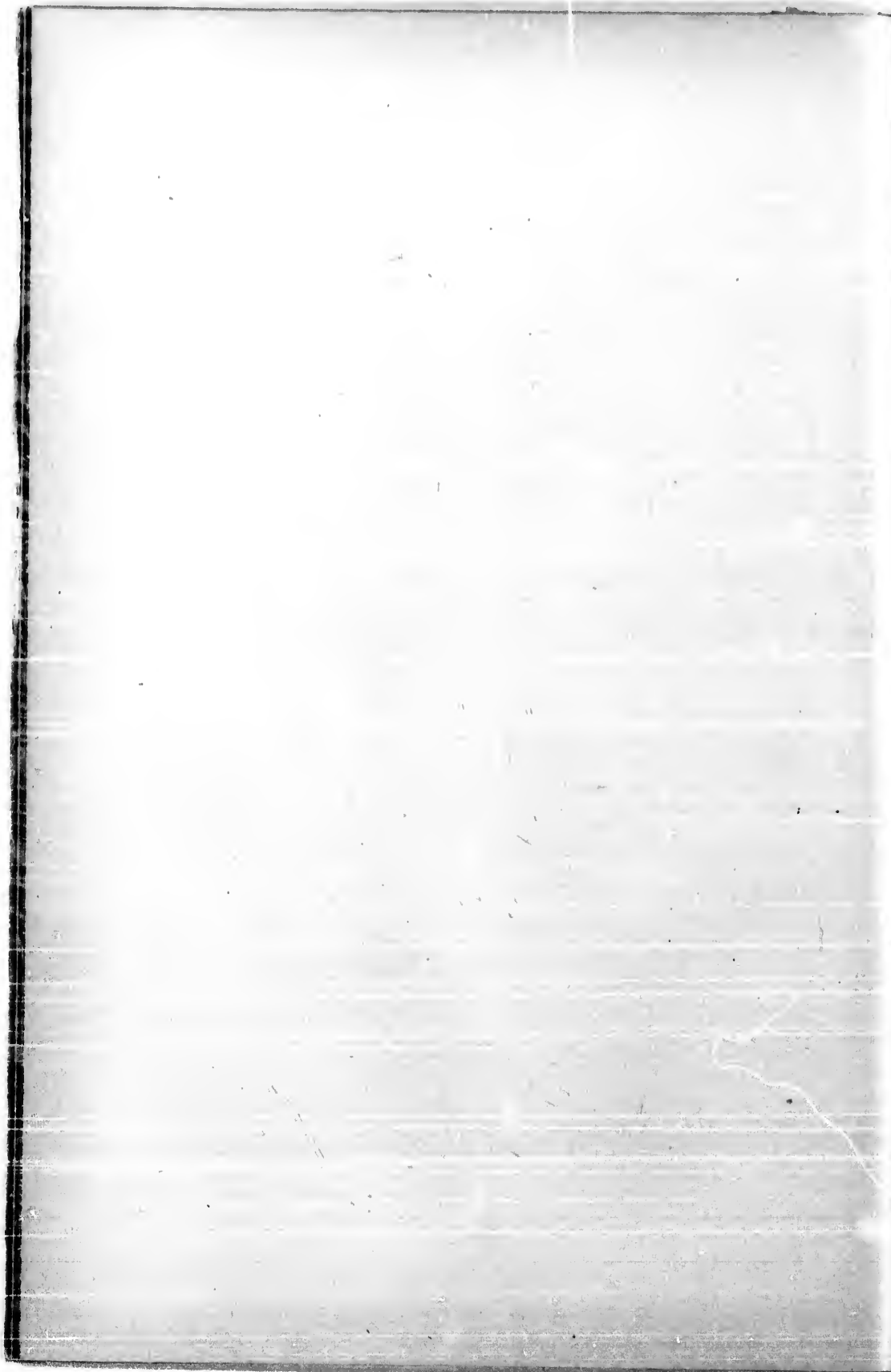
Many generations passed before the Pacific was traversed in the opposite direction, so as to achieve the circumnavigation of the globe in the reverse way, from west to east. Navigators had in vain attempted to beat up against the trade winds which set regularly in the Pacific, although their efforts were attended by numerous discoveries of islands and archipelagoes, such as New Guinea, the Carolines, the Marshall, Pelew, and Bonin groups. But after struggling for weeks and months against the marine and aerial currents, the explorers one after the other confessed themselves baffled, and put back to the Philippines or the Moluccas. At last the Augustinian friar, Andres de Urdañeta, found, or rather guessed, the eastward route across the Pacific. Reasoning by analogy, he concluded that the atmospheric laws must be the same in the Atlantic and Pacific basins; consequently, that the south-west winds of West Europe must be balanced by currents setting in the same direction in the temperate latitudes comprised between Japan and California. The meteorological anticipation was completely justified in 1565, when Urdañeta himself, nearly half a century after Magellan's voyage, sailed from the Philippines and Ladrões northwards as far as the forty-third degree of latitude in the Japanese waters, then turning to the south-east, at last gained the Mexican port of Acapulco. The voyage lasted altogether one hundred and twenty-five days.

Henceforth, regular communication was established across the Pacific between Mexico and the Philippines. The route was carefully determined by pilots, and for two hundred years was strictly followed by the Spanish galleons. After leaving Acapulco, skippers were able to spread sail and run before the wind without tacking all the way to the Philippines. But on the return voyage they first made for the Japanese waters about 35° north latitude, keeping under this parallel till within sight of the California coast, and then following the seaboard to the starting-point. So closely was this beaten track adhered to, that scarcely any discoveries were made to the right or the left. Nevertheless, indications of land are figured on the Spanish charts in the region occupied by the Sandwich Islands.

The very stillness of the atmosphere, combined with the infrequency of storms, may perhaps have been one of the causes of the long-prevailing ignorance regarding the oceanic lands of the northern hemisphere. The great ocean well deserves the name of "Pacific" given to it by Magellan. The expression "South Sea," applied in a more general way to all the waters comprised between Asia and America, was at first restricted to the regions lying to the south-west of Mexico and Central America. In this sense it was used by way of contrast with the "North Sea," whence the Spanish explorers had penetrated southwards. The now forgotten term, "Sea of Our Lady of Loretto," was adopted by the Franciscan missionaries, in the belief that the vast ocean bathed lands which were all destined one day to be peopled only by Christian neophytes.



VIEW TAKEN AT TASMAN PENINSULA.



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Beyond the zone of navigation utilised by the Acapulco galleons, nearly all the equatorial archipelagoes of the South Sea were at least sighted by the Spanish mariners during the sixteenth and seventeenth centuries. In 1567 Mendana de Neyra saw the groups at present known by the name of the Ellice and Solomon Islands; in 1595 Hurtado de Mendoza discovered the Marquesas; in 1606 Queiros sailed through the Low Archipelago, visited the New Hebrides, and skirted the Australian seaboard, which he claimed to have first observed, although his voyage to these shores had been anticipated by the Portuguese pilot Godinho de Eredia, and in 1531 even by the Provençal Guillaume le Testu.\* Lastly, Torres, who had accompanied the Queiros expedition, successfully navigated the dangerous labyrinth of reefs and islets separating Australia from New Guinea. His name has been justly given to the strait which, with rare boldness and seamanship, he traversed from sea to sea in the space of two months.

But Spaniards and Portuguese had no longer the monopoly of these oceanic regions, which had been shared between them by the famous Bull of Alexander VI. The illustrious English seafarer, Francis Drake, repeated fifty-seven years later the exploit of Magellan, first circumnavigator of the globe, and after him the routes of the Pacific were further surveyed by Cavendish and some Dutch mariners. By the close of the sixteenth century Dutch traders had even already founded factories in Java, whence their power gradually spread from island to island, everywhere displacing that of the Portuguese. In their turn the Dutch sailors took up the work of discovery in the southern waters, Tasman especially enlarging our knowledge of the Austral lands. Thus were revealed to the western world the west coast of Australia as far as Torres Strait, Tasmania with its basalt headland, New Zealand and its active volcanoes. But such was at that time the intensity of international rivalries between the chief trading peoples, that the discoveries already made by the Spanish or Portuguese pioneers remained unknown to or overlooked by the Netherlandish explorers. Although Torres had actually demonstrated the existence of a passage separating Australia from New Guinea, Tasman maintained forty years later that both lands belonged to the same continent.

The second half of the eighteenth century was the decisive epoch in the scientific exploration of the South Sea Islands. Henceforth exploring expeditions were no longer undertaken in the interests of a single nation, or of some powerful trading company, but rather for the benefit of the whole of the civilised world. At the same time the more accurate observations now made imparted far greater authority to the reports of the explorers themselves. The longitudes in the southern waters were for the first time determined by the method of lunar distances by Wallis in 1766. Thenceforth the enormous errors of the early seafarers, with discrepancies of from one thousand to two thousand miles, became impossible, and mariners were no longer doomed to beat about for weeks and months together in search of large archipelagoes already reported by their predecessors. Owing to this uncertainty, numerous explorers had to abandon the attempt to sight the Solomon

\* Major, *Journal of the Royal Geographical Society*, 1872.

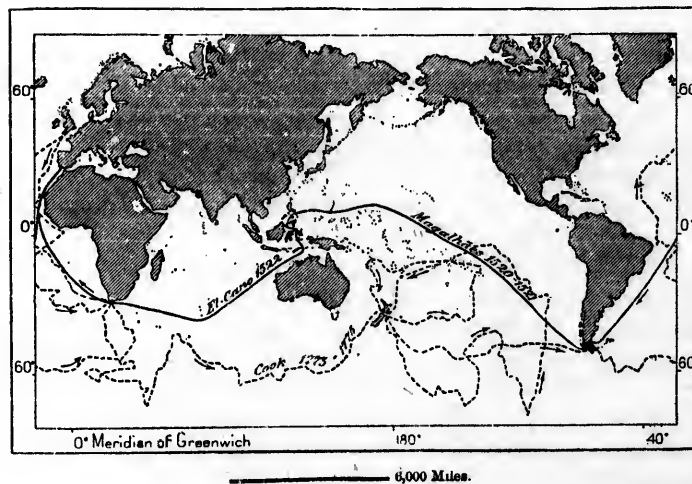
group discovered by Mendana de Neyra. Its very existence was questioned, and the Spanish sailor's account was attributed to fantastic apparitions, clouds on the horizon simulating the outlines of reefs, coastlands, forests, or villages. On the other hand, other groups became decomposed, and the same island was sighted in apparently different places, thus receiving several names from successive observers. At last the application of astronomical processes put an end to this bewildering fluctuation in the oceanic insular regions.

#### COOK'S VOYAGES.

The epoch of methodic exploration in the South Sea, begun by Wallis, may be said to have closed in 1827 with the discovery of the two great Fijian islands by

Fig. 4.—FIRST CIRCUMNAVIGATION OF THE GLOBE FROM WEST TO EAST AND EAST TO WEST.

Scale 1 : 450,000,000.



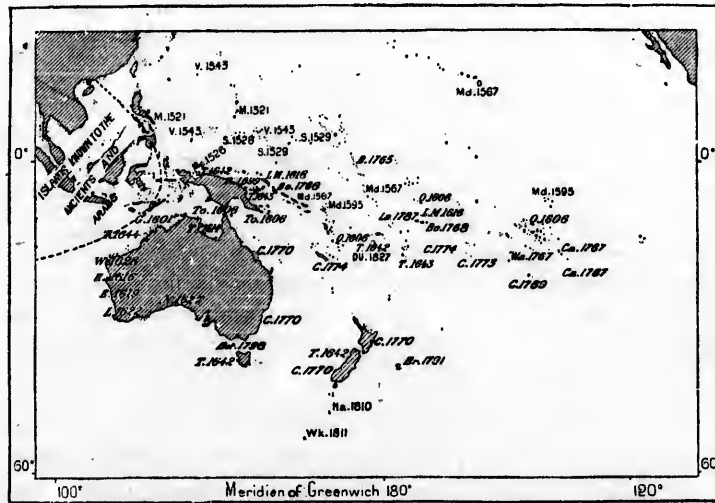
Dumont d'Urville. During the intervening sixty years, rendered memorable by the voyages of Carteret, de Bougainville, Cook, Vancouver, and Laperouse, the geographical work of oceanic research was completed in all its main features. Thenceforth nothing remained and nothing still remains to be done, except to fix more accurately the position of the island groups, to trace their outlines more carefully, indicate all the reefs, survey the doubtful landmarks, and efface those that had been erroneously inserted on the official charts.

Amongst the explorers of the last century, the first place belongs unquestionably to Cook. The year 1769, when the illustrious navigator began his network of researches in the Pacific, may be said to rank next to 1521, date of Magellan's voyage, as the chief turning-point in the history of oceanic discovery. Landing at Tahiti, Cook began his gigantic labours with his memorable observa-

tions on the transit of Venus, thus determining a precise longitude in the centre of the Pacific. He then completely circumnavigated the two great islands of New Zealand, surveyed the east coast of Australia, and rediscovered Torres Strait.

In his second voyage he explored more especially the Austral seas on both sides of the polar circle, but advancing in the opposite direction from that taken

Fig. 5.—DATES OF THE CHIEF DISCOVERIES IN OCEANIA.



M. 1521. Magellan, *Gualan, Philippines.*  
 Me. 1526. Meneses, *New Guinea.*  
 S. 1528. A. de Saavedra, *Carolinas.*  
 S. 1529. A. de Saavedra, *Marshall.*  
 G. 1531. Guillaume le Testu, *Australia.*  
 V. 1543. Villalobos, *Carolinas, Pelew.*  
 Md. 1567. Mendana, *Elites, Solomon, Sanduich.*  
 Md. 1595. Mendana, *Marquesas, Sta. Orus.*  
 Q. 1596. Queiroz, *Low Islands, Fohaofo, New Hebrides.*  
 T. 1606. Torres, *Torres Straits, Louisiades.*  
 L. M. 1616. Lemaire, *Niuefa, New Ireland.*  
 H. 1616. Hartog, *Endrachtland.*  
 E. 1619. Edel, *Edeliland.*  
 L. 1622. Lecuwins, *Leeuwinsland.*  
 N. 1627. Nuyts, *Nuytsland.*  
 W. 1628. Witte, *Witland.*  
 T. 1642. Tasman, *Tasmania, New Zealand.*

T. 1643. Tasman, *Tonga, Fiji, New Britain.*  
 T. 1644. Tasman, *Tasmania-d, Carpentaria.*  
 D. 1699. Dampier, *New Guinea.*  
 B. 1765. Byron, *Gilbert Islands.*  
 Wa. 1767. Wallis, *Tohiti.*  
 Ca. 1767. Carteret, *Pitcairn, Carteret, Low Islands.*  
 Bo. 1763. Bougainville, *Samoa, Solomon.*  
 C. 1769. Cook, *Austral Islands.*  
 C. 1770. Cook, *New Zealand, Australia.*  
 C. 1773. Cook, *Hervey Islands.*  
 C. 1774. Cook, *Savage Islands, New Caledonia.*  
 La. 1777. Lapérouse, *Sawaii.*  
 Br. 1791. Broughton, *Chatham Island.*  
 Ba. 1796. Bass, *Bass's Strait.*  
 Ha. 1810. Hazelburg, *Macquarie.*  
 Wk. 1811. Walker, *Campbell.*  
 D. U. 1827. Dumont D'Urville, *Fiji.*

by all previous circumnavigators. He was thus the first to make the circuit of the globe from west to east, according to the rotation round its axis. This event took place over two hundred and fifty years after Magellan's circumnavigation from east to west, following the regular course of the trade winds.

Cook's third expedition was directed towards the northern waters, where he penetrated through the strait separating the two continents of Asia and America. He then rediscovered the Sandwich Islands, where he was first received

as a god, but soon after murdered under circumstances that have never been satisfactorily explained.

Cook's researches had the effect of once for all exploding the theoretic fancy that on the surface of the globe the dry land should occupy exactly the same space as the oceanic basins. Since the time of Hipparchus the most eminent geographers accepted as an established dogma the perfect equilibrium between land and water; and it was under the influence of this idea that Ptolemy had traced across the southern part of the Indian Ocean a continental coastline connecting Africa with India. This shadowy seaboard, continually receding from the eager eye of navigators, was successively identified by them with New Guinea, New Holland, and New Zealand; and later, every island sighted in more southern latitudes was supposed to be some headland of the long-sought-for continent.

Cook, who himself firmly believed in the existence of this Austral world, placed its shores far to the south of the waters reached by his predecessors; but in any case we now know that the Antarctic continent, or insular group, must be of slight extent compared with the boundless waste of circumpolar waters. When at last convinced of the absence of continental lands in the regions traversed by Cook, his companion Forster advanced the hypothesis that nature had readjusted the equilibrium between the two hemispheres of the planetary orb by depositing on the bed of the Antarctic Ocean rocky masses of greater density than elsewhere.

#### EXPLORATION OF THE ANTARCTIC WATERS.

Although in the pride of his immense triumphs, Cook placed limits to the genius of man, declaring that no future navigator would penetrate farther southwards, his record has already been beaten, and since his time the known surface of the ocean has been enlarged in the direction of the South Pole. The lands discovered in some places are sufficiently contiguous to each other to be regarded as very probably forming a continuous seaboard. They would thus collectively constitute one of the largest islands on the surface of the globe.

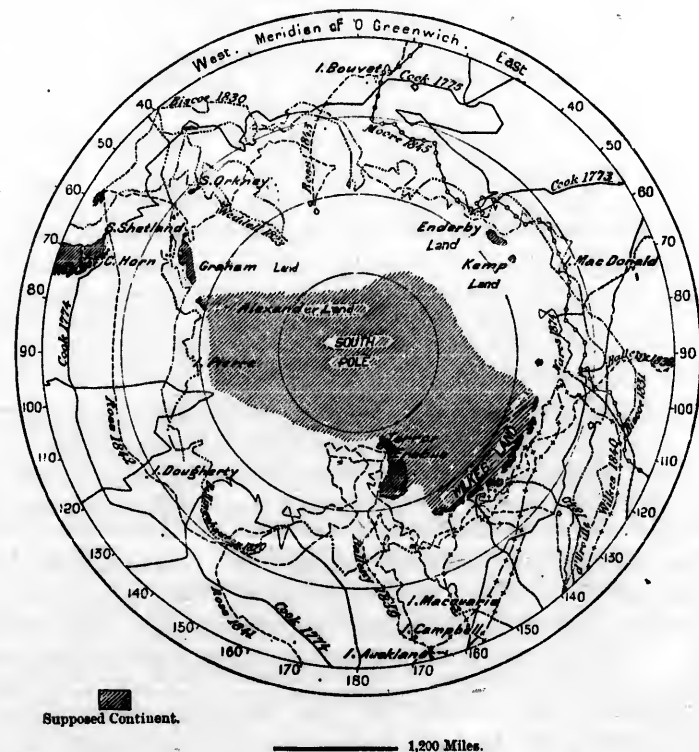
The most extensive mass of dry land in the Antarctic Zone occurs to the south of Australia. In 1839, Balleny had already discovered an archipelago of volcanoes in the immediate neighbourhood of the polar circle. According to his estimate the insular cone of Young Island, which is completely snowclad, would appear to attain an elevation of at least 12,000 feet. Another much lower island was seen to eject two columns of vapour. But the valleys and ravines between the peaks are everywhere filled with ice or glaciers, so that the bare rock is visible only where the action of the waves has revealed the black lavas of the cliffs and headlands surmounted by a covering of white snow. No creeks occur, nor even any strand, except here and there a narrow beach strewn with ashes and shingly scorice. Sailing to the west of this archipelago, mainly about the sixty-fifth degree south latitude, Balleny thought he sighted land in two places, and even gave the name of Sabrina Land to some high ground dimly seen from a distance.

The following year the French navigator, Dumont d'Urville, and the American

Wilkes, were attracted to these waters in the hope of here fixing the exact position of the south magnetic pole. They again visited the seas explored by Balleny, and both unhesitatingly asserted that they sighted true land, and not merely continuous bands of floating ice. D'Urville gave the name of Adelia to the rugged coast from 3,000 to 4,000 feet high, which he observed to the south and followed westwards across some ten degrees of the meridian, without, however, landing at any point. Farther west Wilkes also sighted land in four places, and

Fig. 6.-- EXPLORATIONS IN THE SOUTH POLAR WATERS.

Scale 1 : 100,000,000.



all the elevated ground, whether scattered islands or continuous land, has received the general designation of Wilkes Land.

Nevertheless James Ross, who followed a different track, threw some doubts on the reports of the three navigators who had followed each other in this oceanic region. Nothing, in fact, is more deceptive than the hazy horizons of these southern waters, where the rays of a low sun are refracted on the ice, and where the most practised eye is needed to distinguish between a real rocky crag and a "crystalline mountain detached from some distant glacier." Except at one point,



where he came close to the black rocks of a line of cliffs, Wilkes kept everywhere at a distance of about twelve miles from the ice-fringed land, which appeared to be everywhere covered with hoar-frost. East of the Balleny Islands, he also reported a mountain mass on the very spot where James Ross, sailing in an open sea, afterwards failed to touch the bottom with a sounding-line 1,000 fathoms long.

But whatever view be taken of the true character of Wilkes Land, it is certain that east of the Balleny Archipelago the sea extends much farther southwards. James Ross explored these waters in 1841 and 1842, each time penetrating nearer to the South Pole than any previous or subsequent navigator. In 1842, the expedition specially equipped for piercing the ice floes reached  $78^{\circ} 9' 30''$ , which, however, is still over 800 miles in a bee-line from the South Pole, or nearly 400 miles short of the corresponding point reached in the Arctic Zone. During his first voyage, Ross followed southwards the east coast of a region which he named Victoria Land, and which is lined by imposing mountains such as the glittering ice-capped peak of Sabrina (10,000 feet), and the still loftier Melbourne, rising to an altitude of considerably over 13,000 feet.

At the point where the expedition was compelled to turn back, there towered above the ice-bound waters the twin volcanoes of Erebus (12,000 feet) and Terror (11,000 feet), the former of which emitted volumes of smoke, murky during the day and ruddy at night. The navigators, who had succeeded in getting ashore at two places on this Austral continent, were prevented from landing near the volcanoes by a wall of ice nearly 350 feet high, which formed the escarpment of a vast plain at least 300 miles broad.

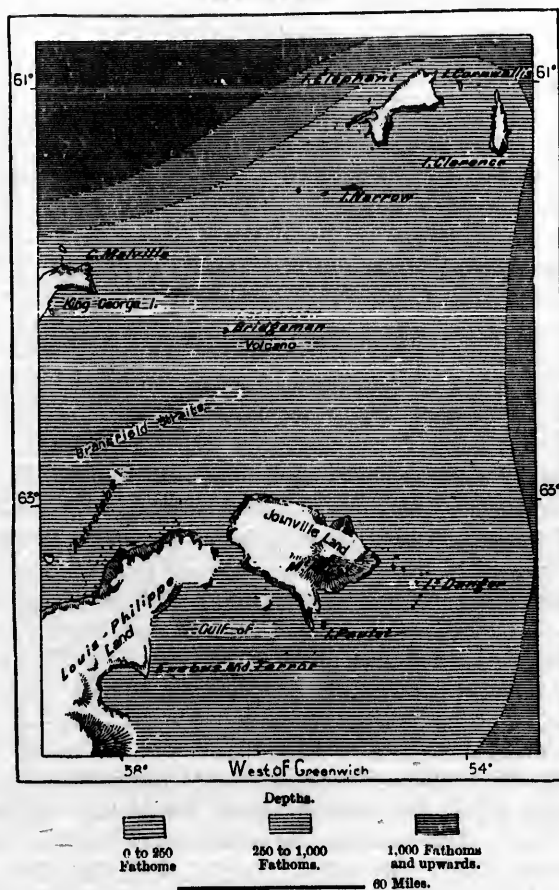
East of Victoria Land the expeditions of Cook and Bellingshausen have revealed the existence of no Antarctic mainland south of the East Pacific waters, or of any land at all, except a doubtful islet reported by Cook, and by him named Stone Island. But in the region south of America, facing Cape Horn and the neighbouring archipelagoes, the islands or perhaps the coasts of a great Antarctic land have been seen at several points in the neighbourhood of the polar circle. Here Bellingshausen discovered Alexander Land, which is probably continuous with the hilly coast of Graham's Land observed by Biscoe in 1832, and more carefully indicated by Dallman in 1874. Then to the north-east of this elevated ground stretch parallel chains of numerous islands, comprising Louis-Philippe and de Joinville Lands, discovered by Dumont d'Urville, the Shetland Isles and Southern Orkneys, already sighted by the English and American whalers, and perhaps even by the Dutch vessel *Van Geeritz* in 1598. All these are mountainous masses encircled by deep waters where the sounding-line records hundreds of fathoms within a few cable-lengths of the shore.

But immediately to the east of these archipelagoes, Captain Weddell, in command of a whaler, forced a passage in 1823 through the floating ice and entered a perfectly open sea, where he penetrated southwards beyond the seventy-fourth degree of latitude. This is the southernmost point yet reached in the waters stretching south of the Atlantic. Farther east—that is, in the direction of Wilkes Land—the only dry land yet seen are the coasts of Enderby and Kemp, extending

to the south of the polar circle. Biscoe, who discovered Enderby in 1831, in vain attempted to land on the island, being everywhere prevented by the masses of ice at a distance of 18 or 20 miles from the shore. Nevertheless, a whaler subsequently succeeded in reaching this point. The Victoria and Louis-Philippe mountains, which of all the Antarctic regions advance farthest northwards, are situated, the

Fig. 7.—NORTHERN PROMONTORY OF THE ANTARCTIC MAINLAND.

Scale 1 : 3,900,000.



former over against New Zealand, the latter opposite the southern extremity of America. Thus mountain ranges and volcanic chains face each other on either side of the Antarctic waters.

Since the voyages of Ross—that is to say, for nearly half a century—no scientific expedition has penetrated beyond the polar circle. In 1874 the *Challenger* approached without crossing it. It is surprising that in these days of daring

enterprise the serious prosecution of the work of exploration should have been suspended for so many years, more especially as research has been greatly facilitated by the progress of maritime enterprise and the thousand resources offered by modern appliances. Hence it is with a certain feeling of shame that geographers have to record the enormous gaps still occurring along the line of antarctic navigation, and well may ask for volunteers to resume the work of Cook, Ross, d'Urville and other illustrious navigators. At one time it was hoped that the next expedition might have been fitted out in Australia, which lies nearest to the south polar lands, and whose inhabitants are most interested in investigating the meteorological and glacial phenomena of those frigid regions. Between the southernmost point of Tasmania and the coast of Wilkes Land the distance is not more than 1,600 miles. But a scheme advocated in 1888 came to nothing owing to the parsimony of the British Government, which refused to grant the modest sum of £5,000 required to meet the preliminary expenses. The question, however, has now been taken up by the Germans, and there are some prospects that the influence of Dr. Neumayer may induce the Reichstag to grant a sufficient sum to defray the expenses of a German antarctic expedition.

#### BATHYMETRIC RESEARCHES.

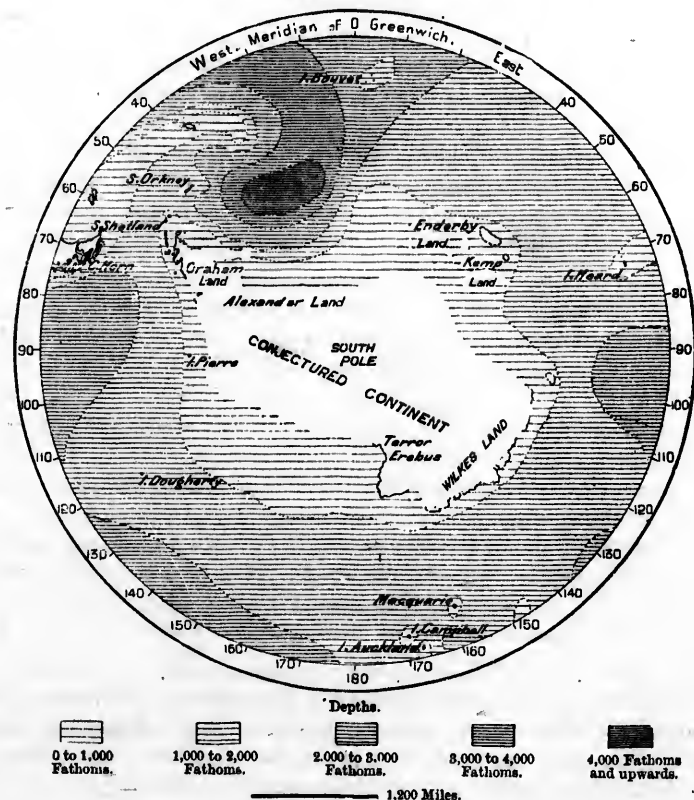
In the part of the ocean whose surface has already been surveyed, the exploration of its depths has long been begun, and the density of the marine waters may even be said to be ascertained, at least in a general way. The Indian Ocean presents as a whole a tolerably regular bed, with a somewhat uniform depth of over 2,000 fathoms. As revealed by the soundings of the *Challenger* and other more recent expeditions, the submarine escarpments of the continent and large islands enclosing this basin on three sides fall rapidly down to the oceanic abysses, so that almost everywhere a depth of 1,000 fathoms occurs within 120 miles of the coasts. Towards 40° south latitude a body of equal depth floods the sill which forms the southern limit of the Indian Ocean, properly so called.

Within this normal bathymetric curve of 1,000 fathoms, which is disposed nearly parallel with the continental seaboard, the line of 2,000 fathoms describes a large number of sinuosities, at least to the west and north round about Madagascar, the Mascarenes, the Seychelles, and the Laccadives. The Chagos archipelago also rises in the midst of abysses flooded by from 2,000 to 2,500 fathoms of water. The mean for the whole Indian Ocean is estimated by John Murray at about 2,100 fathoms, or 450 more than Otto Krümmel's calculation.

The greatest cavities hitherto revealed by the sounding line in this basin occur in the regions lying between the north-west coast of Australia and the islands of Java and Sumatra. Here the vessels engaged in laying the submarine cable have recorded depths of from 2,600 to 2,800 fathoms, and to this abyss Krümmel proposes to give the name of the "Lemurian Depression." It is a remarkable fact that the deepest chasms in the Indian Ocean have been found at relatively short distances

from the shore, and in the vicinity of the most active volcanic area in the Sunda Islands. Along nearly the whole coastline of the Antarctic lands south of the Indian and Pacific Oceans the waters appear to be much shallower, judging at least from the results of the few soundings that have hitherto been taken. It would almost seem as if the greater cavities had been gradually filled in by the ice-borne débris from the austral regions. Nevertheless, an enormous abyss does apparently occur under the Antarctic polar circle to the south-east of the Southern

Fig. 8.—DEPTHS OF THE AUSTRAL SEAS.  
Scale 1 : 100,000,000.



Orknoys, where James Ross failed to touch the bottom with a sounding line over 4,200 fathoms long. This solitary record, however, will have to be verified by fresh observations.

Compared with the Indian Ocean, which is destitute of islands in its more central parts, the Pacific, everywhere studded with archipelagoes, presents an extremely irregular bed. In many places occur elevated submarine banks, which would be transformed to islands or peninsulas were the sea-level to be lowered a

few hundred fathoms. The three great Indonesian islands of Sumatra, Java, and Borneo, together with the Malay peninsula, all rest on a vast flooded plateau, where the water is scarcely anywhere more than forty fathoms deep. The two great oceanic basins are here separated by a sill some 900 miles broad. Australia and New Guinea may in the same way be regarded as forming upheaved portions of a common submarine bank, which also comprises Tasmania in the south, and in the north several insular groups contiguous to Papuasia.

But the two regions of the Eastern Archipelago and Australia are separated by a trough over 500 fathoms deep skirting the east side of Timor, while depths of over 2,000 fathoms have been recorded to the south of Ceram.

In the Pacific properly so called most of the archipelagoes with their dependent chains of reefs also rest on elevated banks, which like that of Central America are nearly all disposed in the direction from north-west to south-east. In the vast semicircle of continental lands sweeping round from the Cape of Good Hope to Cape Horn, the archipelagoes of the Pacific would thus appear to be the scattered fragments of a circle resting eastwards on the American seaboard. The disposition of those outer and inner curves may be compared to that of many large breached craters, within which have been developed regular craters of smaller dimensions.

The deep cavities limited on either side by the elevated banks have received from the English and American explorers names which recall either the vessels employed in the hydrographic surveys of the South Seas, or else the naturalists who have laboured with the greatest zeal in these bathymetric operations. Thus the circular cavity to the west of Tasmania over 2,000 fathoms deep has been named "Jeffrey's Trough." Here the line recorded at one spot a depth of no less than 2,600 fathoms. On the east side of Tasmania in the direction of New Zealand occurs another chasm of larger size and equal depth (Thomson's), which is continued in the north towards Queensland by that of Patterson, thirty or forty fathoms deeper. Those of the *Gazelle*, running parallel with the general axis of the oceanic islands, that is, in the direction from the north-west to south-east, are somewhat shallower, nowhere exceeding 2,300 fathoms. At their western extremity they are connected with those of Carpenter, which begin at Torres Strait and Papuasia, and terminate between New Caledonia and the New Hebrides. At the deepest point the plummet here recorded 2,630 fathoms, or about three miles, and an equal depth occurs in the Nares pit to the north of New Guinea and New Britain. The cavities are still deeper towards the east, where those of Hildgard and Miller have 3,080 and 3,305 fathoms respectively.

North of the Carolines the Pacific waters are far less obstructed by insular groups, and, as might have been expected, are proportionately deeper than those of Polynesia properly so called. The cavities named from the *Challenger*, to which we are indebted for so many important researches in oceanic physiography, offer the enormous depth of 4,575 fathoms between the Carolines and the Marianne group, while farther east in the direction of the Marshall Islands other chasms have disclosed depths of considerably over 3,000 fathoms. Lastly, the whole of the North Pacific region between Japan and California presents a vast elliptical

trough encircling a shallower central area, whose axis is formed by the Sandwich Islands and the reefs continuing them towards the north-west. The pits named from Wyman (3,300), east of Hawaii, as well as those of Belknap (3,100) and Ammen (3,094), south and west of the same group, belong to this circular depression, which farther west towards Japan takes the name of the *scarora*, the American ship which here revealed the greatest depth yet recorded in any oceanic basin. This chasm of 4,650 fathoms, sinking nearly as low as the highest mountain rises above sea-level, is situated about 240 miles to the east of the southern extremity of the Kurile Archipelago.

As in the Indian Ocean, the greatest depths would thus seem to occur also in the Pacific in the neighbourhood of igneous areas, that is, along the line of active volcanoes which curves round from Japan to the peninsula of Alaska. These chains of burning mountains may thus be said to represent the true coastline of the North Pacific basin. Beyond them the waters are comparatively very shallow, except in one part of the Bering Sea, where depths of 500 and even 1,000 fathoms have been recorded. The projecting mainlands of North-east Asia and North-west America rest on a common submarine base, which approaches very near to the surface. In Bering Strait itself the mean depth is little over 20 fathoms, and nowhere exceeds 30 fathoms. Between these shallows, here scarcely separating the two continents, and the profound abysses of the North Pacific the transition is very sudden. At some point the soundings have revealed precipitous inclines which would be regarded as steep slopes even in Continental Alpine regions.

Except in the neighbourhood of California the Eastern Pacific waters have been less carefully surveyed than the Australasian seas. The whole space, some 12,000,000 square miles in extent, comprised between the Polynesian archipelagoes and the American seaboard from Mexico to Chili, was still unsounded before the expedition of the Italian vessel, the *Vettor Pisani*, in 1885. Now, however, we possess a series of thirteen soundings between the coast of New Grenada and the Sandwich Islands, where 3,140 fathoms was the greatest depth recorded by this expedition. Allowing for the irregularity of the intervals between these soundings, the mean depth of the marine bed in this part of the East Pacific Ocean would appear to be about 2,300 fathoms. Before the *Vettor Pisani* expedition the velocity of the waves caused by great seaquakes was the only available means for determining the depth of the waters in this section of the oceanic basin.

The specimens brought to the surface during the various exploring expeditions present on the whole a remarkable uniformity. In the vicinity of the land, and especially about the great fluvial estuaries, the mud and clays of the marine bed are formed by deposits of terrestrial origin mingled with fragments of shells and corals. Farther seaward, in depths ranging from 500 to 1,500 fathoms, the sedimentary matter consists of triturated shells and the calcareous remains of animalculæ. The mud dredged in these waters contains from ninety to ninety-five per cent. of carbonate of lime. But according as the depths increase this proportion diminishes, and in abysses of 2,000 to 2,500 fathoms the prevailing formation is

everywhere a clay formed of foraminifera, radiolaria, diatoms, and other remains of minute organisms mixed with particles of pumice and various decomposed products of volcanic origin. Neither gravel nor the bare rock has anywhere been discovered on the deep bed of the Indian Ocean.

The slight proportion of carbonate of lime in clays lying at great depths is due to the carbonic acid present in the water. The countless calcareous organisms falling as dust from the upper marine waters become completely dissolved before reaching the bottom. But sharks' teeth and the skeletons of cetaceans occur abundantly in the argillaceous deposits, from which the remains of extinct and living animals are often fished up together. Nodules of iron of cosmic origin are also found interspersed in the same clays.

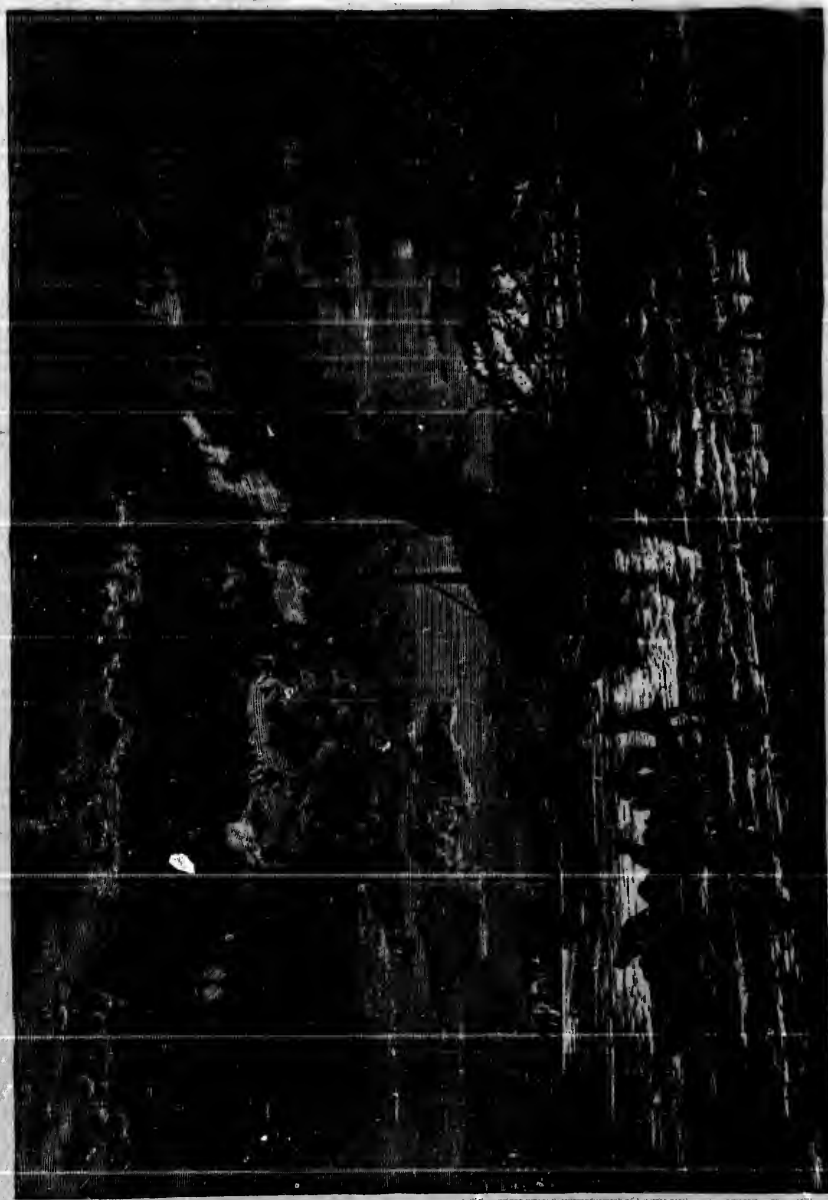
#### ATMOSPHERIC CURRENTS.

As attested by the very name of "Pacific," given to the great ocean by its first discoverers, storms are less frequent in this basin than in the Atlantic, at least in the tropical latitudes with low tides. This is due to the vast uniform surface presented by an immense extent of the South Sea far from the neighbourhood of continental seabords, which owing to the great differences in their reliefs give rise to abrupt changes in the climate and the course of the winds. The waters are usually the least ruffled and navigation safest in the Eastern Pacific regions, where vessels sail for thousands of miles without meeting a single island. Here also the trade winds blow with the greatest uniformity. Those from the north-east prevail with great constancy in the tropical zone some 7,000 miles broad comprised between the Revilla-Gigedo and the Marianne groups. The south-eastern trades have a less extensive range of about 3,000 miles between the Galapagos and the Marquesas.

But the course of the atmospheric currents is interrupted and frequently turned backwards by the thousand independent centres of attraction formed by the insular groups, some mountainous, others scarcely rising above the surface, which are scattered over the West Pacific equatorial waters. The normal trades are here often replaced by the alternating winds, which follow in the track of the sun. During the winter of the southern hemisphere the south-east trades are most regular; but in summer their ascendancy is contested by northern and north-eastern breezes. Frequently also dead calms set in, while occasionally the conflicting currents give rise to cyclonic movements.

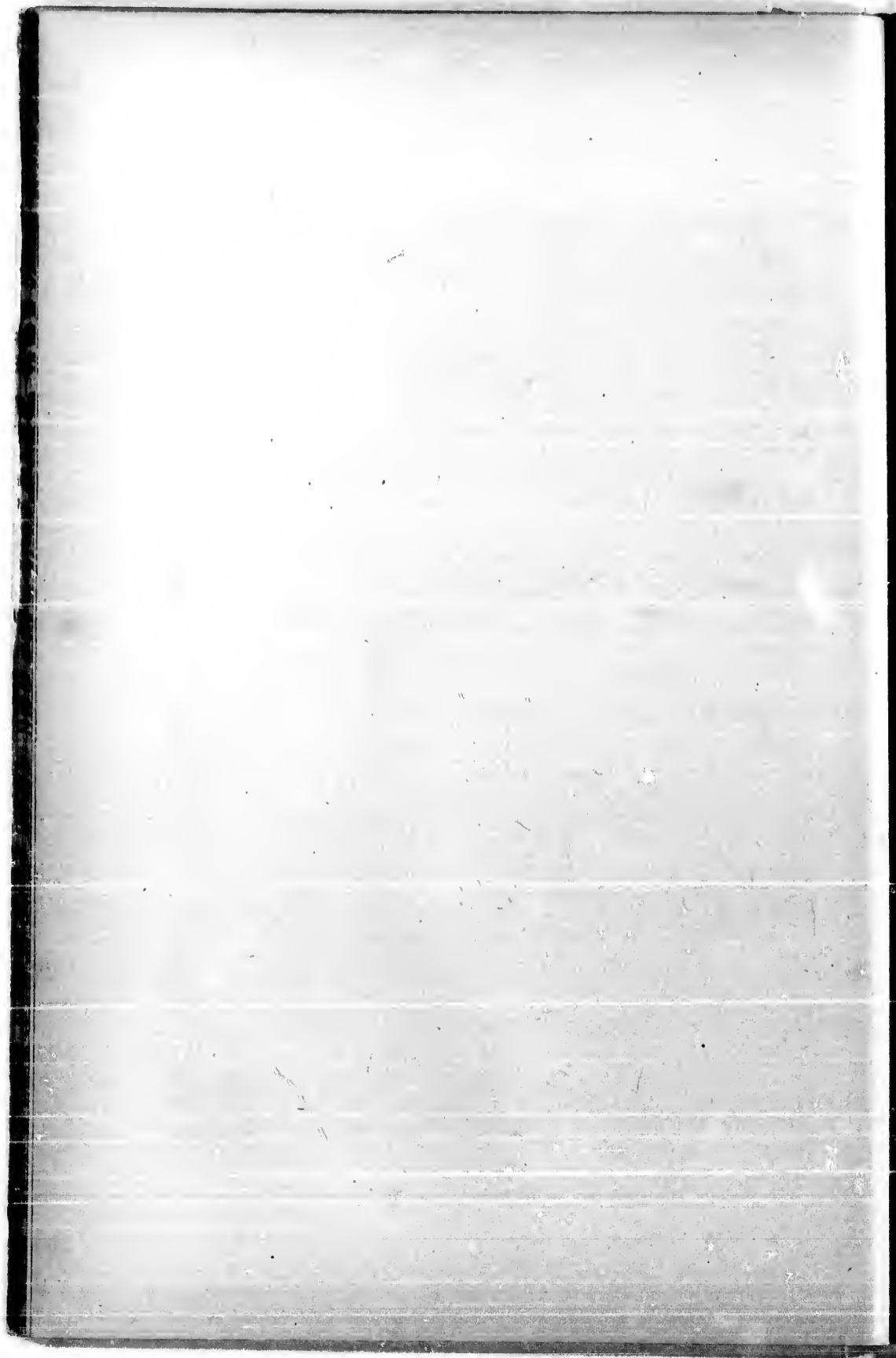
A remarkably mild temperature usually prevails in the oceanic archipelagoes, surrounded by waters which are subject to less vicissitudes of heat and cold even than the atmosphere itself. Between the hottest and coldest month on either side of the equator within the tropics the mean temperature of 72° to 77° F. has an extreme range limited to from four to eight degrees. Nevertheless, the oscillations for the whole year range from twenty-eight to thirty-six degrees according to the position of the insular groups.

The rainfall also shows discrepancies of as much as tenfold and upwards, accord-



PORT MORESBY, SOUTH COAST OF NEW GUINEA.





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ing as the slopes of the islands are exposed to the moist or dry winds. Thus while certain valleys enjoy a copious and even an excessive annual supply of moisture, certain low-lying islands in the neighbourhood of the equator receive scarcely a single shower except at long intervals.

West and south-west of the Polynesian islands properly so called, the vicinity of the great insular masses, such as New Guinea, Australia, Celebes, and Borneo, attracts the aerial currents more powerfully in the hot seasons than at other times. Hence are developed here, not merely gentle breezes, as in Eastern Oceania, but regular monsoons of longer or shorter duration, according to the diverse conditions of the environment, the extent of dry land, the altitude of the highlands, the superficial area of spaces destitute of vegetation. In these regions the south-east trades prevail during the winter season of the southern hemisphere; but in summer the normal currents set from the west or north-west, and are usually accompanied by moisture-bearing clouds and heavy downpours. Thus the normal meteorological system is regulated by two uniformly alternating currents setting in contrary directions, and of essentially different character, one bringing fair the other foul weather. Nevertheless, the endless intricacies of creeks, bays, inlets, straits, and channels cause numerous irregularities and local breezes, by which the whole system is in many places greatly modified.

On the very verge of the range of the monsoons the atmospheric currents are deflected from their regular path. The waters of Torres Strait between New Guinea and Australia, obstructed by innumerable shoals and reefs, and averaging not more than some 10 or 12 fathoms in depth, are heated by the tropical suns to a much higher degree than the deep oceanic basins to the east and west. The consequence is a considerable increase of temperature in the circumambient atmosphere, which thus becomes a focus of attraction for all the surrounding currents. The north-east trades veer round so as to set directly up the strait, where they blow with great violence during the winter months. On the other hand, the summer monsoons, which prevail especially in December, January, and February, cease to set in the direction of the south-east and are deflected towards the strait about Port-Moresby, thus depriving the York peninsula of its due share of moisture.

In the centre of the labyrinth of islands between New Guinea and Borneo the aerial system is so disturbed by the various modifying conditions of the environment, that it is not always possible to determine with certainty the true character of the current, whether a trade-wind or a monsoon, or to decide to which should be attributed the moisture-bearing clouds. Here the annual rainfall is generally very copious, in some islands, such as Sumatra, exceeding 160 inches. The average temperature ( $78^{\circ}$  to  $82^{\circ}$  F., according to the aspect of the seaboard) is also higher than in the South Sea Islands; it is also more uniform, varying not more than four or five degrees between the hottest and coldest months. The yearly range is, in fact, less than the daily variation between the morning and afternoon. Owing to this equable regime the Eastern Archipelago has been called the "hothouse" of the great terrestrial botanical garden.

West of Borneo and the Philippines the meteorological conditions are again modified by the differences in the outlines and elevations of the great insular masses. Here mariners no longer speak of trade winds, and recognise the monsoons alone. That of the south-west, sweeping over the Sunda Strait and Sumatra, prevails somewhat regularly from the middle of April to the middle of October, in the more open waters stretching away to Formosa. But it is occasionally interrupted by the south-eastern winds, and on the insular and continental seaboard its course is fringed by lateral breezes, eddies, and back-currents, which enable sailing craft to beat up against the monsoon.

This south-west wind which prevails in summer is followed in winter by the north-east monsoon, which is in fact the normal polar current. Like the south-west monsoon it blows throughout half the year, although most intensely in December and January. Both seasons are accompanied by rains, as well as by sudden gales and storms. But the terrific cyclonic movements of the China Sea, here known as typhoons, that is, *tai fung*, or "great winds," occur chiefly during the south-west monsoon in June or July, or close towards the September equinox when the normal annual currents are reversed. These fierce whirlwinds, which are generally developed in the east, move with spiral action in the direction of the west or north-west. They are usually more intense in the vicinity of the land than on the high seas, and fall off rapidly towards the south. Hence the typhoons rarely extend their range towards the equatorial regions in the waters stretching south of Luçon, largest of the Philippine Islands.

Beyond the Sunda Archipelago, that is, in the open space presented by the Indian Ocean as far as the Mascarenes and Madagascar, the winds are less influenced by insular or continental seaboard, and consequently here acquire a far more regular course. The zone of the south-east trades, which occupies the section of the ocean comprised between Australia, Madagascar, and the equator, is uniformly displaced northwards and southwards according to the alternation of the seasons themselves. Thus it is shifted to the north of the equator with the movement of the sun towards the northern hemisphere, while at other times its range seldom extends much beyond the 5° of south latitude.

But round about the central part of the ocean, dominated by the regular system of the south-east trades, there stretches the vast semicircle of lands between South Africa and Australia, which are fringed by a zone of alternating monsoons setting landwards during the hot and seawards during the cold season. In no region of the globe have the monsoons a more regular course than in the northern section of the Indian Ocean between Somaliland and Sumatra. The south-west monsoon with its escort of thunderstorms and rains prevails from the middle of April to the middle of September throughout the Arabian Sea and the Bay of Bengal. It is followed by that of the north-east, that is, the polar current, which lasts from the middle of October to the middle of March. But in the southern hemisphere the atmospheric system is less regular on the coasts of Australia, Madagascar, and the African mainland; nor is the contrast between land and water so sharply marked in this region. Here also, as in the China Sea, the clash

of the conflicting winds at times gives rise to tremendous hurricanes, especially at the change of the monsoons and during the summer heats. These disturbances are most disastrous in the neighbourhood of the Mascarenhas, although they also occasionally spread havoc over the waters of the Gulf of Aden and the Bay of Bengal.

On their outer borders in the direction of the poles the region of the trade winds is skirted by zones of variable currents, the mean result of which generally takes the direction from west to east. Being enclosed towards the north, the Indian Ocean has naturally one only of these zones comprised mainly between  $28^{\circ}$  and  $60^{\circ}$  south latitude. But the Pacific, as well as the Atlantic, has its two systems of variable winds, one in the northern the other in the southern hemisphere, the latter merging westwards in that of the Indian Ocean, eastwards in that of the Atlantic, and thus completing the circuit of the globe. The discovery of these oceanic regions dominated by the western currents, that is by the counter trade winds, has been of paramount importance in the history of maritime research. Guided by his knowledge of the Atlantic winds, Urdañeta was thus enabled to direct vessels across the Pacific towards the shores of the New World, while by following the corresponding zone of variable winds in the southern hemisphere Cook successfully accomplished the circumnavigation of the planet in the contrary direction to that followed by Magellan.

#### MARINE CURRENTS.

The movement of the marine corresponds to that of the aerial currents in the great oceanic basin, but the former, belonging to a more stable element, are naturally of a more constant character than the latter. They represent, so to say, the fly-wheel of the great terrestrial mechanism. Hence the rythmical displacements of the waters across the boundless oceanic spaces have been of even greater moment than those of the atmosphere in the history of human progress. If the trades and counter-trades have enabled European navigators the more easily to traverse the ocean between the Old and the New World, and thus hastened the work of exploration amongst the oceanic islands and austral lands, to the marine currents was largely due the dispersion of mankind and gradual peopling of half the globe.

The prominent feature in the vast system of oceanic movements is the great stream which in the equatorial seas sets in the same direction as the apparent course of the sun between the shores of the New World and those of New Guinea and the Philippines. The liquid volume which thus trends from east to west has a mean breadth of probably over 3,000 miles, for it is occasionally observed ranging from  $26^{\circ}$  south to  $24^{\circ}$  north latitude, but with a reflux or a zone of calm waters in its central parts. The whole body of equatorial seas moves with a velocity varying from 20 to 40 miles a day according to the seasons and the surroundings, and to a depth which certainly exceeds 750 fathoms in the axis of the stream. And this prodigious moving mass traverses nearly one-half of the

circumference of the planet. Compared with such an oceanic current all the rivers flowing from the continental regions seawards sink into insignificance. The discharge is at least 70,000 millions of cubic feet per second.

This vast central current, main branch of the system of secondary streams developed in the rest of the ocean, gives rise to two great lateral backwaters, one in the North Pacific, the other in the Southern Ocean. Taking the same course as the monsoons of the Caroline Archipelago, the waters of the equatorial stream are deflected towards the north-west in the direction of Japan; then on approaching the Chinese seaboard they follow the coast towards the north-east, and under the name of Kuro-Sivo, or "Black Stream," expand into a vast curve across the North Pacific. Although gradually losing the character of a current in the strict sense of the term, it sets slowly along the coasts of British North America, the United States, and Lower California, ultimately rejoining the equatorial current.

To this great stream in the northern corresponds another in the southern hemisphere. South of the equatorial seas a liquid mass passing east and west of New Zealand turns south to the lateral waters, and by a curve symmetrical with that of the Kuro-Sivo merges west of Chili in a littoral current, which skirts the American coast till it becomes again absorbed in the equatorial stream. An analogous movement takes place in the Indian Ocean, where the waters of the hot zone also set slowly in the direction of the west. At Madagascar they ramify into two branches, which flow southwards, and in the Antarctic regions form a junction with a return current, which after coasting the West Australian seaboard rejoin the equatorial waters.

But although analogous in their main features these three great movements present many striking differences in their details, according as they are affected by the course of the winds, the depths of the seas, the form and disposition of the neighbouring lands. In many places the more sluggish waters quicken their speed, and in the very heart of the sea is thus developed a sort of river, whose water is distinguished from that on either side both by its colour and velocity. The friction against its liquid banks causes it to oscillate in short waves like those of a fluvial rapid, while the conflict of waters of varying temperature gives rise to fogs spreading over vast spaces. Such phenomena are observed chiefly about the Kuro-Sivo of Japan and its eastern extension across the North Pacific.

Each counter current has also its lateral streams, which penetrate into the straits and inlets, as well as its tributaries of cold water flowing from the polar seas. An incessant interchange goes on between the tepid floods of the equatorial regions and those of low temperature coming from the frigid zone. These polar waters move bodily in the direction of the equator, in order to replace the losses caused by evaporation under the tropical latitudes. According to the course of the winds, the form of the marine bed and of the seaboards, this collective displacement becomes decomposed in secondary and more rapid streams, some of which flow by the side of those setting in the contrary direction from the equator, while others passing underneath them continue their course at lower depths.

At first sight it might be supposed that all the polar streams, being colder and

consequently relatively denser than the equatorial, should in all cases plunge beneath the more tepid waters with which they come in contact. But some, being less saline, owing either to their slighter evaporation or to their mingling with the fresh water of the melting icebergs, are in fact lighter than the surrounding warmer masses, and consequently rise to the surface. Naturalists engaged in exploring the oceanic depths endeavour to detect the course of these superimposed currents setting in opposite directions by ascertaining the temperature at certain intervals along the line of soundings. This is one of the most delicate of marine operations, the full significance of the recorded phenomena being itself at times very difficult to appreciate. But by carefully comparing the results of observations taken in different places they are able gradually to arrive at trustworthy conclusions.

The normal sequence of temperatures from the surface to the bottom has already been determined. The upper layer being in contact with the atmosphere, its temperature coincides with that of the local isothermals, while the deeper waters are scarcely above freezing-point, the intermediate spaces showing a regular transition between the two extremes. All anomalies in this gradual transition, all abrupt changes are assumed to indicate the presence of disturbing currents. Thus in the austral seas, between  $34^{\circ}$  and  $66^{\circ}$  south latitude, the gradation of temperature is modified by the neighbourhood of floating ice. At from 500 to 1,100 feet below the surface a cold layer intervenes between the upper strata heated by the summer suns and the lower waters whose temperature decreases normally downwards. This cold layer, which oscillates about the freezing point, is evidently due to the melting of the enormous icebergs always present in these latitudes.

Of the special cold currents either setting from the poles or rising from the lower depths, the most remarkable for its influence on the climate of the coastlands is the stream named from Humboldt, and known also as the Peruvian Current, which skirts the western shores of South America, and which is from  $20^{\circ}$  to  $22^{\circ}$  F. colder than the neighbouring waters. The North American seaboard is also washed by a frigid stream, which flows southward to the equatorial seas. A small part of this stream may perhaps in Bering Strait intersect a branch of the tepid water setting towards the Arctic Ocean; but the great mass of the cold water trending southwards comes from the Alaska seas and other inlets of the North Pacific.

The marine waters are thus being everywhere constantly displaced, and in this way the southern floods with their corresponding flora and fauna are carried northwards, while the regions of the torrid zone are tempered by contact with the polar currents. The climates of the two different zones blend in a new climate, thanks to the intermingling streams, or else flow side by side in opposite directions, since to every displacement corresponds an opposite movement. Even the great equatorial stream has its counter-stream, which answers to the atmospheric zone of calms, and which, especially from June to October, sets in the direction from west to east, that is, from New Guinea to Equador. It is precisely in the axis of the equatorial stream, and especially south of the line, that this

general backward movement of the oceanic waters makes itself felt. It has an estimated mean breadth of three hundred miles; but it follows a somewhat irregular course, and in many places merges in lateral backwaters.

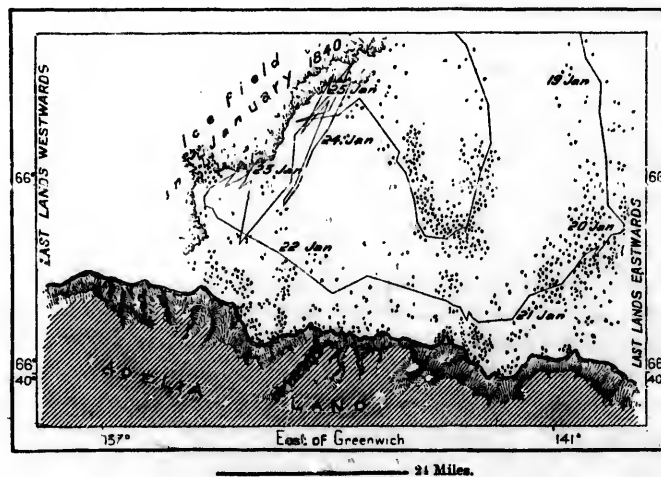
The Indian Ocean has also its counter equatorial stream skirting the north side of the current which sets towards the west. Students of historical migrations attach the greatest importance to these parallel currents flowing in opposite directions, and thus facilitating the movement of peoples from continent to continent.

#### DRIFT ICE—ICEBERGS AND FLOES.

Round about the Antarctic ice-cap the approach to the islands and mainland is obstructed by continuous streams of drift ice and floes, which are constantly drifting

Fig. 9.—ICE FIELD TRACED BY DUMONT D'URVILLE.

Scale 1 : 1,330,000.



about, in one place grouped together in the form of gulfs or marine inlets, in another disposed like projecting headlands, elsewhere developing long narrow passages into which navigators cannot venture to penetrate without extreme caution. Ranging in height from 10 to 14 feet, but here and there interspersed with irregular groups or "bunches," resembling erratic boulders, these masses no longer present an insurmountable obstacle to mariners provided with the powerful appliances of modern mechanics, and with vessels specially constructed to resist the impact or pressure of floating ice.

Beyond these shifting barriers stretch comparatively open spaces which are occupied only by great icebergs, either isolated or accompanied by a *cortège* of lesser blocks. Explorers who have penetrated into these Antarctic seas about the polar circle, or even beyond 70° south latitude, have observed that these icebergs

drifting northwards with the current differ both in their form and origin. Some, which break away from steep upland valleys, present a great diversity of outline and appearance. According to the lines of fracture or the tilt of the glaciers shooting them seawards, they rise above the surface in the form of domes, peaks, or needles. Others again, which are usually of vast size, take the shape of rectangular blocks with almost level upper surface. These are not of glacier origin, but have been detached from the icy barrier skirting the flat coastlands at varying distances. They do not melt even in summer. During the fine seasons of 1841, 1842, and 1843, Ross found that only on eighteen days the temperature rose three or four degrees above freezing point. Some were fringed with transparent stalactites, which this explorer was unable to explain, as he had never observed the ice melting.

As far as can be judged from the few observations hitherto made, the frozen masses, 160 to 180 feet high, are simply the land ice gradually impelled seawards by the pressure of the more or less inclined masses covering the interior of the continent. Owing to their specific gravity they project for distances of even 10 or 20 miles beyond the coastline, while still adhering to the rocky bed. In the neighbourhood of the barrier Ross found a depth of 250 fathoms, which is precisely the depth at which icebergs rising 180 or 200 feet above the surface must, so to say, "lose their footing," and float away freely. The weight of the icebergs being about nine-tenths of that of marine water, nine-tenths of their volume must necessarily remain submerged; but the mass being generally broader at the base than the summit, the depth of the submerged walls must be estimated at seven or eight times the height of the exposed cliffs.

Once detached from the continental sheet of ice by some rectilinear form of breakage, the huge flotsam sets out on its long journey towards the equatorial seas. Some of the blocks present a regular wall 5 or 6 miles long with arched openings at the base. They look almost like some street frontage gone adrift, at times sparkling in the sun, but more frequently wrapped in vapour, like some misty phantom of the brain. A nearer view reveals a frowning stronghold faced by mighty bastions; embattled ramparts or gloomy recesses where the angry waters disappear amid the flanking towers; overhanging cornices with snowy draperies pendent from the summit. The icy cliffs, standing out at a distance with even surface of uniform dull colour, are now resolved into an endless variety of tints and outlines. Throughout the whole thickness of the walls follow the parallel parting lines of the successive snowy layers crystallized by pressure and the weather, drawing continually closer with the superincumbent weight, here and there warped to serpentine curves or else fractured with sharp fissures. The prominent parts are of a dazzling whiteness, others shaded in blue, each slope, each crystal aperture the loveliest azure, and at night the floating mass is all aglow with an opal phosphorescence. It drifts slowly with the current, incessantly lashed by the waves breaking against it, as against some rocky shoal. The crews of passing vessels often hear the continuous thunder of the waters rushing through its cavernous recesses and dashing against the inner walls. Then the sustaining pillars at last give way, the arched vaults



break with a crash, and the scattered fragments of the crystalline mountains lose that tabular form which is so characteristic of the southern as compared with the northern icebergs. Gradually breaking into smaller pieces, the débris floats away in long convoys, where it is no longer possible to distinguish those of marine from those of glacier origin.

According to the quantity of the drifting ice and the velocity of the currents the fragments advance to a greater or lesser distance northwards, as a rule, however, seldom penetrating much beyond the  $55^{\circ}$  of south latitude. Yet they have not unfrequently been met much nearer the equator, especially to the west of New Zealand and in the South Atlantic, where they have been seen as far north as Tristão da Cunha, and off the Cape of Good Hope under the thirty-fourth parallel. On an average the austral advance 240 miles nearer to the equator than the northern icebergs. The largest observed by the *Challenger* was about 250 feet high; but Cook recorded one over 330 feet, while several fully one-third higher were measured by Wilkes. They range as a rule from 1,500 to 3,000 feet in breadth, yet none of those seen by the naturalists of the *Challenger* carried any fragments detached from the rocky mountain slopes, although such cases were frequently observed by Ross, Dumont d'Urville, and other explorers. A sketch by John MacNab, who accompanied Balleny's expedition of 1839, represents an iceberg bearing a black rock embedded between two crystal nippers. Another huge mass seen by Weddell was so covered with blackish clay that at a distance it would certainly have been taken for a cliff.

#### VOLCANIC AGENCIES.

Drift ice thus contributes in some measure to modify the form of the continents by transporting débris of all kinds to the islands scattered for thousands of miles over the ocean, or depositing them on the marine bed and in this way perhaps laying the foundation for future barrier reefs. But other agencies are also at work, in one place enlarging, in another diminishing the contours of the oceanic lands. The researches of naturalists have shown that during the course of long ages these agencies have accomplished considerable changes in the geography of the Pacific islands. In the work of modification the chief part has been played by the submarine igneous forces, and the coralline "island builders," which strew the seas with their marvellous structures.

Volcanoes are far more numerous and energetic in the Pacific basin and surrounding continental seaboard than on the opposite shores of the Old and New World washed by the Atlantic. The fires of Iceland, the Azores, the Canaries, the Cape Verd Islands and West Indies, pale before those which follow at intervals around the vast semicircle formed by the coasts of the mainlands sweeping round from Cape Horn to the Cape of Good Hope. The craters are reckoned by hundreds in this "fiery circle" some 20,000 miles in extent, which reaches from the northern island of New Zealand to the southern shores of Chili. Here the chain of burning mountains, occasionally interrupted by wide intervals, especially north of New

Zealand, comprises the active cones of the New Hebrides, the Santa-Cruz and Solomon groups, the chain of the Philippines, and of Japan, where Milne reckons 129, of which thirty-five are active, the Kurile Archipelago with sixteen, the Aleutian Islands with thirty-four, of which ten are active. Through the Alaskan peninsula the series is connected with those of the west coast of America, which are continued southwards to the Bridgeman and other cones and westwards to the New Shetland Islands. Here rises the breached crater of Deception Island with its circular haven 18 or 20 miles round and 500 feet deep, whose flanks consisting of alternate

Fig. 10.—VOLCANOES OF THE PACIFIC.

Scale 1 : 200,000,000.



strata of ice and ashes discharge rivulets of thermal waters. Lastly, this focus of activity is connected by the arc of a circle passing by the south pole with the three lofty cones of Erebus, Terror, and Melbourne, the first of which still casts a lurid light over the dreary waste of snow. Between these giants and New Zealand the vast circuit is completed by a succession of islands and headlands, partly at least composed of lavas.

Within the circuit itself occur the lines of faults, through which have been vomited mountains of scoræ or ashes, and most of these cones run in parallel lines

or are disposed in curves. The Mariannas, the Tonga and Samoan archipelagoes have all their volcanoes, and towards the centre of the circuit of North Pacific burning mountains rises the group of stupendous Hawaiian craters.

Beyond the circuit towards the Indian Ocean, a formidable igneous chain, beginning to the west of New Guinea, comprises a line of islands west of Timor, Flores, Sumbawa, Sombok, and Bali, together with Java with its forty-five cones, of which twenty-eight are still active. West of Java the volcanic chain no longer runs westwards, but is intersected at a sharp angle by another line of fracture traversing Sumatra with its sixty-seven cones, of which five are still active. On the opposite side of the Indian Ocean rise the insular cones of the Mascarenhas and Comoro group, while Madagascar itself is studded with hundreds of extinct craters. Others, such as those of St. Paul and Amsterdam, follow in the austral waters, here rising amid the surrounding ice floes.

New Zealand, the Sunda Islands, Japan, the Kuriles and Hawaii are amongst the regions that have been most profoundly modified by igneous agencies, at least during the historic period. But the most active centre on the surface of the globe is probably the Sunda Strait, which marks the precise spot where the two volcanic axes of Java and Sumatra intersect each other on the edge of the submarine bank separating the Sunda plateau from the deep abysses of the Indian Ocean. Here is situated the famous island of Krakatau, which lost two-thirds of its area during the eruption of 1883, when other islands rose to the surface, and the atmosphere became charged with volcanic dust wafted by the winds round the periphery of the globe.

#### CORALLINE FORMATIONS.—ATOLLS.

The changes caused by the coral builders, although accomplished at a much slower rate and without any sudden convulsion of nature, are none the less even more important than those due to igneous agency. In the Pacific alone Dana enumerates two hundred and ninety coralline islands, which with the inner lagoons cover a total area of no less than 20,000 square miles.\* If to these be added surfaces large enough to afford space for a village or clump of cocoanut palms, the islands and islets must be reckoned by many thousands which have been constructed by the polypi in the Indian and Pacific Oceans, and especially in the central and western parts of the South Sea. These organisms are unable to carry on their operations in waters whose winter temperature is less than 68° or 70° F. But the zone where they find the necessary thermal conditions offers on either side of the equator a variable breadth, in some places exceeding 3,500 miles.

Everywhere within these wide limits, living colonies are able to establish themselves on the shores and shallows flooded to depths of 130 to 150, and under certain conditions of from 300 to 320 feet. But they are unable to live in waters too highly charged with sedimentary or alluvial matter, and the barrier reefs are con-

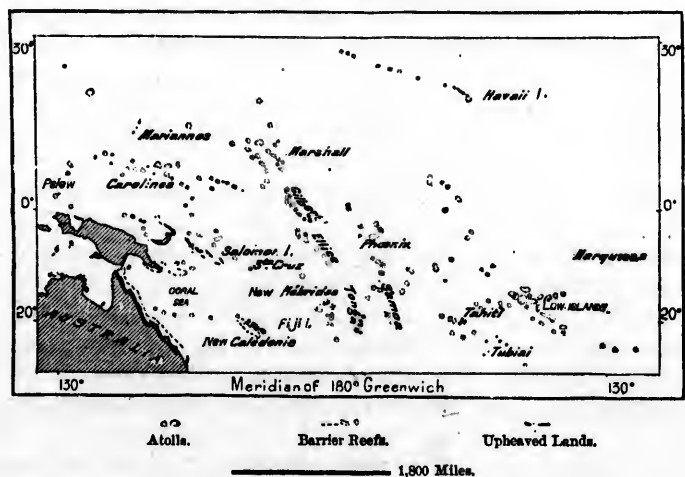
\* *United States Exploring Expedition*, vol. x.

sequently interrupted by large fluvial estuaries. Nor can they secure a footing on too rapidly shelving rocks. Hence certain coasts which we should expect to be formed of "living" coral are found to consist only of "dead" matter. The work is also hindered or arrested altogether in certain storm-tossed seas, where the deeper and colder waters are churned up and driven landwards. Thus may perhaps be explained the absence of corals along a great part of the arid and parched seaboard of Somaliland.

But apart from these few interruptions, the shores and islands of the equatorial zone are everywhere fringed or encircled by coral reefs. Besides the polypi, or true coral builders, of which there are numerous species, other organisms also secrete calcareous matter, and thus contribute towards the enlargement of the dry land. Account must also be taken of the seaweeds, algæ, nullipores, and the like,

Fig. 11.—ZONE OF THE CORALLINE ISLANDS.

Scale 1: 120,000,000.



some of which develop a solid crust on the rocky surfaces, like the lichens in northern latitudes, while others accumulate in thick deposits on the beach. Being thus gradually raised by the petrification of successive generations, the reefs continue to grow with the new life destined to disappear and become fossilised in its turn. This growth of the living rock proceeds as a rule at an extremely slow rate, not more than 38 or 40 inches in two hundred or three hundred years; but the field of operation is limited only by the boundless extent of the marine waters, and the yearly result consequently represents hundreds of millions of cubic yards added by all these zoophytes to the solid crust of the globe.

Even islands situated in an area of depression and slowly subsiding when compared with the surrounding sea-level may be fringed by a band of reefs growing at a more rapid rate, and thus gradually rising above the surface of the water. The

polypi flourish best as a rule on the outer rim of the reefs, where they are exposed to the fresh currents and wash of the tides, and here their buildings most rapidly rise to high-water level. Then their further growth above the surface and transformation to islands or continental seaboard is the work of storms. Huge blocks detached from the encircling reef are thrown together in rude heaps, and gradually consolidated by fresh additions. Then the dry surface is weathered and prepared for the reception of the seeds brought by wind and water. Here the sea-fowl build their nests, the germs strike root, grasses and shrubs spring up on the new land thus born of the tempest.

The form and appearance of the upheaved coral structures differ greatly according to the regions where they have been constructed. The least noteworthy are the barrier reefs which fringe the insular and continental shore lines, and which rest on a foundation of shelving rocks. But in many places the reefs are not in contact with the coasts around which they have grown up, but are developed at some distance seawards, leaving here and there a navigable passage, or at least a flooded channel between their inner edge and the mainland. Some of these formations extend for hundreds, and in the case of the Great Barrier Reef of Australia for over 1,000 miles along the coast. Others, such as the annular reef of New Caledonia, completely encircle the island, which remains as a central nucleus to the system. A slight upheaval would change to dry land the intermediate space between the island and the ring, thus doubling or trebling the extent of the raised surface.

Lastly, there are thousands of systems which have no central nucleus, and which consist of nothing but a perfect or fragmentary ring enclosing an inner lagoon either still communicating with or separated from the sea and gradually silting up with the accumulating sands and organic debris. Some of these lagoons have even been transformed to freshwater basins by the slow action of the rains. To all annular reefs has been extended the term *atoll* from those of the Maldivé Archipelago, the most regular and numerous group found in the whole ocean.

Every possible transitional form occurs between the barrier reef skirting the mainland and the perfectly circular atoll lashed on its outer rim by the stormy seas, and enclosing an inner lagoon of smooth water. Most of the forty thousand rocks and islets in the Maldivé Archipelago are so disposed as to form atolls within atolls, that is to say, each fragment of a ring is itself a ring.

The study of the coralline reefs led the illustrious Darwin to form some bold generalisations on the slow oscillations of the terrestrial crust. Finding that the barrier reefs and outer walls of the atolls rise in many places above deep waters, he concludes that these rocks were entirely built by the same polypi who are still piling up similar structures. But as they can work only in the surface waters where the ceaseless ebb and flow brings them the materials of their edifices, the great elevation of so many coralline rocks would seem to attest a gradual subsidence of the marine level. The first colonies began their operations within about 120 feet of the surface; but according as the structures rose the ground sank, and

so the reef continually subsiding at the base and rising at the summit, grew to a far greater thickness than 120 feet.

Thus was explained the formation of barrier reefs at great distances from the shore. At one time they fringed the coast, which slowly sank with the general movement of subsidence, while the reefs continued awash, thanks to the incessant labour of their coralline inhabitants. The mainland, which formerly served to support the superstructure, gradually sank deeper and deeper, thus continually retiring from the outer barrier of the steadily rising coral reefs. The passage also became gradually enlarged, and by the disappearance of the central nucleus itself the inner waters were at last transformed to a lagoon. Certain archipelagoes, such as the Low Islands, are compared by Dana to a vast cemetery, where every atoll marks the site of an engulfed land.

According to this theory it would therefore be easy to determine the character of the oscillating movements to which the oceanic islands are subjected. The reefs raised to great heights above the sea would thus indicate an area of upheaval, the fringing coralline rocks would imply a state of comparative stability on the seaboard, while the barriers and the atolls might be likened to floats placed on the sites of submerged lands. Most of the Pacific islands—that is to say, all those that follow from Pitcairn in the Low Archipelago to the Philippines along a line passing north of Tahiti and Samoa—would thus belong to a zone of depression, and these scattered groups might be regarded as fragments of a vanished continent, stretching across the south side of the North Pacific Ocean.

Such as Darwin's theory, which, however, can scarcely be applied with any probability to all the oceanic lands girdled by coral reefs. Wherever the rocky pedestals supporting the superstructures of living polypi themselves consist of calcareous secretions to any great depth, there can be no doubt that subsidence has really taken place. But verifications have hitherto been made only at a limited number of points, and in the absence of direct observations it would be rash to do more than regard subsidence as very probable wherever the outer walls of the coralline islands plunge rapidly—as, however, they rarely do—into abysmal depths. Thus near Enderbury, in the Phoenix Archipelago, the soundings reveal 1,800 fathoms within 3 miles of the shore, 900 fathoms at 1,400 yards from Danger Island, near Vanikoro, while one of the reefs at Tahiti indicates a seaward slope of 72 degrees.

On the other hand, observations made in the vicinity of certain coralline islands show that at the foot of an escarpment less than 200 feet high, there stretch vast platforms where fragments of volcanic origin have been found scattered amongst crumbling blocks of coral. In this case it is quite possible that eruptive cones eroded by the waves to a slight depth below the marine surface may have served as foundations for the coral-builders, or else that their structures have been raised on rocks entirely formed by other organisms working at considerable depths. But many protracted observations must still be made before the diverse coralline islands can be classified according to their origin and history. Several groups, such as the Low Archipelago, Fiji, the Pelew, Solomon, and Tonga islands, supposed by

Darwin to occupy a zone of subsidence, are on the contrary now known to belong to an area of upheaval

#### OCEANIC FLORA.

An oceanic basin covering over half of the planetary surface from Behring Strait to the Antarctic regions must naturally present every gradation of climate, and consequently also a great diversity of animal and vegetable life. In the neighbourhood of the continents the oceanic islands partake more or less of the adjacent floras and faunas. Nevertheless the Eastern Archipelago is the only insular group which can be regarded as forming part of the Old World from the standpoint of its natural history. The Indian flora, scarcely arrested by the intervening shallow waters, continued to advance from island to island towards the south-east. In this insular region it has even developed a marvellous wealth of forms, rivalled only in some few privileged districts of the neighbouring mainland.

Thanks to the periodical return of the monsoons, the currents and counter-currents, the Indian flora has also spread to the clusters of small equatorial groups, some of which contain an extremely limited number of endemic plants. On the surprising resemblance presented by the native vegetation of remote islands certain naturalists base a strong argument in favour of a former vast expansion of oceanic lands, which are at present broken into a thousand scattered fragments.

But while widely separated lands offer a great analogy in their plant life, others again lying in close proximity often present the most startling contrasts. Thus Madagascar possesses an independent flora, and in this respect is by no means an African island, as might be supposed from its geographical position. More than half of the local species hitherto discovered are absolutely indigenous. The volcanic Mascarenhas group also possess such a large number of peculiar forms, that these islands may be regarded as so many distinct botanical stations.

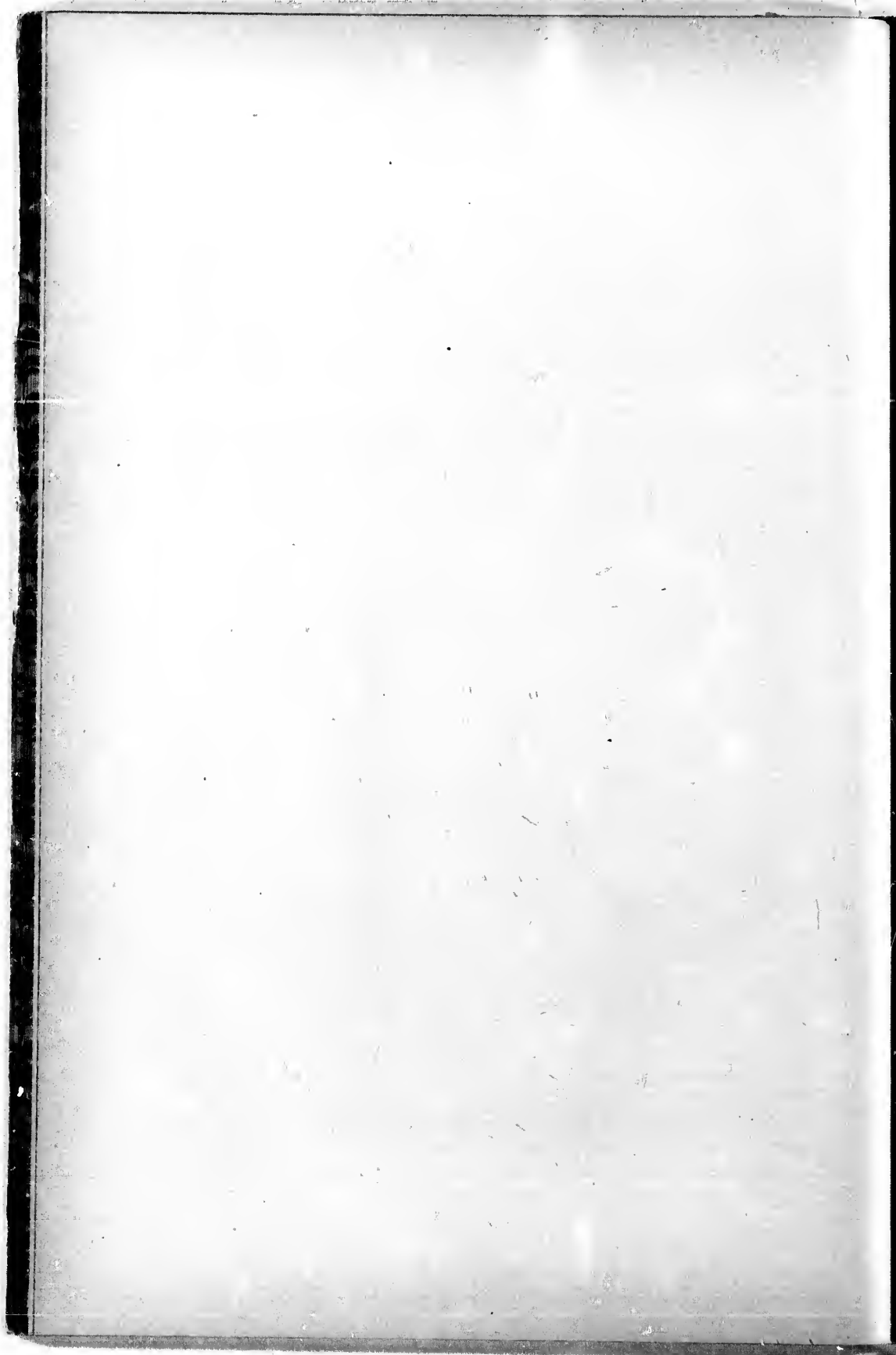
In the Pacific Ocean the Hawaiian Archipelago also constitutes a separate vegetable zone; of all tropical insular groups it possesses the relatively largest number of endemic plants. In the Galapagos group also more than half of the species are of local origin. Although this archipelago lies near the American mainland, and is exposed to the direct influence of the equatorial current setting from the coast of Ecuador, each of its six islands to some extent even constitutes a special centre. Thickets of plants belonging to a single genus and growing on analogous soils are nevertheless formed of different species in the different members of this remarkable group.

The flora of the Australian continent is one of the most characteristic on the globe, although its northern and north-western shores approach close to the islands forming part of the Indian vegetable zone. The contrast is very marked between York peninsula in north Australia and the south coast of New Guinea, yet the shallow intervening strait is studded with islands, by which plants might with apparent ease have migrated to and fro. Nor is Australia altogether destitute of species of Indian origin, for in the forests of the north-western regions no less



LOUIS-PHILIPPE LAND, ANTARCTIC OCEAN.





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than a hundred different trees are found which have come from the Asiatic continent. But the typical forms are the same throughout the whole of Australia, where the vegetation everywhere presents a great uniformity of aspect. In the woodlands the prevailing types are those of the eucalyptus, acacias, casuarinas, and trees with slightly developed foliage or leaves pointing vertically downwards. The open steppes are overgrown chiefly with diverse kinds of scrub and brushwood.

The Australian indigenous flora is extremely rich in forms, in this respect yielding only to that of the Cape regions. New Caledonia, although lying 800 miles from the coast of Queensland, offers in its vegetation a surprising resemblance to that of Australia; yet the distance is too great to assume any considerable interchange of species. On the other hand the New Hebrides, lying immediately to the east and north-east of New Caledonia, are connected with the Indian zone by their luxuriant tropical flora.

Norfolk Island, also in the East Australian seas, is distinguished by its endemic vegetation, which includes one of the finest species of araucaria, a palm, some thistles and tree-ferns. It forms a transition between Australia and New Zealand, which differ altogether in the character of their respective floras. According to Grisebach, that of New Zealand shows more affinity with the Araucanian of South America than with that of the neighbouring continent. Its evergreen woodlands are the richest in the world in tree-ferns, and consequently give a better idea than any others of the aspect of nature in the geological epochs when the great cryptogamous plants prevailed. But on the whole this flora is comparatively poor, which is doubtless due to the isolated position of the archipelago in the South Sea. Notwithstanding its proximity to the Chilian seaboard, the island of Juan-Fernandez is connected with the New Zealand zone through the high proportion of its tree-ferns.

The impoverished floras of the oceanic islands south of the forty-fifth degree of latitude scarcely deserve mention when compared with those of the corresponding latitudes in the northern hemisphere. Although lying as far from the south as do Havre and Cherbourg from the north pole, Kerguelen Island possesses only eighteen flowering plants, or about five times less than Spitzbergen. This poverty is due partly to its arid soil and isolated position, partly also perhaps to the extreme uniformity of the annual climate and to the deficient sunlight in those foggy Austral regions. The lands lying nearer the antarctic snows still possess a few stunted growths, although passing navigators might suppose their rockbound shores absolutely destitute of vegetation. The first explorers who ventured into the antarctic seas speak with a sort of awe and horror of these dreary wastes, and endless succession of bare cliffs, sands, and snows with peaks lit up by watery sunbeams or wrapped in mists, according as the clouds gathered or were dispersed by the boisterous winds. "Cursed lands!" they exclaimed, "abode of everlasting gloom!"

## OCEANIC FAUNA.

The oceanic world has also its special faunas, although their distribution presents the greatest contrast, according to the direction of the atmospheric and marine currents, the greater or less isolation and accessibility of the insular groups. The seabirds of strong wing and keen vision, who sweep over the waters for hundreds of miles at a stretch, have a very wide range, limited north and south only by the climatic conditions. They accomplish long migrations as easily as the fish, and are able to spread from island to island, like the plants whose germs resist for months the action of the marine water. But apart from these aquatic fowl, who dominate the aerial spaces, most of the local animals are confined to their respective insular domains, their migration from one region to another being mainly due to the conscious or unwilling intervention of man, or else to the facilities occasionally presented by geological changes in the distribution of land and water. In no other way does it seem possible to explain the existence of species common to many remote islands as well as to these lands and the neighbouring continents. On the other hand, forms peculiar to a single island or archipelago must be regarded as of strictly local origin or development. However they may have reached their present habitation, here their evolution into distinct forms has been accomplished. But such characteristic types are chiefly confined to the lower members of the animal kingdom.

Madagascar, which almost ranks as a continent in virtue of its peculiar flora, is no less original in its fauna, which with one or two exceptions appears to be almost entirely local. The Mascarenhas also constitute an independent centre, which till recently comprised some birds badly equipped for the vital struggle, and consequently destined soon to disappear after the arrival of man.

Notwithstanding its proximity to the Indian and Indo-Chinese peninsulas, the Eastern Archipelago cannot be regarded as a simple zoological dependency of the mainland. On the contrary, it appears to be itself the centre of dispersion for numerous forms, the Malay peninsula and Indo-China having apparently received from the archipelago as many immigrants as they have sent thither. If the elephant, rhinoceros, and tiger have reached Sumatra from the continent, Borneo, or at least the region of which this island is a fragment, has given in exchange the orang-utan and several other peculiar insular forms. So rich is Malaysia in large mammals that this region should be regarded as still forming part of the Asiatic world.

The parting line between the Malaysian and Australian zoological zones passes to the east of Celebes, which island forms a little centre of its own, very distinct in many respects from all its neighbours.

Australia, the home of the marsupials, presents in its fauna, as in its flora, a character of antiquity which has led some geologists to regard it as one of those regions whose surfaces have never been re-moulded or seriously modified by natural agencies. Nevertheless, comparatively recent Tertiary formations are now known to occupy a large extent of the continent. The marsupials, unknown in the

Old World except in the Indo-Chinese lands, which in this respect may be considered a dependency of Australasia, are here represented by no less than thirteen genera and over a hundred species. On the other hand, there is a total absence of apes, pachyderms, and ruminants, while the carnivora, rodents, and edentata are far from numerous.

In its lower fauna Australia is no less original, its birds and lizards being quite distinct from those of the Asiatic continent. New Zealand also forms a separate zone, which has long been destitute of any characteristic mammals except a rat, and perhaps one species of otter. On the other hand, it possessed two remarkable families of birds, the apteryx and dinornis, which, like the dodo of Mauritius, have perished since the arrival of man. New Zealand had no less than fifteen species of these birds, which belong to the ostrich family.

Farther east the Polynesian islands are completely destitute of mammals, beyond some small species of bats and rodents. Reptiles are also rare; while birds, thanks to their power of flight and natation, have been distributed in considerable numbers throughout the archipelagoes. In the same way man himself, passing in his light outriggers beyond the straits and broader marine channels, has gradually colonised nearly all the islands of Polynesia.

#### INHABITANTS OF THE OCEANIC REGIONS.

Before the arrival of the Europeans, the oceanic islanders had already established communication with each other, and long migrations had taken place, in one direction towards Madagascar, in the other towards the remote eastern islands of the Pacific. The populations of diverse origin occupying the Eastern Archipelago, who are connected either by affinity or by commercial relations with the people of South-east Asia, have long played the part of agents in promoting the intercourse that has been maintained from one extremity of the ocean to the other. The natives of Madagascar are at least partly related to the Malays of the Eastern Archipelago, who have gradually spread their domain from island to island eastwards, everywhere intermingling with the aborigines, or else colonising unoccupied lands. Nearly all the idioms spoken throughout this vast domain, from Madagascar to Easter Island, from the African to the American waters, are regarded as more or less closely related members of the one great Malayo-Polynesian linguistic family. Nevertheless the extreme branches of this widespread family present profound differences, while from the connection must be altogether excluded all the Australian and extinct Tasmanian languages, and many also current amongst the Papuan and Negrito inhabitants of New Guinea, the Philippines, the Andaman, Nicobar, and a few other groups.

But while their common speech attests a general movement of migration throughout the whole extent of the Indian and Pacific Oceans, the marked contrast in their physical appearance indicates such a great diversity of origin, that many writers have grouped the oceanic populations in fundamentally distinct brown or dark races. But however this be, such physical differences between the inhabitants

of the various insular groups, or of uplands and lowlands, may be largely explained by the intermingling of the two streams of ethnical migration. While one great wave gradually advanced along the line of the equator between Africa and America, another stream set in the transverse direction, between the south-east extremity of Asia and the Australian continent. Like the marine currents themselves, these waves of human migration intermingled or intersected each other in their onward movement across the oceanic lands. To the stream which followed the direction of the equator was due the diffusion of a common form of speech, while the transverse current passing from hemisphere to hemisphere across the narrow marine gulfs and inlets brought from the Asiatic mainland the populations differing in appearance and usages, and gradually displaced the different cultures.

The various dark populations at present scattered over the oceanic islands originally followed the route of the Malay peninsula, possibly also that of lands now vanished or flooded by the shallow waters of the Java Sea. But the same highway was afterwards taken by the Malays and other kindred people, by whom the dark races were displaced, absorbed, or driven to remote islands and upland regions of difficult access. The Samangs and Sakais of the Malay peninsula, the Andamanese Islanders, the Negritos of the Philippines, the New Guinea Papuans, and the Australians, although for the most part greatly differing amongst themselves, are generally regarded as belonging originally to the same group as the black populations of India—Santhals, Gonds, Kohls, Mundahs, and others. But how profoundly the primitive type must have become modified in this wide area during the course of ages, when the emigrants advancing southwards dwelt under diverse climates, exposed to difficulties of diverse nature, compelled to modify their manner of life in a thousand ways, brought into friendly or hostile contact with distinct peoples, and intermingling in different proportions with all these new elements.

We are separated only by a period of two thousand years from the dawn of historic times in the Eastern Archipelago; yet this comparatively short period suffices to show the profound influence exercised on the southern maritime peoples by the civilisation introduced from Asia. At the beginning of this era the Hindus were the teachers of the populations of Java, Bali and Sumatra. Their influence is known to have even reached Borneo, and their far-reaching activity is well attested by numerous monuments, local names, writing systems, religious legends, and social usages. The Arabs who succeeded the Hindus, both as instructors and promoters of commercial intercourse, also commanded a large measure of success in this insular region, where many millions at present profess the Mohammedan religion, and where even Arabic family names are current from the Comoros to Borneo.

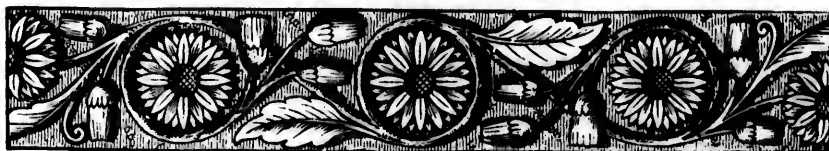
On the other hand, the action of the Chinese has been less direct and of more limited extent. They keep more aloof from the natives, and have never attempted any religious propaganda like the missionaries from India and Arabia; yet in several districts the Chinese constitute the substratum of the population. The race has been incessantly renewed by the constant stream of immigration maintained for many generations from the Celestial Empire.

At present the preponderating influence has passed to the peoples of Western Europe. All these lands inhabited by Malays, Negritos, Papuans, Maoris, and other Polynesians, belong politically to one or another European power, or are already regarded as coming within their legitimate sphere of action or that of the United States. Thus like Africa, the oceanic world is almost entirely parcelled out amongst the Western nations. Commanding a thousand marine highways, including that through the Isthmus of Suez created by themselves, these nations have far outstripped their Hindu, Arab, and Chinese forerunners in rapidity of action, material strength, and dominant civilising influences, while still increasing their hold of these regions at the very antipodes of the European world.

In this political, commercial, and ethnical expansion of the cultured peoples of the West, the foremost place belongs unquestionably to the Anglo-Saxon race, the British and American branches of which seem destined jointly to absorb the whole of the Pacific insular lands. The young but vigorous colonies of Australia and New Zealand may be said already to constitute an oceanic Britain, forming a sort of equilibrium with that of the Northern hemisphere, and serving as a sure foundation for the future spread of the English language, social and political institutions, throughout the Eastern seas, from Auckland Island to the Sandwich Archipelago, from Torres Strait to Easter Island.

The great ethnical divisions of the people occupying the oceanic region correspond in a general way with the geographical distribution of the insular groups themselves. *Madagascar* forms a little world of its own, where the Malay immigrants, and the aborigines of African descent have already been merged in a single nationality with absolute uniformity of speech. The *Eastern Archipelago* and the *Philippines* are mainly inhabited by the Malays, closely related to those of the Asiatic peninsula to which they give their name. But amongst them still survive isolated communities of different origin, dark and dwarfish peoples by many supposed to be of Dravidian or Kolarian stock. The Pelew, Marianne, Caroline, and Marshall groups stretching north of the equator and of the Melanesian lands, and to which the collective term *Micronesia* has been fittingly applied, offer a mixture of races constituting an ethnical transition between the Malays, the Papuans, and the natives of the smaller insular dependencies of Japan. Farther south the expression *Melanesia*, indicating the black complexion of the great bulk of the inhabitants, has been similarly applied to Papuaasia, or New Guinea, with the adjoining groups of New Britain, New Ireland, the Solomon Islands, New Caledonia, and the New Hebrides.

Till recently the *Australian* continent also belonged to an aboriginal dark race of homogeneous type, with scarcely a trace of Malay blood except here and there on the north and north-west coastlands. Lastly all the eastern islands, from Hawaii to New Zealand, constitute the watery domain of the large brown *Polynesian* race, which also preserves a remarkable uniformity of type, except in Fiji and a few other places, where it has been modified by intermixture with the aboriginal Melanesian element.



## CHAPTER II.

### THE MASCARENHAS.

#### RÉUNION—MAURITIUS—RODRIGUES.



THE term *Mascarenhas*, originally applied in 1513 by the Portuguese navigator, Pedro de Mascarenhas, to the single island of Réunion, has gradually been extended to the whole group, which although geologically distinct, presents great uniformity in its outlines, climate, productions, and history. Long united politically under the sovereignty of France, the different members of the archipelago still remain sister islands, at least in the homogeneous character of their white populations. After the conquest, however, Réunion alone was restored to France, England retaining possession of Mauritius, the most important if not the largest, together with its natural dependency, Rodrigues. They have jointly a superficial area of 1,600 square miles, and a population in 1888 of nearly 560,000. This gives a density of 350 to the square mile, although the hilly districts are mostly uninhabited.

The two chief islands, of nearly equal size and configuration, are irregular oval cones of volcanic origin rising from great depths to considerable elevations above the surface. Réunion, the larger and higher, has alone a still active crater; but in economic importance it is far surpassed by Mauritius, the north-eastern island, which has the advantage of a natural haven serving as a convenient harbour of refuge in those stormy waters. This port has consequently become the centre of an active export trade, and the headquarters of various industrial enterprises in Madagascar and other parts of the Indian Ocean.

Being exposed to the same regular south-east trade winds and land breezes, and equally well watered on the windward side, both islands are subject to the same climatic conditions. Thus the mean annual rainfall in Mauritius is about 150 inches, in Réunion 160 to 165 inches, while both are frequently devastated by the same destructive cyclones. These tremendous hurricanes, which are developed between 5° and 10° S. latitude, sweep over the Indian Ocean in an oblique direction towards the south-west. In the Mascarenhas waters, or farther west near Madagascar, they are deflected to the south and again to the south-east, thus taking the opposite direction to the regular trades. Although occurring at every season, they are rare

in winter, and most frequent between December and April, but especially to be dreaded in February, when the waters are churned up, giving to the seas the appearance of a boiling caldron. During the storm of February 26th, 1860, many vessels foundered, and cargoes to the value of £120,000 were swallowed up by the waves, while twenty-three thousand native huts were swept away by the still more terrific gale of 1868. Occasionally huge blocks of coral are torn from the reefs and borne by the raging waters far into the interior, looking as if hurled across the land by some tremendous submarine explosion.

## FLORA AND FAUNA.

Owing to their oceanic origin the Mascarenhas have an independent flora and fauna, differing not only from those of the Asiatic and African continents, but also from those of Madagascar and neighbouring islands. It is no longer possible to determine the exact nature of the local flora before the arrival of the first settlers, as since that time most of the forests have been cleared and cultivated plants introduced, while some three hundred wild species have supplanted the indigenous forms. Except the citron, Réunion appears to possess no fruit-tree peculiar to itself. Nevertheless botanists still enumerate over five hundred endemic plants in the Mascarenhas and Seychelles. Of the forms common to other regions, the Asiatic are more numerous than those of African origin. Of twenty-two varieties of the pandanus, these islands possess as many as twenty, and of these nine are peculiar to Mauritius, four to Réunion, three to the Seychelles, and two to Rodrigues. The large proportion of ferns and orchids imparts to the vegetation of the Mascarenhas a distinct place among insular floras.

Most naturalists admit that all the mammals at present found in the island—a Madagascar lemurian and centetes, a wild cat, a hare, some rats and mice—have been introduced by the colonists. Some lizards, snakes, and frogs also occur; while the land turtles, formerly so numerous that they "paved" the beach, have been exterminated by the fishermen. The deer, still met in Mauritius but extinct in Réunion, were introduced by the Portuguese, and efforts have recently been made to acclimatise the ostrich. Strange to say, the islet of Ronde, about 16 miles north of Mauritius, forms a separate biological kingdom, possessing one peculiar species of cabbage-palm, some lizards, two snakes, and relatively more monocotyledonous plants than any other region in the world.

These islands were formerly noted for their large wingless birds, such as the dodo and the aphanapterix, the "solitary" (*peizophaps solitaria*), the giant water-fowl larger than a man, a species of lori, as well as many others, the non-fossilised remains of which have recently been discovered by Clarke in Mauritius. But a few decades after the arrival of the Europeans all these helpless birds, apparently dating from the Miocene epoch, had already disappeared, falling an easy prey to the rats, dogs, cats, and pigs of the settlers. Quite recently the *alectorenas nitidissima*, a species of pigeon, has become extinct in Mauritius, just as the *alectorenas rodericana*, another variety of the same genus, had already died out in Rodrigues.



## INHABITANTS.

Like the Seychelles and neighbouring insular groups, the Mascarennas were completely uninhabited till the year 1616, when Pronis, governor of Fort Dauphin in Madagascar, transported twelve mutineers to Réunion. But these, as well as a few French and Malagasy who established themselves at St. Paul in 1655, soon disappeared; and the first permanent settlement, consisting of two Frenchmen and a few Negro slaves, was delayed to the year 1663. Living a free life in the midst of abundance, with no enemies to fight or governors to oppress them, the little settlement prospered, villages were founded in the midst of plantations, and trade was opened with the mother country. Then came the French East India Company, which monopolised the commerce of Bourbon (Réunion), while Cerné was seized by the Dutch and by them renamed Mauritius in 1598. But the Dutch settlement having been abandoned, Mauritius was occupied by the French of Bourbon in 1715. These early settlers, mostly from Normandy, Brittany, and Santonge, were the ancestors of most of the white populations which now inhabit the Mascarenhas and Seychelles to the number of about eighty thousand.

These islands of the Indian Ocean offer a remarkable instance of tropical lands where the European race has succeeded in establishing itself, although later intermixture makes it impossible now to determine the real proportion of whites amongst the present miscellaneous elements. But the French Creole families are known to be very fruitful, averaging about two hundred and fifty children to one thousand married women, or one-third more than in France.

But the Europeans, including some English since the occupation of Mauritius, Rodrigues, and the Seychelles by Great Britain, constitute only a minority of the present population, which comprises the descendants of Malagasy, Kafir, and other African slaves emancipated by the French Republic. This measure, however, was successfully resisted by the planters, and the blacks did not acquire their independence till about the middle of the present century. Although they are greatly inferior in number to the rest of the inhabitants, their French Creole jargon has become the common medium of intercourse for all—French, English, Chinese, Arabs, Malays, and Hindus.

The abolition of slavery obliged the planters to introduce coolies from China, Malaysia, India, and especially Malabar, the term "Malabar" being now commonly applied to all the Hindus of whatever origin. Every precaution was taken to protect the freedom of these coolies, but on most of the plantations the old treatment of the Negro slaves continued to be applied to the hirelings. The immigration of the Indians, now more numerous in Mauritius than all the other elements combined, has also been carried out in violation of the natural laws. Owing to the scarcity of women but few families could be established, and polyandria became the rule on the plantations. The few children of these households were greatly neglected, and the excessive infant mortality had to be compensated by continuous fresh importations from China and India. To the Chinese was due the introduction of leprosy, to the Hindus the so-called "Bombay fever," which in 1866-8

swept away seventy-two thousand souls, or one-fourth of the population of Mauritius. And although these epidemics have decreased, the general poverty is greater than ever, owing chiefly to the rapid growth of the population, in which the Hindus are steadily acquiring the predominance over all other sections of the community, in wealth and influence as well as in numbers.

## MAURITIUS.

Although forming a link in the great semicircular chain of islands, Mauritius appears never to have been connected with any other land, but to have been independently upheaved. Consisting entirely of basaltic rocks, it is probably older than Réunion, its coasts being much more indented, its hills more eroded, and its craters more obliterated. The great central mass is encircled by plains of reddish clay formerly clothed with dense forests, but now laid out in plantations and gardens and studded with villages. The central plateau is dominated by the Piton du Midi (2,000 feet), consisting exclusively of horizontally disposed columnar basalt, but exceeded in altitude by the Black River peak, culminating point of the island (2,730 feet). Above the picturesque hills in the northern district rises the remarkable obelisk-shaped Pieter Both (2,700 feet) surmounted by an enormous globular block, which adventurous climbers have occasionally scaled by means of ropes and ladders.

The periphery is encircled by fringing reefs and islets with here and there a few navigable channels giving access to the harbours. Cliffs of marine origin now rising above the surface, show that Mauritius has undergone a change of level since its first upheaval. La Ronde, La Plate, Le Coin de Mire, and other islets near the north coast are covered with refuse which attest the former existence of an active volcano in these waters.

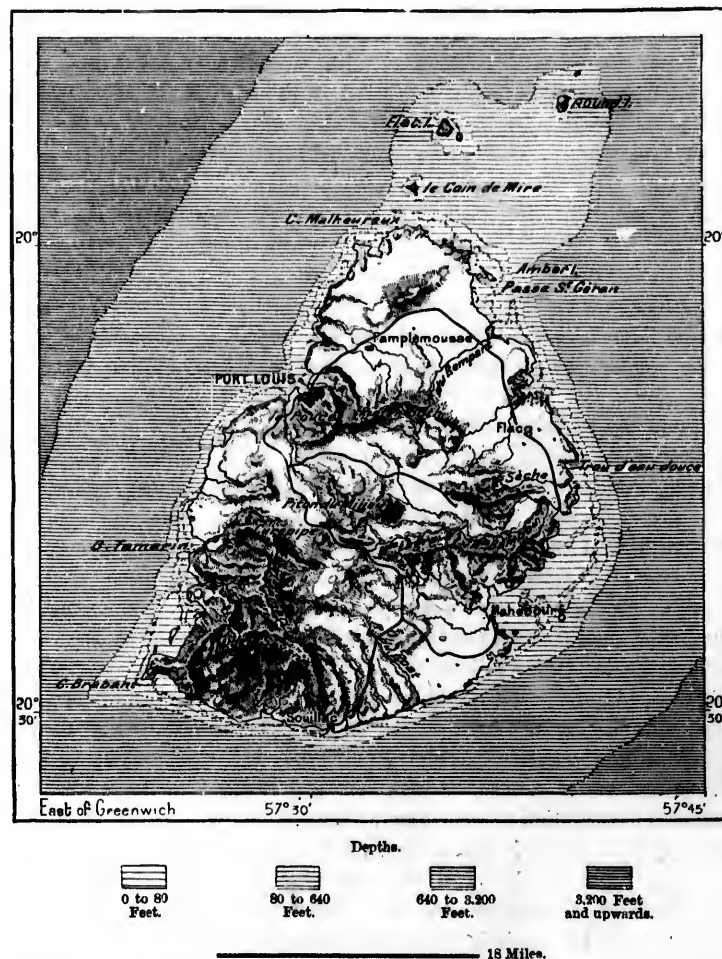
Mauritius has become almost completely disafforested, all the magnificent timber, matted together with a network of creepers, as described by Bernardin de Saint-Pierre, having entirely disappeared. These clearances have had the usual result of disturbing the discharge of the streams, which are alternately flooded and nearly dry watercourses. At the foot of the hills are also formed temporary meres, whose deadly exhalations are diffused far and wide. The droughts are longer, the rains more sudden, more copious and irregular, and extensive tracts formerly under cultivation are now barren wastes.

The only large town is the capital, *Port Louis*, on the east or leeward side, with a haven sheltered by coral reefs, and defended by forts and batteries. Founded by *Matié de la Bourdonnais* in 1735, to replace an older port on the south-east coast, *Port Louis* has gradually monopolised the whole trade of the island. But although presenting a pleasant aspect towards the sea, it lacks the splendour and elegance one would expect to find in one of the chief commercial centres in the Indian Ocean, with a population of over seventy thousand. Many of the suburbs, and even some of the busy quarters, being occupied by the Hindus and Malagasy, have a poverty-stricken and neglected appearance, while much of

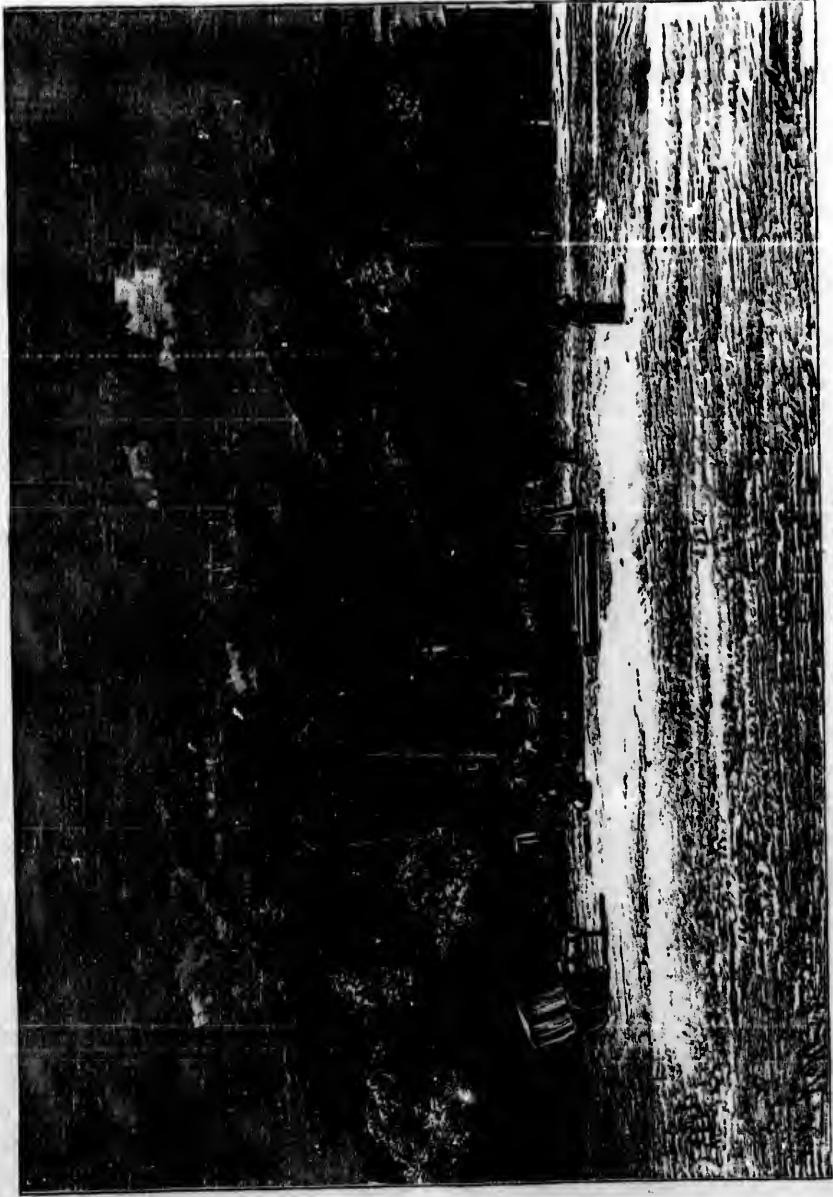
its former trade has been diverted elsewhere by the opening of the Suez Canal. Nevertheless, the exchanges still average considerably over £5,500,000 yearly; the port is always crowded with shipping, and connected by regular steam service with Europe through the Suez Canal, as well as with Madagascar and Réunion.

Fig. 12.—MAURITIUS.

Scale 1 : 750,000.



The staple produce and exports are sugar and rum, the island possessing over two hundred and fifty sugar mills, and forty distilleries, yielding on an average from fifty to eighty thousand tons of sugar, and five thousand gallons of rum, worth altogether from £160,000 to £200,000. Other articles of export are vanilla,



PORT LOUIS—STATUE OF BOURDONNAIS.

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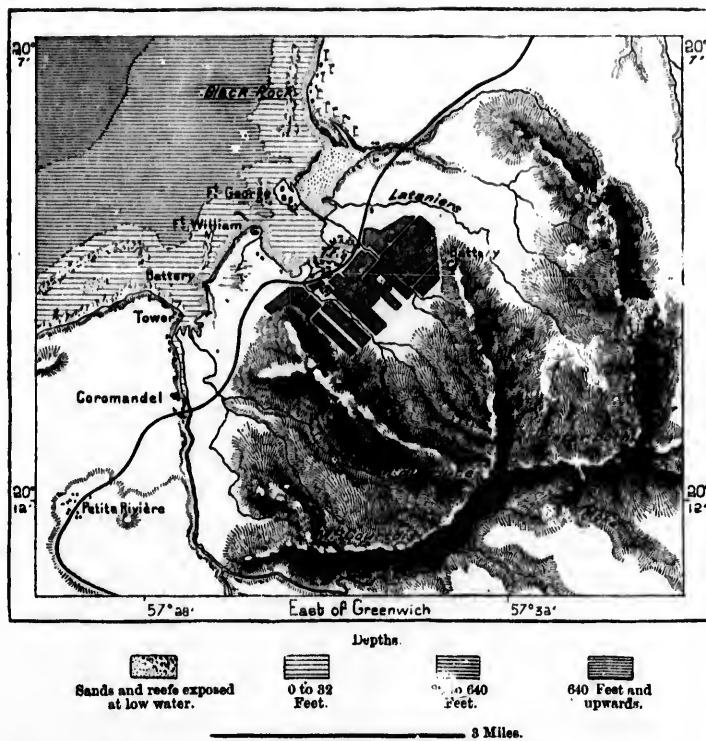
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aloe fibre, and coconut oil, the imports being European wares, rice from Bombay, maize and cattle from Madagascar.

The whole island is intersected by railways connecting the capital with the chief groups of plantations and residences of the wealthy classes. On the north-east line, six miles from the capital, lie the sugar works of *Pamplemousse*, and close by the famous garden, founded in 1768 by Poivre, for the cultivation of tropical plants. Here are some of the finest avenues in the world, and the place is still better

Fig. 13.—PORT LOUIS.

Scale 1 : 125,000.



known as the scene of Bernardin de Saint-Pierre's "Paul and Virginia." To the north-east lies the reef-fringed isle of Amber, where was wrecked the *Saint-Géran*, as related by this charming writer. Such also is the power of the popular imagination, that travellers are shown the very graves of the two lovers.

The railway running from Saint-Louis towards the south-east traverses the Wilhelm's Plains, where *Curepipe*, lying about the geometrical centre of the island and 1,800 feet above the sea, has become the chief health resort in Mauritius. The experimental tea plantation of this district contained in 1887 over twelve

thousand plants in good condition. The south-east line terminates on the east coast at *Mahebourg*, marking the site of one of the earliest Dutch settlements.

Mauritius is a crown colony, whose governor, as well as the five members of the executive council, is named by the Queen. According to the modified constitution of 1884-5, eight of the twenty-seven members of the legislative council are *ex-officio* members, nine are appointed by the governor, and ten elected by citizens enjoying a certain income. The defensive forces consisted in 1887 of four hundred and forty-three men, and half of the military expenditure is defrayed by the home Government. The legislation, partly French and partly English, is extremely complicated, affording ample scope for endless litigation, to the great benefit of the lawyers. Although there is no State religion, both the Catholic and Anglican Churches receive State aid, the latter out of proportion to its numbers. Grants are also given to a certain number of schools, which, however, are scarcely numerous enough to afford primary instruction to one-fourth of the children. Mauritius possesses several scientific and literary institutions, and a considerable number of periodicals, as many as six daily papers appearing in the capital. The revenue, although exceeding £700,000, scarcely covers the expenditure, and there is a public debt of over £800,000. The official currency is the Indian rupee of ten to the pound sterling, and the metrical system is obligatory since 1878.

With the exception of Sokotra, all the English islands in the Indian Ocean, including even the Chagos and other groups belonging geographically to India, depend administratively on Mauritius.

#### RÉUNION.

The largest of the Mascarenhas, officially designated as "Ile de la Réunion," but also still known by its old name of Bourbon, presents a smaller extent of arable land and is consequently less densely peopled than Mauritius. The surface consists chiefly of hills and steeply escarped plateaux, fringed by a narrow belt of plains and gently inclined slopes. Hence most of the central parts are nearly uninhabited, the population being confined mainly to a restricted zone of coastlands. But although it has preserved its romantic aspect, Réunion, like Mauritius, has lost its primeval woodlands, which formerly descended to the water's edge, and earned for the island the title of "Eden."

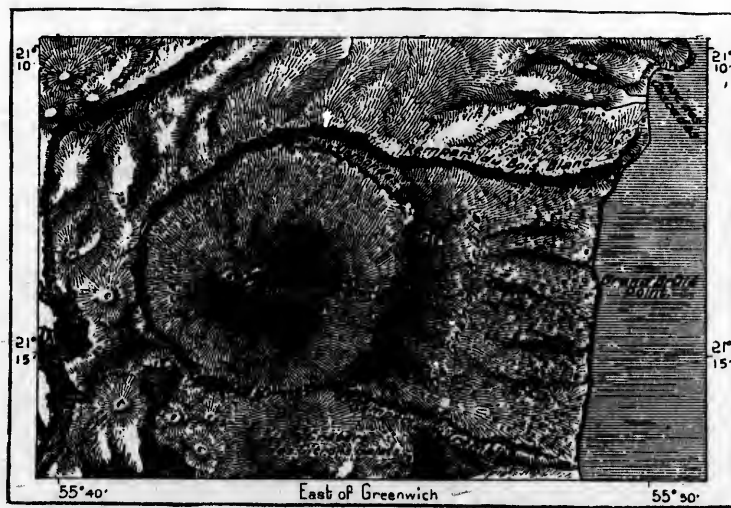
The main axis is disposed, not north-east and south-west like that of Mauritius, but north-west and south-east, and in this direction are disposed all the higher crests. At the entrance of the gorges occur a few narrow alluvial or shingly plains, but elsewhere the escarpments rise everywhere abruptly from the water's edge to the plateaux occupying the interior of the island. In the central parts, where the land has been eroded by the running waters, the upland plains exceed 5,000 feet in mean height, the parting line between the two slopes rising in some places even to an altitude of over 6,500 feet, and culminating in the Piton des Neiges, about 10,000 feet. Mount Cimandef ("Bonnet Pointu"), a regular pyramid forming a northern shoulder of this piton, although only 7,300 feet, seems to be the

highest point of the island when seen from the north-west between St. Denis and St. Paul.

Towards the eastern extremity the eruptive lavas have developed two masses, whose crests exceed 7,600 and 8,000 feet. Here is situated the semicircular Grand Enclos, whose two outer ramparts stretching seawards completely enclose the Grand Brûlé volcano. The cirque, averaging from 800 to 1,000 feet, is perhaps the most regular formation of this kind in the whole world. It encloses a space of about 40 square miles in extent, the encircling walls having a total length of 28 or 30 miles. Farther west occur similar formations, and in recent

Fig. 14.—THE GRAND BRÛLÉ.

Scale 1 : 180,000.



years a second "enclosure" has been developed within the first round about the central crater.

Here eruptions are still frequent; towards the end of the last century they occurred at least twice a year, and between 1800 and 1860 as many as twenty copious discharges were recorded by M. Maillard. The outbursts are at times accompanied by showers of ashes and other igneous matter, such as those slender threads of obsidian which the Hawaii islanders call the "hair of the goddess Pélé." In many parts of the Grand Brûlé roofs of hardened scoriæ conceal the hollow passages through which the liquid lava streams were formerly discharged, and these incrustations, which easily give way, are a source of great danger to unguarded wayfarers on the flanks of the volcano.

Indications of upheaval to a height of 250 feet have been observed on the



south-west side of Réunion, where old coralline beaches are seen rising above the present coastline. But owing to the great depth of the surrounding waters, coral reefs, such as those that completely encircle Mauritius, are somewhat rare on the shores of the sister island.

Besides its symmetrical volcanic formations, Réunion is also remarkable for the wonderful cirques formed by the erosive action of the tropical rains. On the west side occur three of these vast funnel-shaped basins with intervening narrow ridges radiating from the central mass of the Gros Morne, the whole being thus disposed "like a three-leaved shamrock." These deep chasms—Cilaos, Mafate, and Salazie—sources respectively of the rivers St. Etienne, Galets, and Mât, have each their thermal waters, of which the most efficacious is that of Mafate, which abounds in sulphur. In the neighbourhood rises the isolated mountain mass of the Piton d'Enchein, with a romantic lakelet at its foot.

In their general disposition the insular streams present the character of Alpine torrents, destructive in their upper courses, and farther down depositing the débris produced by their erosive action. The vastness of these erosions may be judged from the fact that the Salazie cirque alone has been excavated to the extent of no less than 3,000,000 cubic feet. The process of denudation is still going on, and even increasing, owing to the destruction of the forests on the mountain slopes, the hand of man thus tending to transform a naturally fertile island into a barren rock.

The dwarf bamboo (*bambusa alpina*), locally known by the name of "calumet," forms on the hillsides a sharply defined vegetable zone between the altitudes of 4,500 and 5,000 feet. Farther up the plateaux and higher summits are partly clothed with the *hubertia*, a large shrub with gnarled twisted stem, which throws off numerous smooth branches bearing large clusters of yellow blossom.

As in Mauritius, the chief industry is the cultivation of the sugar-cane, combined with sugar refining and the distillation of rum. Since the wars of the Empire the sugar plantations have gradually supplanted all other cultivated plants on the coastland up to an altitude of from 2,800 to over 3,000 feet, yielding an average yearly crop of thirty thousand to forty thousand tons. Formerly the annual crop was estimated at sixty thousand tons, but this industry has suffered much from various forms of blight as well as from the competition of beetroot sugar. During the last century coffee was the staple product in Bourbon, where a native variety (*caffea Mauriciana*) had been discovered, but at present the only important coffee plantations are those of St. Leu and St. Pierre. The clove, which formerly contributed to enrich the island, has ceased to be grown, but on the other hand vanilla has become one of the chief articles of export, the yield amounting in 1887 to about a hundred and fifty thousand pounds more than that of any other colony, and alone sufficient to supply the whole of Europe. Neither tea, the vine, nor cotton are grown, but cinchona has lately been acclimatised, and in 1888 as many as 26,700 of this valuable plant were already flourishing in the island.

But, as in Mauritius, the development of these plantations has been attended by a corresponding reduction in the growth of alimentary plants, and notwith-

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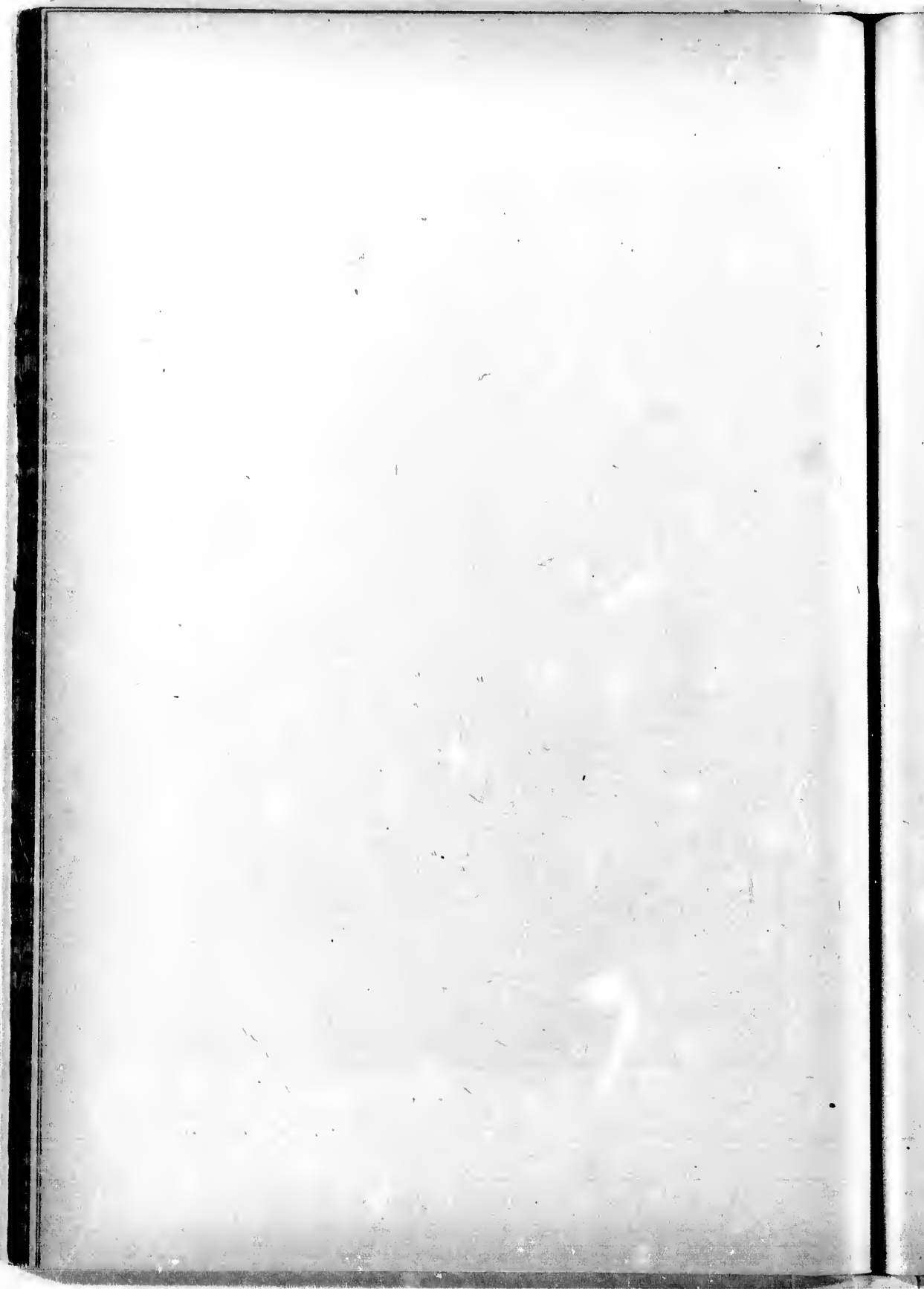
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PITON D'ENGEIN, RÉUNION.



standing its fertility, the soil no longer yields sufficient corn, vegetables, or fruits for the local demand. Consequently these provisions, as well as cattle and other live stock, have now to be imported, chiefly from Madagascar, and rice for the coolies from Bengal. The extension of the plantations, owned by a few great proprietors, has also had the effect of driving the old settlers from their small holdings, which can no longer be worked profitably, and compelling them to swell the number of idle hands in the large towns. The great landowners have thus

Fig. 15.—THE THREE CIRQUES.

Scale 1 : 200,000.



gradually absorbed everything except a few *llettes* or isolated plots in the upland valleys.

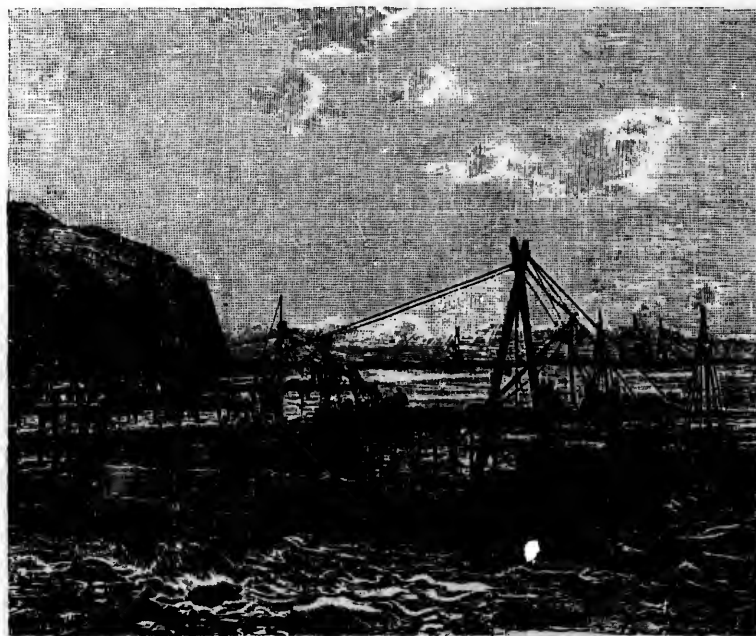
The competition of European wares has hitherto prevented the development of any local manufacturing industries. No attempt has even been made to utilise the inexhaustible deposits of titanite iron thrown up by the waves on the beach at St. Leu, although these sands contain a mean proportion of over fifty per cent. of pure metal. Réunion has a small commercial fleet, but nearly all the foreign

trade is carried on under the French flag, and especially by the steamers plying regularly between the Mascarenhas and Madagascar.

#### TOPOGRAPHY OF RÉUNION.

*St. Denis*, present capital of the island, is not the oldest French settlement, having been preceded by *St. Paul*, founded by pioneers from Fort Dauphin (Madagascar), on the north-west coast. It occupies the northern extremity of the island between two small rivers, and is a fine European city of some forty thousand inhabitants, well laid out with regular streets and some handsome public buildings.

Fig. 16.—THE MARINA OF ST. DENIS.



such as the governor's palace, town hall, barracks, hospital, lyceum, and museum. A large space in the very heart of the town is occupied by a beautiful botanic garden. But *St. Denis*, lying on the windward side of the island, is exposed to the full fury of the cyclonic gales, and as it possesses no large sheltered harbour, the shipping, on the approach of these hurricanes, is obliged to quit the open roadstead and take refuge on the high seas. Nevertheless a brisk trade is carried on, especially in sugar, of which nearly twenty thousand tons were exported in 1886.

Till recently the safest, or rather the least dreaded, seaport on the west side of the island was *St. Paul*, lying "under the wind" some 28 miles from the capital, on a semicircular bay protected on the north by the triangular peninsula

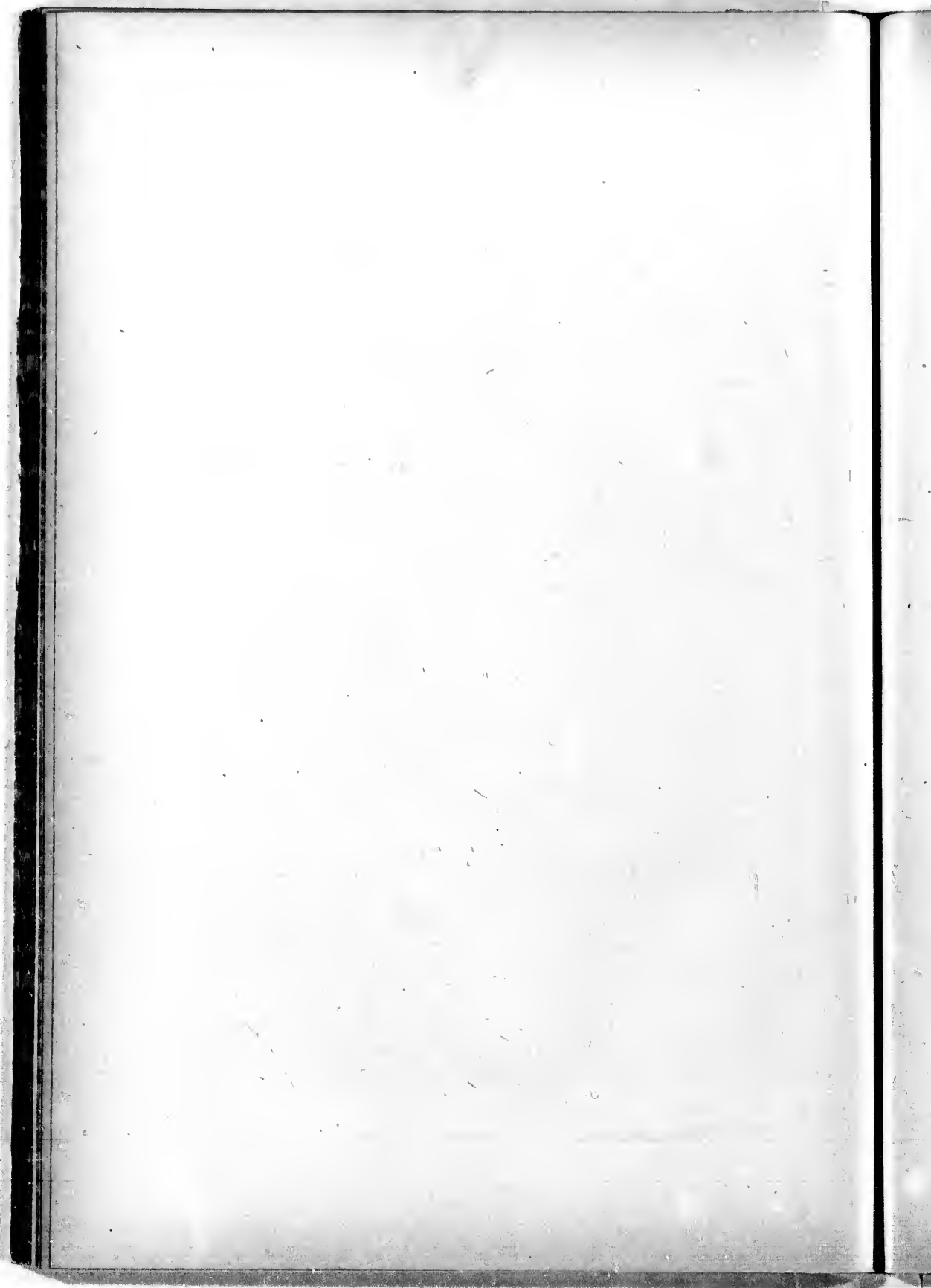
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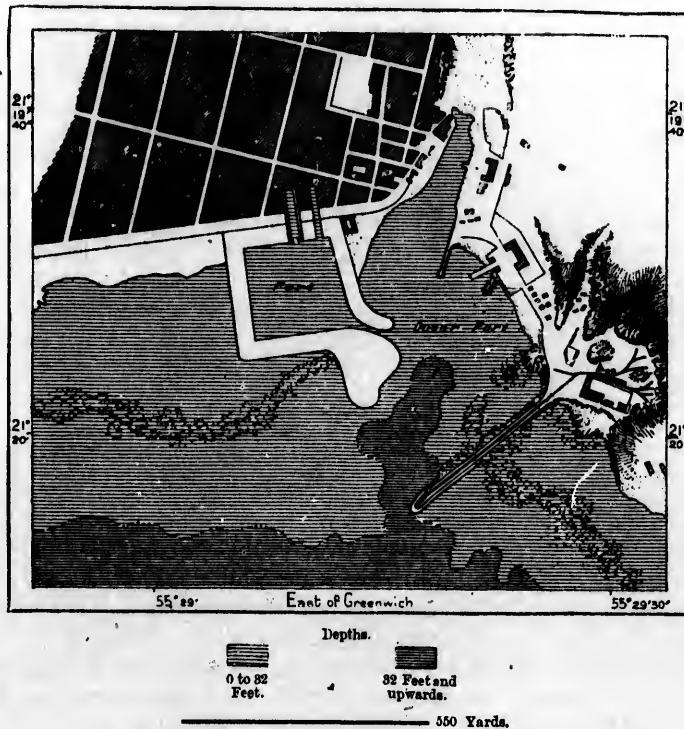
SAINT-DENIS, RÉUNION.



of *Pointe des Galets*. But this place offers few facilities for trade, and is moreover frequently exposed to the so-called "vent de St. Gilles," a sort of back-current from the regular monsoon, sweeping round from the east to the west side of the island. A harbour of refuge, however, has lately been constructed at a cost of no less than £2,700,000, to the north of St. Paul, under the shelter of the *Pointe des Galets*. The basin, which is accessible to the largest vessels frequenting these waters, has an extent of over forty acres, with a depth of 26 feet. This port is

Fig. 17.—St. Pierre.

Scale 1 : 12,000.



conveniently situated towards the centre of gravity of the productive parts of the island, where it is least exposed to the violence of the cyclones. Some of the blocks used in constructing the sea-walls weigh as much as a hundred and twenty tons.

South of St. Paul follow the half-deserted towns of *St. Leu* and *St. Louis*, and beyond them the prosperous seaport of *St. Pierre*, with a well-constructed harbour and solid breakwater enclosing an outer basin 30 to 50 feet deep. Here is the terminal station of the coast railway, which describes a curve of 75 miles round half the periphery of the island through St. Paul, the *Pointe des*



Galats, St. Denis, to *St. Benoît*. This line is a remarkable piece of engineering work, abounding in deep cuttings, bridges, embankments, and tunnels.

Beyond the villages of *St. Joseph* and *St. Philippe* on the south coast, the zone of inhabitable and fertile lands is interrupted by the eruptive rocks discharged from the Grand Brûlé and several secondary craters. But after passing *St. Rose* the main highway round the coast leads to *St. Benoît*, which may claim the title of a town, and which is approached by a handsome bridge here crossing the River des Marsouins. The railway from *St. Benoît* to *St. Denis* passes by *Bras-Penon*, one of the few places in the island which is not under the protection of some patron saint.

#### ADMINISTRATION.

Réunion is represented in France by a senator and two deputies, while the local administration is entrusted to a governor, assisted by a council, which is composed of the chief officials and two of the leading citizens. There is also a general council of thirty-six members elected by the cantons, and judicial matters are controlled by a procureur-général. The mother country votes a yearly subsidy for the support of the officials and of the garrison, numbering from three thousand to four thousand men. But public works and instruction are provided for by the direct and indirect taxes, constituting a considerable local burden.

The island is divided administratively into eight cantons and sixteen communes, tabulated in the Appendix.

#### RODRIGUES.

Within a recent period Rodrigues, the Diego Raïs of the Portuguese, was supposed to be of different origin from other members of the Mascarenhas group. Although it had been classed by Bory de Saint-Vincent and other naturalists amongst volcanic lands, Higgin\* had described it as a mass of red and grey granite underlying sandstones and limestones, and this erroneous description had sufficed to cause this island to be regarded as a remnant of the "Lemurian" continent. Rodrigues, however, is not formed of granite rocks, but like Mauritius and Réunion, consists of lavas ejected from the depths of the sea. Here are even seen superb columnar basalts, amongst others those of Thunder Mountain, which rises on the north side, above the banks of Oyster River. The shafts of the columns in this place exceed 200 feet in height.

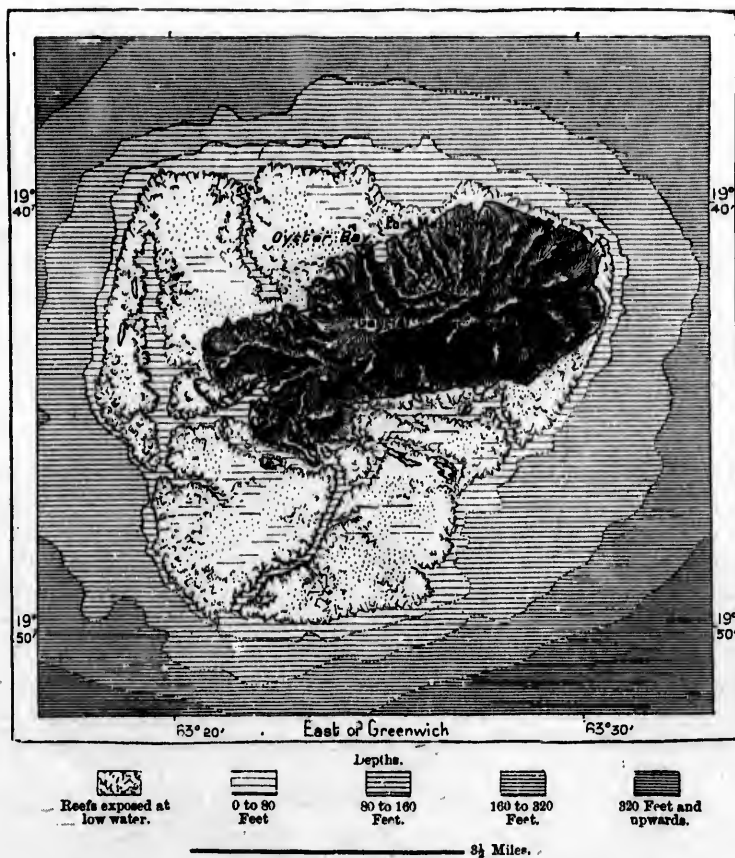
The lava formations are continued seawards by plateaux of cavernous reefs, which more than double the extent of the island, and which render Rodrigues inaccessible to shipping, except through narrow and dangerous passages. But on the other hand, the surrounding waters are exempt from cyclonic storms; the south-east trade winds blow with great regularity, while the island is of too small extent to give rise to shifting currents.

\* *Proceedings of the Royal Geographical Society*, 1849.

Rodrigues, which is administered by a commissioner dependent on the governor of Mauritius, had in 1886 a population of less than two thousand, a number relatively ten times less than that of the neighbouring island. Formed of disintegrated volcanic rocks, naturally fertile, and abounding in water and fruits, the island was formerly covered with forests, which have been destroyed by conflagrations. Nothing is now seen except brushwood and here and there a few

Fig. 18.—RODRIGUES.

Scale 1 : 135,000.



clumps of *pandanus vaka*. But although it no longer deserves the name of the "earthly paradise" given to it by Le Guat in the seventeenth century, Rodrigues might easily support large numbers of settlers. It even still exports considerable quantities of maize, haricot beans, fruits, fish, and cattle to Mauritius. The outlet for this trade is the little town of Port Mathurin, on the north coast.

The turtles which down to the beginning of the eighteenth century swarmed

on the banks of Rodrigues, have completely disappeared, driven away or exterminated by the reckless way the fishery was conducted. About the year 1700, as many as thirty thousand were conveyed in eighteen months to Mauritius.

Although visited from time to time by the Portuguese and Dutch, Rodrigues was not permanently occupied till 1691, when the Protestant refugee, Le Guat, resided here for over two years with seven companions. Before the abolition of slavery, a considerable Negro population was employed on the plantations; but since then large numbers of the emancipated hands have withdrawn to Mauritius, distant about 380 miles. In 1843 the population had thus fallen to about two hundred and fifty souls, but since then it has again increased, mainly by the arrival of blacks, who find employment in clearing and reclaiming the land on the slopes of the hills.

There are only two small centres of population, *Port Mathurin* on the coast, and *Gabriel* in the interior, near Mount Limon (1,320 feet), culminating point of the island. On the southern slope are seen, at various elevations, old coralline beaches pierced with caves. In one of these grottoes were discovered the remains of the *pezophas*, or "solitary," and of other birds belonging to extinct species.

During the Napoleonic wars, Rodrigues enjoyed considerable strategic importance. After its seizure by the English, it was made the rallying-point of the expeditions organised in India against Mauritius, and thus contributed to the reduction of all the Mascarenhas Islands.

#### THE KEELING ISLANDS.

Beyond Rodrigues no lands are met in the direction of the Eastern Archipelago for a distance of some 2,300 miles, the expanse of waters being first broken by the small circular group of the Keeling Islands, so named from the English navigator who discovered them in 1609. They are also known as the Cocos Islands, from the cocoanut palms lending a fringe of bright verdure to these low-lying islets.

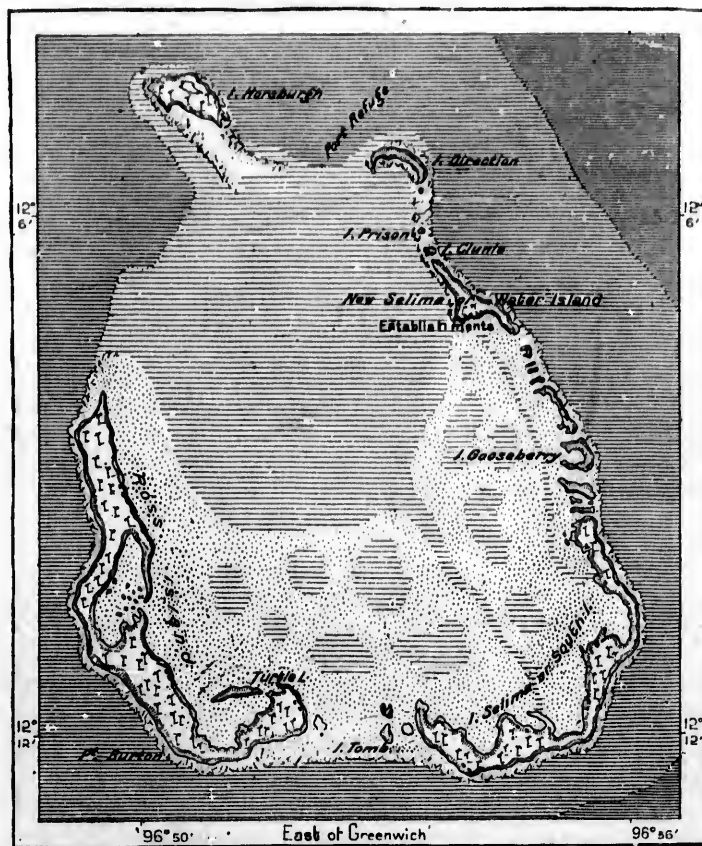
Although lying about 600 miles from the Sunda Strait, the Keeling Archipelago had its origin, probably, in the same terrestrial movements that gave rise to the Asiatic islands, for it exactly faces the fissure now separating Java from Sumatra, and is disposed in a line with the volcanic islets in the middle of the strait.

Hence it may be assumed that the Keelings rest on an igneous foundation upheaved from the bed of the ocean. At little over a mile from the entrance to the atoll, Fitzroy failed to touch the bottom with a line over 1,000 fathoms long, so that the submerged slopes of the plateau must be inclined at an angle of little less than forty-five degrees. This atoll, visited by Darwin during the voyage of the *Beagle*, in 1836, has become in geographical literature one of the most frequently quoted examples in favour of the great naturalist's ingenious theory of subsidence and upheaval of the marine bed. According to this view, the circular group of islets may be regarded as the embattlements of the lofty

coralline tower, slowly built up by the polyps as the base of the structure slowly subsided. Since the preparation of the first chart of the group, indications of upheaval have been observed. The beach has been raised and enlarged, some of

Fig. 19.—KEELING ISLANDS.

Scale 1 : 125,000.



the channels have been closed, and lagoons formerly communicating with the open sea are now inaccessible to shipping.

The atoll, which is interrupted by numerous breaches, and which opens out broadly towards the north, consists of some twenty elongated islets occupying at high water a total space of about six square miles. The only spontaneous growths

are the cocoanut palms and about thirty other species, the germs of which have drifted with the current from Java, sweeping round by Australia. But numerous alimentary plants, as well as domestic animals and rats, now a formidable scourge, have been introduced by man. Hare, the first colonist, settled on the islands with about a hundred slaves. But at present the archipelago has become one large plantation, whose owner, who is also the governor, employs some five hundred Malays in working his vast palm-groves. All the inhabitants—men, pigs, poultry, and the very crabs—live mainly on cocoanuts. Water, of pluvial origin, is procured from wells, which are sunk in the sands and which rise and fall with the tides.

Formerly the group was considered a Dutch possession; but it was occupied by the English in 1856, and attached to the government of Ceylon. Since 1886, however, it depends on Singapore.

#### CHRISTMAS ISLAND.

The triangular island of Christmas, lying 240 miles south of the coast of Java, appears also to have risen like Keeling from the marine bed. Depths of over 3,000 fathoms have been recorded in the waters flowing between it and Java. But although also covered with cocoanut palms, Christmas is not an atoll. Almost completely encircled by fringing reefs, it is entirely of calcareous coralline origin. Three distinct shore lines at the respective elevations of 40, 140, and 170 feet above the present sea-level seem to indicate three successive periods of upheaval.

#### AMSTERDAM AND ST. PAUL.

Both of these islets, lying in the southern region of the Indian Ocean, about midway between the Cape of Good Hope and Adelaide in South Australia, are masses of eruptive rocks ejected from the abysmal depths and unconnected with any other lands. Neither plants, animals, nor fossils indicate any former connection with the Mascarenhas or Madagascar. Within five miles of St. Paul depths have been recorded of 1,200 fathoms, so precipitous are the submarine escarpments. Although only forty-six miles apart, the two islands themselves present great differences in their geological constitution, so that they most probably never at any time formed continuous land. They are considered to belong politically to Great Britain; nevertheless fishermen from Réunion have often endeavoured to make them French territory, and in 1843 a trading company landed some troops to take possession of these waifs in the name of France.

On his return voyage after the death of Magellan, El Cano passed not far from "a very high island, situated under the thirty-seventh degree of latitude, which seemed uninhabited, without any trees and with a circumference of about six leagues," a description answering very well to the island afterwards named New Amsterdam, or simply Amsterdam.

The discoverer of St. Paul is unknown, although the name already occurs in a geographical document of the sixteenth century. At the beginning of the following century both islands were well known to the Dutch navigators, and Van Vlaming was the first to land on them in the year 1696. Since that time they have been frequently visited, too often unwillingly, by shipwrecked crews, and since 1841 St. Paul has been permanently occupied by a community engaged in

Fig. 20.—AMSTERDAM.

Scale 1 : 90,000.



Depth. —

0 to 12 Feet.	124 Feet and upwards.

2 Miles.

fishing and otter-hunting. Recently, also, they have been the object of scientific expeditions, notably in 1874, when the French naturalists stationed at St. Paul to observe the transit of Venus utilised the occasion to study the geological structure and prepare charts of both volcanic masses.

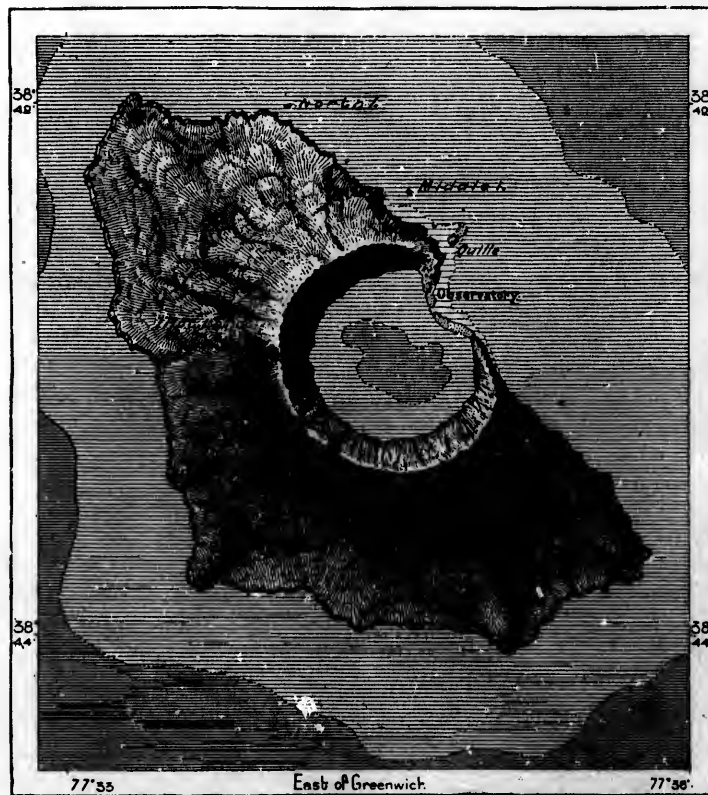
It has often been proposed to establish a port of call at St. Paul on the route to Australia. But under this latitude, although corresponding to that of Palermo

and Athens in the northern hemisphere, the climate is so inclement, the west winds blow at times with such fury, and the islands offer so few resources beyond fish, that a residence on them is always regarded as a painful exile.

Amsterdam, which is much the larger of the two, attains an altitude of 3,000 feet in its highest summit, which is nearly always wrapped in fogs. It has the

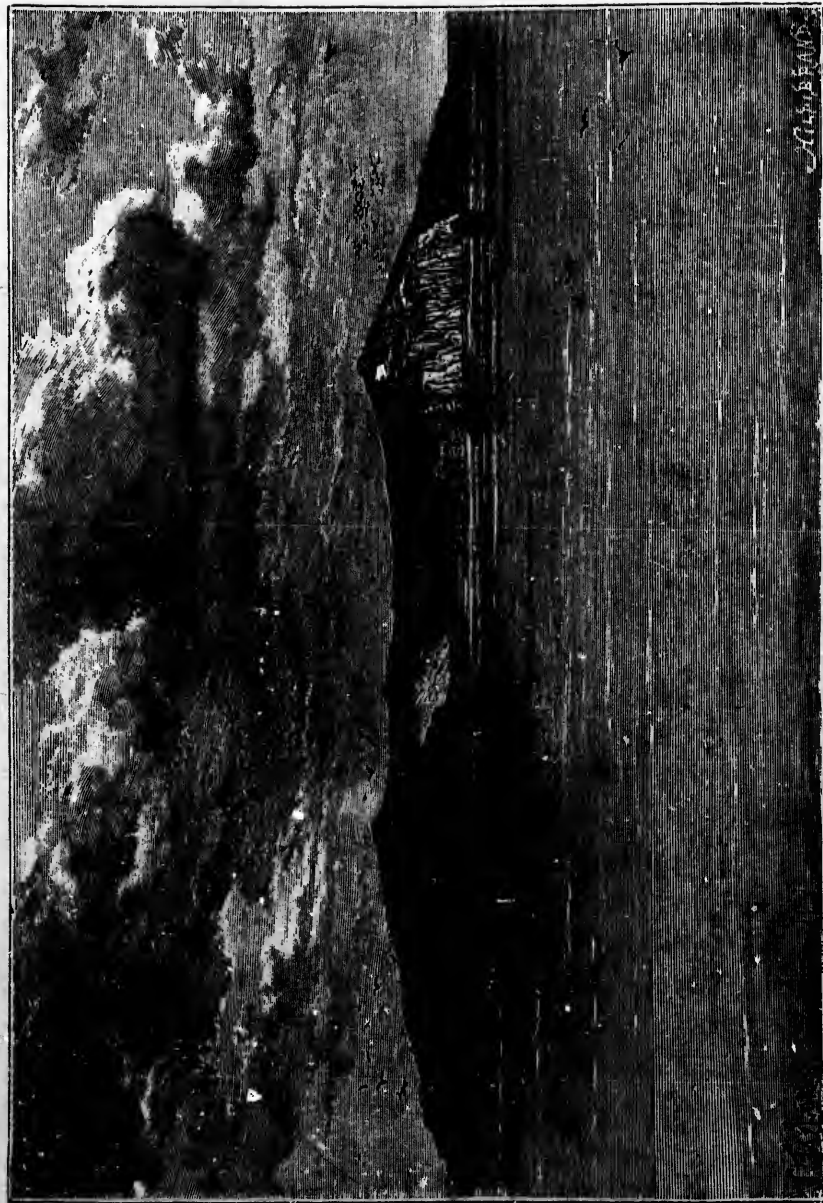
Fig. 21.—ST. PAUL.

Scale 1 : 45,000.



form of a somewhat regular rectangle, whose longest axis is disposed in the direction from south-east to north-west. On the west side have occurred extensive landslips resulting in precipitous cliffs over 2,500 feet high, against which the waves beat with great fury, so that it is seldom possible to land on this side. The summit, which has rarely been ascended, presents a boggy surface dotted

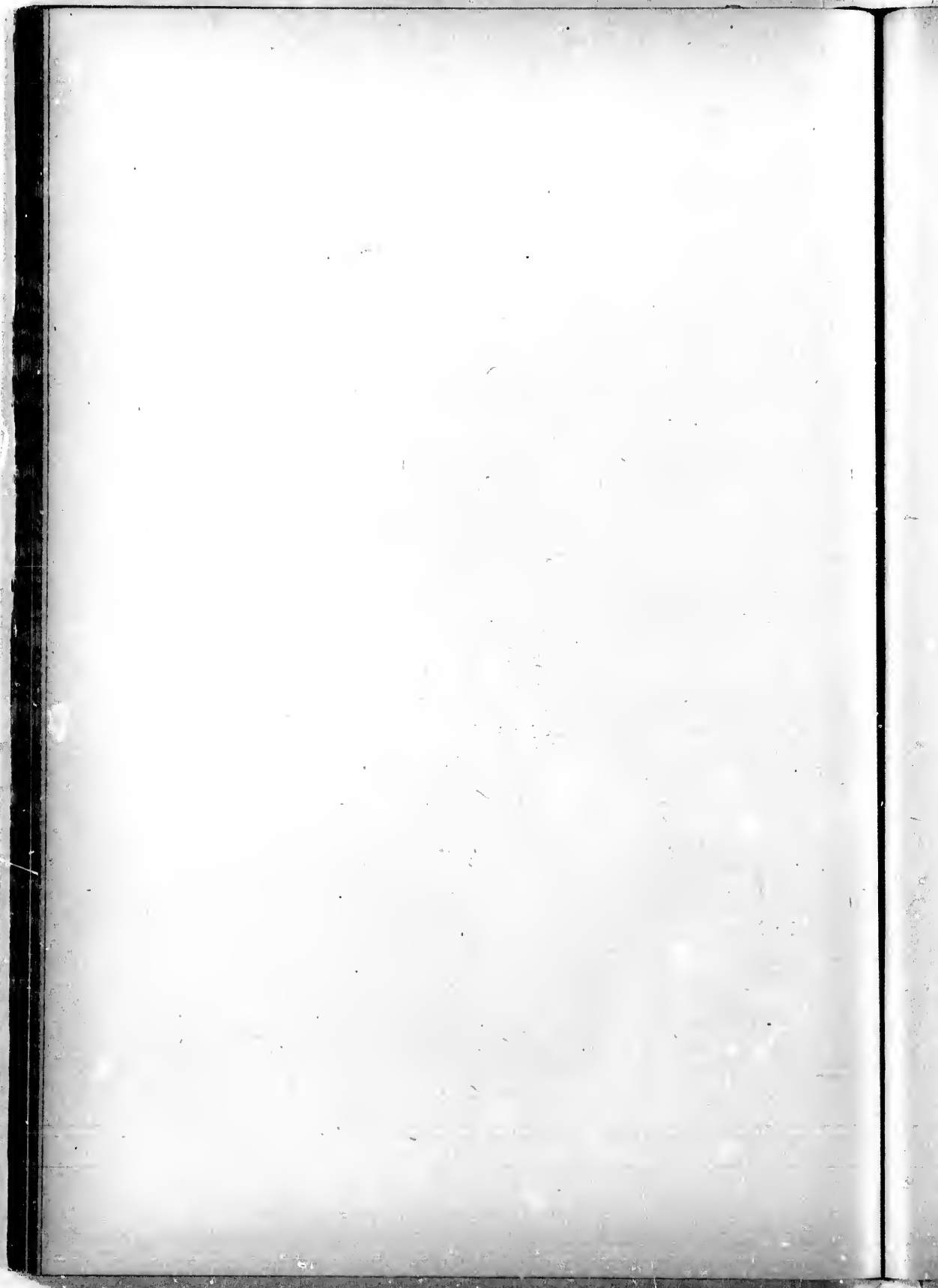
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ISLAND OF SAINT PAUL—VIEW TAKEN FROM THE NORTH-EAST.

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over with cones from which lavas have been discharged. In 1792, at the time of d'Entrecasteaux's visit, the island was in flames, caused either by the burning of the dense mass of reeds growing on the plateaux, or by the craters, possibly at that time in full activity. At present they are perfectly quiescent:

St. Paul, which is five or six times smaller than Amsterdam, presents a typical instance of a breached marine volcano of perfectly regular form. The circular crater, now flooded by the sea, opens towards the north-east, and is enclosed by escarpments and taluses from 760 to 900 feet high. Thus is formed an extensive harbour of refuge completely sheltered and 240 feet deep, but barred at the entrance by two projecting peninsulas of débris, which shift their form with the waves, and which have at times been joined in a continuous rampart, preventing all access to shipping. Thermal springs abound on the margin of this basin, where by merely brushing aside the surface sands enough hot water may be collected to boil the fish captured close by.

A comparison of the early descriptions with those of modern explorers would seem to show that the underground energies have greatly diminished since the discovery of the island. The thermal springs are apparently cooler, the gas jets less abundant, the hot spaces less extensive. Moreover the island is itself diminishing through the rapid destruction of its shores. Everywhere the coast is carved into cliffs, and on both sides of the entrance to the flooded crater huge fragments have broken away from the flanks of the volcano. Towards the north-east the coast is fringed by several rocky islets, of which the most striking are La Quille, a horizontally stratified pyramidal mass, and North Island, a basaltic colonnade affecting the form of a circular temple.

The flora comprises from thirty-five to forty species of mosses and lichens, and about fifteen of herbaceous growths. The trees planted by the fishermen and the botanists of various expeditions have not succeeded, while the vegetables, such as potatoes, sorrel, and carrots, have much degenerated. The cabbage alone thrives to a surprising degree, tending even to acquire arborescent proportions. A few butterflies, and even a bee, have been found, but no land-shells. The pigs let loose on the island survived only a few years, but the cats, mice, and rats have become acclimatised. "Thrown together by a common fate, they dwell peacefully in the same retreats."

Amsterdam, less studied because less accessible than St. Paul, appears to have a richer flora and fauna. It is even said to possess one or more small quadrupeds, including a weasel. Here the French expedition of 1874 discovered about fifty plants, of which as many as twenty-three were indigenous species. Amongst the larger growths is the *phylica arborea*, a shrub which had not previously been met beyond the Atlantic basin.

#### THE AUSTRAL ISLANDS.

Several insular groups follow eastwards in the regions of the Indian Ocean strewn with floating ice. But these cold lands, girdled round by breakers and

buffeted by fierce gales, are too inhospitable to afford a permanent home to man. Here shipwrecked mariners have often passed an anxious time daily sweeping the horizon in search of a friendly sail. Whalers have also established more or less permanent stations in the neighbourhood of the fishing-grounds. Lying on the ocean highway between Great Britain and Australia, in the track of the western trade winds, these islands are fortunately well known, and have even been carefully studied, especially by the naturalists of the *Challenger* expedition of 1874. All are of volcanic origin, rising above the surface of waters over 1,500 fathoms deep.

#### MARION, PRINCE EDWARD, AND THE CROZETS.

Marion, so named from the navigator who discovered it in 1771, is the highest of the western group, lying over 720 miles to the south-east of the Cape of Good Hope. It is exclusively of igneous formation, its central cone rising to a height of over 4,000 feet, and even in summer covered with a snowy mantle down to 1,000 feet above sea-level. The periphery of this central cone is studded with secondary craters presenting the appearance of excrescences on its flanks, while heaps of red scoriae, here and there moss-grown, descend to the water's edge.

Prince Edward, so named by Cook, attains an altitude of 2,000 feet. The Crozets, also discovered by Marion, form an archipelago of several islands, one of which, Possession Island, exceeds 5,000 feet. Hog Island takes its name from the animals here let loose by an English captain to supply the whalers and shipwrecked crews; but Rabbit Island would now be a more appropriate name, for the swine have been replaced by thousands of coneys, which make their burrows in the heaps of scoriae.

#### KERGUELEN.

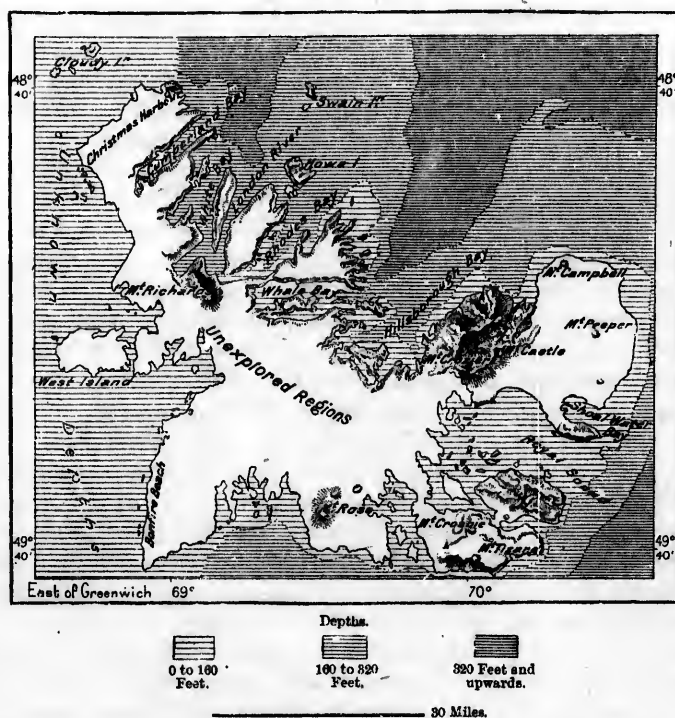
Kerguelen, by far the largest of all these groups, was discovered in 1772 by the French captain whose name it bears, and who again visited it the next year, when he found it to be an island, and not a peninsula of the great southern continent sought for by all navigators in the Austral seas. It was again explored in 1776 by Cook, who proposed to call it Desolation Land, a name which it certainly merits, to judge from the reports of the whalers, the naturalists of the *Challenger* expedition, and of those sent the following year from England, America, and the United States to observe the transit of Venus.

Kerguelen, which lies near the fiftieth degree of south latitude, and which is surrounded by some three hundred islets, rocks, and reefs of all sizes, was formerly almost inaccessible to sailing vessels. Nevertheless it offers, especially on its east side, a large number of deep bays, creeks, and islets, affording shelter to ships that have succeeded in threading the maze of outer channels and passages. These indentations on the seaboard present the same fjord-like formations as those observed on the shores of the north polar regions, which were at one time completely covered by an ice-cap.

The Kerguelen mountains, all of igneous origin and either of columnar or terrace formation, are not disposed in any regular system, although the main axis runs on the whole in the direction from north-west to south-east. According to the reports of the whalers, the underground forces are still active, and a mountain in the south-west is said to emit vapours. Mount Ross, the highest summit hitherto measured (6,100 feet), lies near the southern extremity of the island, while the eastern and south-eastern peninsulas are respectively occupied by Mounts Crozier (3,300 feet) and Wyville Thomson (3,200 feet). Glaciers

Fig. 22.—KERGUELEN.

Scale 1 : 1,500,000.



descend from the upper valleys of these highlands, and at least at one point on the west side reach the seacoast.

Towards the west the snows and ice covering the interior, and easily confused at a distance with the overhanging banks of white clouds, render an accurate survey of the craters, crevasses, and lava streams almost impossible. But near the seaboard are seen numerous volcanoes, whose craters are now filled with snow or water. The east side, where fair weather prevails, receives less moisture, and here the snow line is arrested at a mean elevation of 1,000 feet above the sea.

Formerly the island enjoyed a very different and much milder climate, for in the valleys the argillaceous schists here and there overlie fossil wood at every stage of transformation, in one place almost still fresh, in another half petrified, or even changed to pure silica. In the cavities of the basalt rocks are also found layers of coal varying from a few inches to over a yard in thickness, and overlying more recent eruptive rocks. So numerous are these deposits that it has been proposed to convert Kerguelen into a coaling station on the ocean highway between England and Australia. Were the project realised, this now useless French possession might acquire a certain commercial value. There can be no doubt that cattle might also be reared on the island, where the sheep landed by the expedition under Captain Ross thrived well. Sheep-farming has succeeded excellently on the Falkland Islands, which have the same climate as Kerguelen, and an analogous fauna and flora.

The present climate of Kerguelen is very equable, varying little from winter to summer. According to Studer, the difference of temperature throughout the year is only 18° F., ranging from 32° in winter to 50° in summer, with a mean of 39° or 40°. But there is an excess of moisture, and high gales are always blowing either from the north or west, and are often accompanied by hail, snow, or rain, though at times also by clear, bright skies. Sometimes these gales are displaced by north-easterly winds bearing copious rains, fogs, and a higher temperature; but the normal direction of the atmospheric currents is from the north-west. To these incessant storms the naturalist, Studer, attributes the fact that the local insects, especially the flies and butterflies, are destitute of wings, which could lead only to their destruction, by exposing them to the risk of being blown seawards with no hope of return. Even the strong-winged albatross never builds on the north-west side of the island, which bears the brunt of the tempest and is wrapped in eternal fogs. His home is on the shores facing the clear blue skies.

The Kerguelen flora is extremely poor, resembling that rather of an antarctic land than of an island situated in the temperate zone and corresponding in latitude to the valley of the Somme in the northern hemisphere. Hooker, who spent a winter on the island, failed to discover more than eighteen flowering plants, to which further researches have only added three, making twenty-one altogether in a total of about a hundred and fifty species. Nearly two-thirds of the vegetation consists in fact of algæ and mosses, and even of the phanerogams about one-third are monocotyledons, a proportion occurring nowhere else in the whole world. After traversing the zone of large algæ (*macrocystis pyrifera*), some of whose rope-like stalks are 200 feet long, the observer comes upon a narrow zone of grass, followed by plants of the saxifrage type, mosses, and a few graminaceæ sprouting in the cavities of the rocks. On the slopes of the hills *azorella selago* develops extensive beds saturated with water, where the explorer sinks to his knees at every step. The only plant producing any effect on the landscape is a gigantic species of cabbage, whose botanical name (*pringlea antiscorbutica*) sufficiently indicates its value to seafarers condemned to long periods of a coarse salt meat diet. This species is peculiar to Kerguelen, being found nowhere else in the

Indian Ocean. The *lyellia*, another flowering plant, resembles an Andean growth, and three species also supposed to be indigenous in Kerguelen are so like their congeners in Tierra del Fuego, that botanists are inclined to regard them as simple varieties; lastly, one of the local growths is of Australian origin. But on the whole, the Kerguelen flora is most akin to the Fuegian, a fact doubtless due to the marine currents setting steadily eastwards.

The only bird peculiar to Kerguelen and the Marion and Crozet groups is the *chionis minor*, about the size of a pigeon, and not unlike an allied species common to the Falkland Islands and Tierra del Fuego. There are no land mammals, reptiles, or batrachians, and the fur-bearing seals and other cetaceans still swarming in the Kerguelen waters at the beginning of the century have already become rare. In 1843 over five hundred whalers found occupation in these seas, but in 1874 not more than five or six were employed in the capture of whales. The otters are also threatened with extermination, and have already become so scarce that they are no longer regularly hunted. But a number of vessels are still engaged in the capture of the huge sea-lions, one of whom yields as much as a ton of oil. These and other seals still find some shelter from their human enemies in the bays along the west coast, whither the fury of the elements prevents the fishers from following them. Some of these fishers, who had collected a vast quantity of oil on the south-west point of Kerguelen, had to wait for years before a single ship ventured through the breakers to take in a cargo, and growing impatient they at last set fire to their whole stock, whence the name of *Bonfire Beach* given to this part of the coast.

The most frequented haven is *Christmas Harbour*, at the north-west extremity of the island, the position of which is indicated at a distance by a basalt rock assuming the appearance of an imposing triumphal arch.

#### MACDONALD AND HEARD ISLANDS.

MacDonald, lying to the south-east of Kerguelen, is a mere rock fringed by breakers and inaccessible to fishers. But Heard is visited both by whalers and seal-hunters. Except at the black lava headlands, this island is entirely covered by a white mantle, two vast snow-fields concealing the hills round about Big Ben, the chief summit, which is said to be loftier than Mount Ross in Kerguelen. But although supposed to be over 6,000 feet high it was completely invisible at the time of the *Challenger* expedition, all the heights above 1,000 feet being wrapped in dense fog. The climate of Heard is even more inclement and stormy than that of Kerguelen. The fierce south-east polar winds prevail very generally in these southern latitudes, and are much dreaded by mariners.



### CHAPTER III.

#### THE EASTERN ARCHIPELAGO (INDONESIA).

##### GENERAL SURVEY.



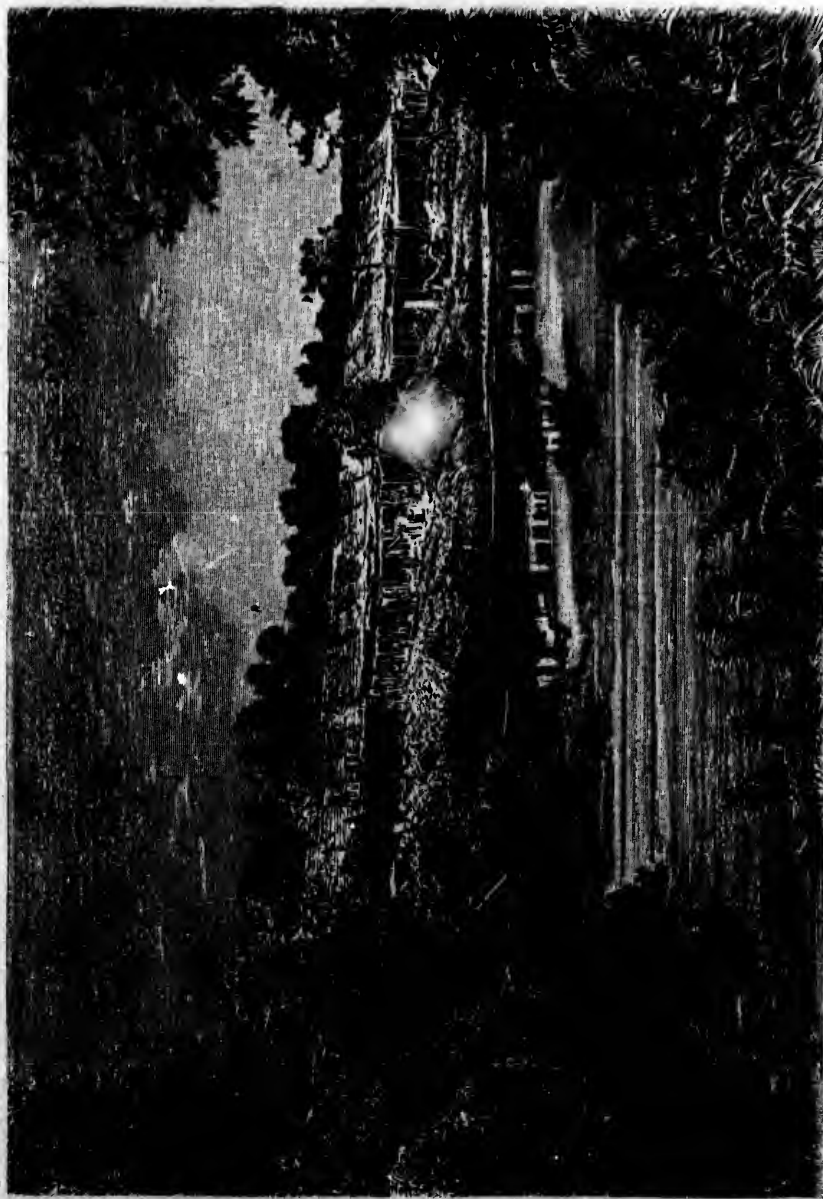
INDONESIA or Insulindia, that is, "Insular India," as the Dutch have rightly named this region, is better known to English readers as the Eastern, Asiatic, Malay, or East Indian Archipelago, and sometimes by the simpler and somewhat more convenient expression, Malaysia. It constitutes, if not a political, certainly a well-defined geographical area. The submarine bank on which stand the two great islands of Java and Sumatra terminates abruptly towards the Indian Ocean in steep escarpments plunging into the very deepest abysses of the whole basin. Java is continued eastwards by a chain of smaller islands extending to the north-east of Timor, and evidently forming part of the same region; the volcanoes traversing this long line of islands attest the action of the same geological forces. South of Papuasia the narrow igneous zone is deflected northwards, as if to mark the eastern limits of Indonesia proper. One of the lines of volcanic forces traverses the island of Halmahera (*Jilolo*), while another touches the north-east extremity of Celebes, thus enclosing this great island within the fiery semicircle sweeping round from Sumatra.

Borneo, largest of all the Sunda Islands, and of almost continental proportions, is even more closely connected with the same group than Sumatra and Java, for it stands entirely on the same scarcely submerged marine plateau. The three great islands are separated by shallow waters less than 50 fathoms deep, where vessels can everywhere ride at anchor. Thus an upheaval of about 40 fathoms would suffice to enlarge the Asiatic continent by an extent of nearly 1,500,000 square miles.

In many respects the Philippines might also be regarded as forming part of the same natural region as Indonesia, for the semicircle of volcanoes is continued across this archipelago, while its two chief members, Mindanao and Luzon, are both attached to Borneo by chains of islands, islets, and shoals. But the Philippines already belong to a different climate, and they are almost everywhere washed by deep waters. The Sulu waters, flowing between Borneo and the Philippines, present abysses of over 2,200 fathoms.

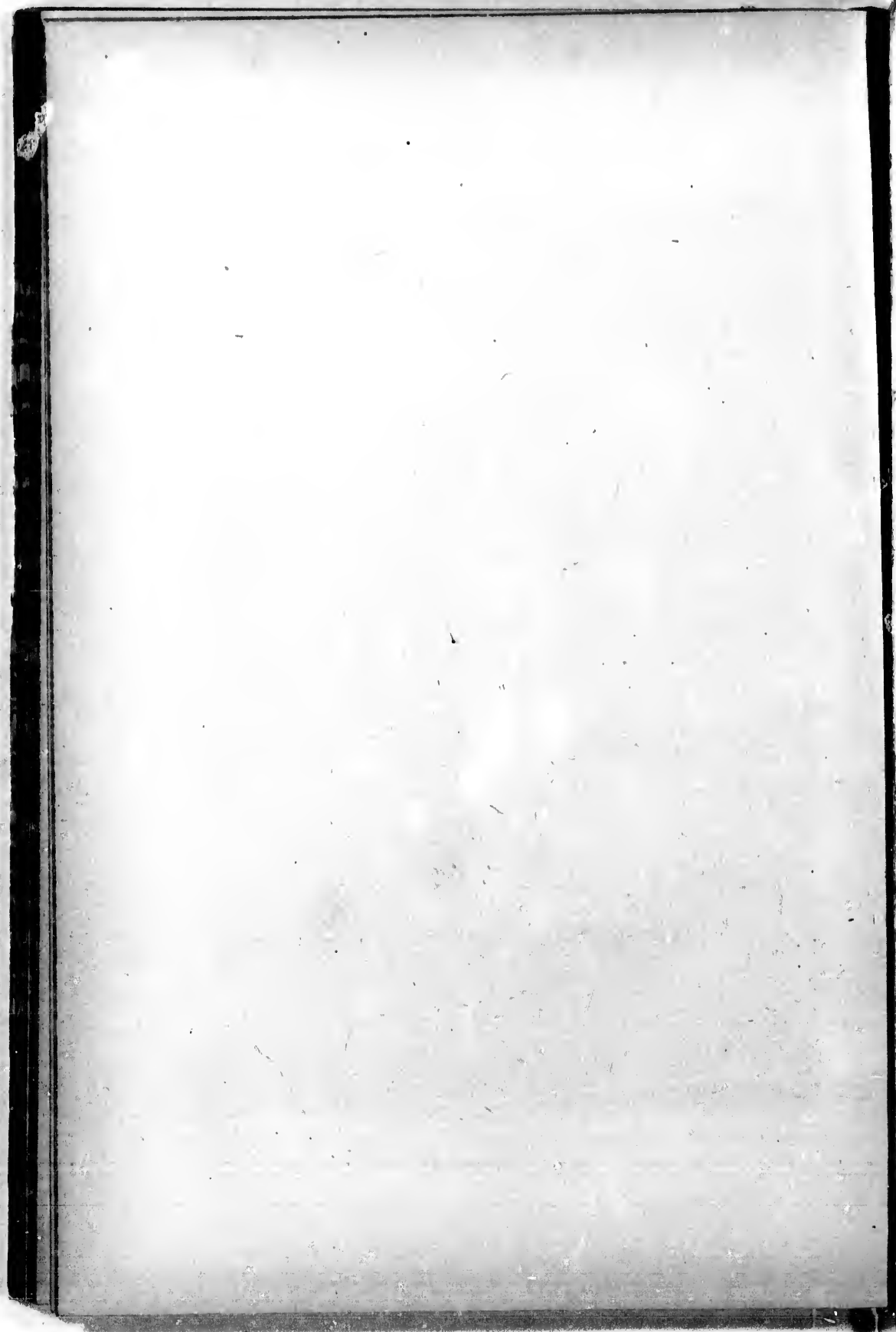


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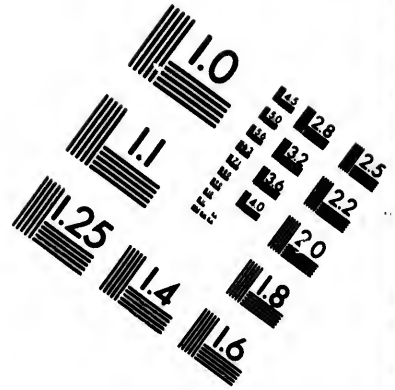
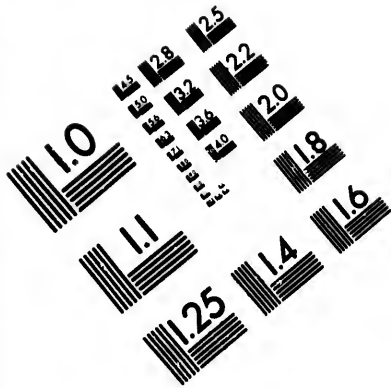


DAYAK DWELLINGS ON THE REJANG, WEST BORNEO.

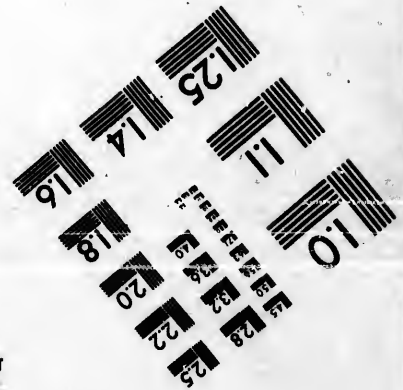
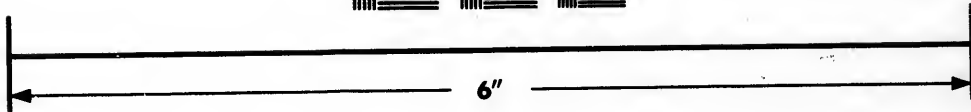
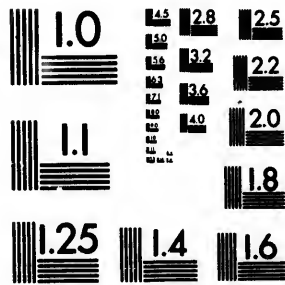








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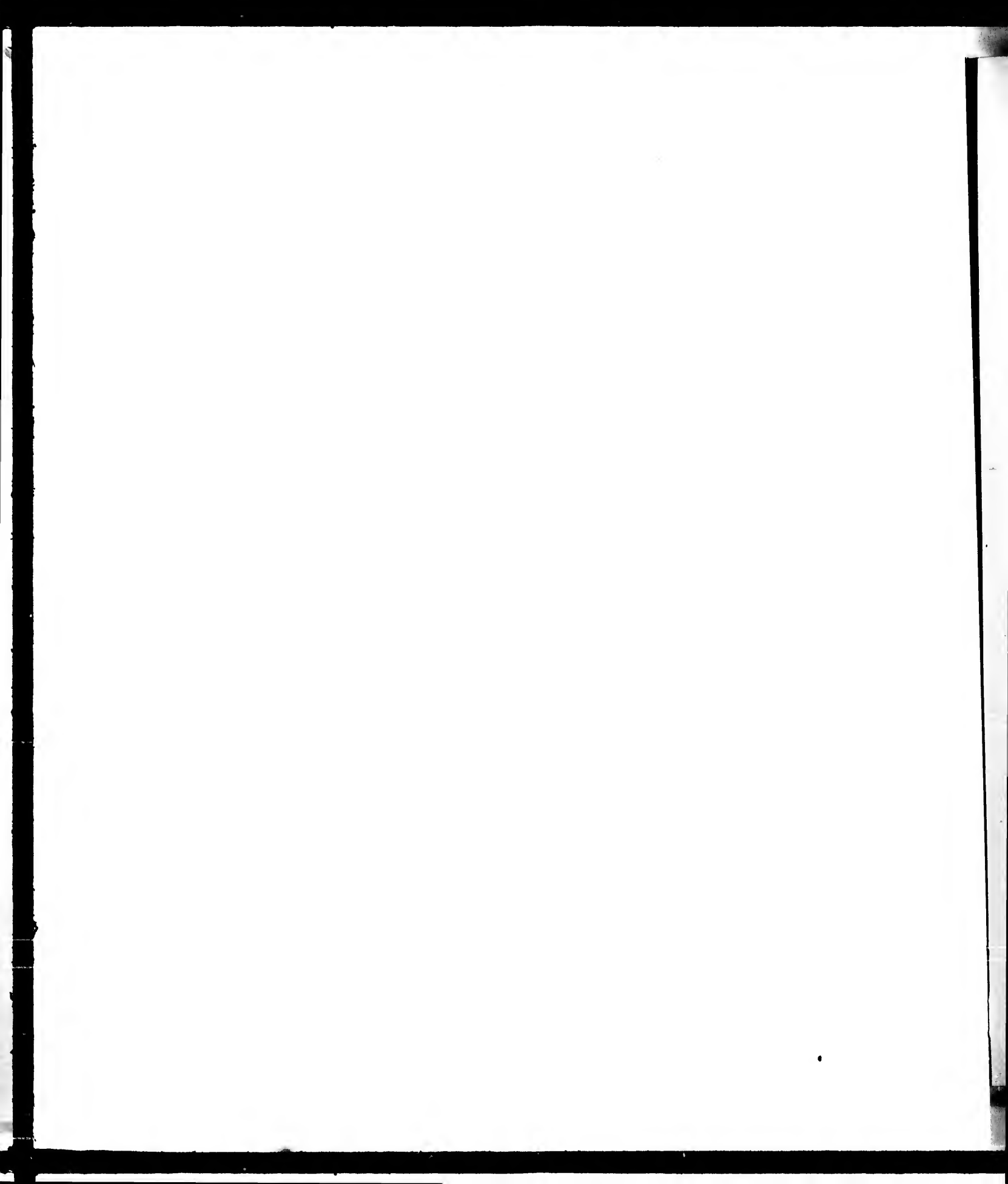
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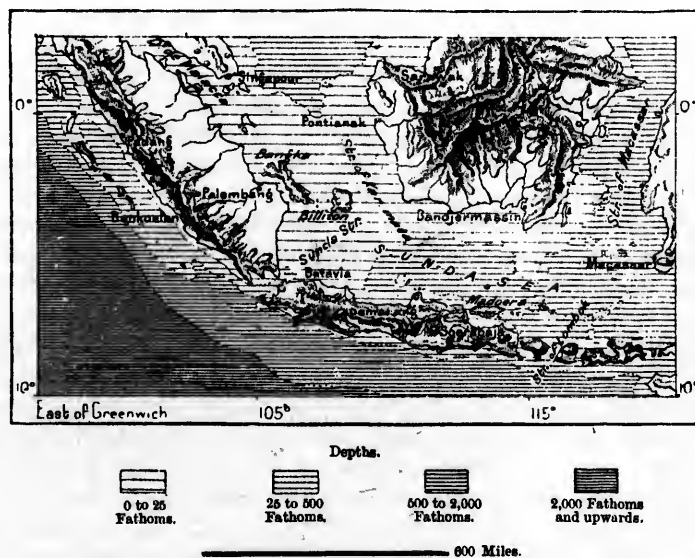


## INDO-MALAYA AND AUSTRO-MALAYA.

But Malaysia itself, as has long been shown by Wallace,\* forms two perfectly distinct physical regions, the Indo-Malayan, comprising the three great islands of Sumatra, Java, and Borneo, connected by a shallow marine bed, and the Austro-Malayan, the two† chief members of which are Celebes and Jilolo, both rising above oceanic waters of great depth. Striking contrasts of climate, floras and faunas, as well as of human populations, are presented by these two main divisions of the Eastern Archipelago. Nevertheless both are characterised by certain common features, in virtue of which they may be regarded as collectively forming

Fig. 23.—INDONESIAN SUBMARINE PLATEAU.

Scale 1 : 48,000,000.



an oceanic world distinct from Asia, of which they constitute a south-eastern continuation.

All these Indonesian lands have a total estimated extent of nearly 700,000 square miles, or nearly six times the superficial area of the British Isles. But the oceanic region over which these lands are scattered is far more extensive. From the northernmost extremity of Sumatra to the last of the Tenimber islets, the distance across the Indian Ocean is no less than 2,800 miles; while between Lombok and the north point of Borneo, Indonesia develops an extreme breadth of about 700 miles. Within this vast expanse are comprised one island larger than

\* *The Malay Archipelago*, the first edition of which appeared in 1868.

† Excluding New Guinea, which is not here considered.

France, another exceeding Great Britain in size, two surpassing Ireland, seven more extensive than Corsica, and dozens bigger than Malta. The seas are everywhere studded with countless *tanahs*, *pulos*, or *nusas*, as the smaller islands and islets are variously called, some settled, others uncultivated, or thinly if at all inhabited. To the traveller lost in the maze of these innumerable insular groups, Indonesia seems a boundless oceanic world. Coasting the larger islands for days and weeks together in some native prau, he is bewildered by the constantly shifting tropical scenes, the endless variety of lands and of peoples at all stages of culture, and whose very names are unknown to him. Headlands with extinct or still smoking volcanoes, coral banks, or insular forests, which seem to spring from the surface of the water, are landmarks that indicate his progress through these interminable island-studded seas.

As a region of transition between the Asiatic and Australian continents, Malaysia presents a strange contrast with the corresponding transitional region of the arid Arabian peninsula between Asia and Africa. In the richness of its insular development, the infinite variety of its landscapes, its brilliant vegetation, the number of its animal species, the diversity of its populations and abundant resources, the East Indian surpasses even the West Indian insular world itself. The Central American archipelago yields also to the Asiatic in historic importance, as well as in the economic value of the relations that have been developed between these two regions and the rest of the world. The relatively small island of Java alone has a larger population and more abundant products than the whole of Central America and the Antilles; while numerous straits between the islands offer to interoceanic traffic more extensive and commodious highways than the future Panama and Nicaraguan Canals can ever hope to become.

Traversed in its entire length by the equinoxial line, Indonesia might well be called the garden of the world, not only, like the interior of Africa, because of its high annual temperature, but also and especially thanks to its fertile and copiously watered soil, its exuberant vegetation, and the costly and varied nature of its products. The very energy displayed by the igneous forces under the Sunda Islands and adjacent lands contributes to make this region one of the centres of terrestrial activity. Here the land quakes and is rent asunder even more frequently than in the Central American and West Indian areas of volcanic disturbance. Java, the most densely peopled and one of the best cultivated and most productive islands in the world, is also the most violently agitated by underground convulsions as well as the scene of the most numerous active craters.

These remarkable lands are not inhabited by independent native populations. A few unreduced tribes still find a refuge on the Sumatran plateaux, in the forests of Borneo and other islands; but numerically they represent but a very small fraction of the Indonesian peoples. The more or less civilised Malayan populations, who have commercially exercised so much influence throughout the oceanic domain, and whose colonies have spread over an enormous expanse from Madagascar to Polynesia, have never been fused into a compact national body.

and their conquests have been the work of one or another isolated group. Numerous petty Malay states have thus been founded, but the race has created no great empires. The diversity presented by their domain, divided into a thousand little insular mother countries, is thus reflected in their historic evolution.

But the political unity, which has failed to be spontaneously developed, is being accomplished under foreign supremacy. The Europeans, who have occupied the whole of America, two-thirds of Asia, and one-half of Africa, have also made themselves masters of the Eastern Archipelago. A single European power, and one of the least importance in a military sense, dominates almost exclusively in this vast insular world comprised between Indo-China and Australia.

#### HISTORIC RETROSPECT.

Under the guidance of Arab pilots, the Portuguese navigators and Italian travellers appeared early in the sixteenth century in the Sunda waters, and in 1511, Albuquerque, already master of the great city of Malacca, secured for his nation the political preponderance in the Malay world. The very next year the first consignment of nutmegs was shipped, in the Banda group, direct for Lisbon. In order more rapidly to explore every part of their new domain, the Portuguese resolved that all vessels, whether Malay, Chinese, or Javanese, trading with Malacca, should henceforth be commanded by a European captain. In this way the European mariners in a few years became familiar with the labyrinth of Indonesian maritime routes, thus securing for themselves the monopoly of the spice trade between the Moluccas and Lisbon.

Doubtless the Spaniards, led by Magellan, soon appeared on the scene, in their turn claiming the exclusive right to the possession of the coveted "Spice Islands." In virtue of Alexander VI.'s famous bull, dividing the world recently discovered, or yet to be discovered, between the two Iberian powers, to Portugal fell all the lands situated in the far East. But Spain on her part claimed these same lands, as lying in the far West beyond the New World, and to put an end to these conflicts the Portuguese were fain to redeem by purchase the islands in dispute.

Of these they remained peaceful possessors for nearly a century; but in 1596 the Dutch flag, which had been excluded by Philip II. from the direct trade with Lisbon, had already discovered the road to the East. The broad-beamed Dutch vessels made their appearance before Malacca and helped themselves to the spices of the native factories. Such was the commercial enterprise inspired by the two brothers Houtman, who bore the Portuguese a grudge for their imprisonment in Lisbon, that within seven years the Amsterdam and Antwerp shippers had equipped fifteen fleets for the Eastern Archipelago, comprising altogether sixty-five vessels. In 1600 the new arrivals secured a strip of territory in Sumatra, and in 1610 they obtained a footing in Java, where they erected a fort, afterwards



replaced, despite the English, by that of Batavia, the central point of their future conquests. At this period the Portuguese had become too enfeebled to continue the struggle with Holland, which in 1609 had already wrested the Moluccas from them. At present, of their former vast empire in the Eastern seas, there remains nothing but the eastern half of Timor with a contiguous islet.

Holland thus became a great political and military state, ruling over many kingdoms, disposing of considerable forces, with redoubtable admirals and brave captains at her service. Nevertheless, the trading company, to which the Netherlands Government had in 1602 granted a monopoly of the commerce with Indonesia, found itself powerless to defend its vast possessions when its English rivals had become masters of the sea. At the end of the eighteenth century the Spice Islands, regarded as the most valuable of all colonial possessions, had fallen into the hands of England, and in order to prevent her from seizing the whole of the Malay Archipelago, the privileges of the company were purchased by the Dutch

Fig. 24.—COMPARATIVE AREAS OF HOLLAND AND THE DUTCH EAST INDIES.

Scale 1 : 48,000,000.



States, then known as the Batavian Republic. But Java and its dependencies passed, none the less, into the power of the English, by whom they were not restored till 1816, after the Napoleonic wars.

Since that time Holland, notwithstanding her insignificant size compared with its Eastern possessions, has remained undisputed mistress of all the insular groups which she had acquired at the close of the last century. She has even extended her sway over several islands not previously claimed by her, while her effective control has been enlarged and strengthened in the interior of Sumatra, Borneo, and Celebes.

The northern part of Borneo alone had hitherto remained beyond the influence of the Dutch, and this circumstance has enabled a British company recently to acquire a considerable portion of the great island. This new English domain, with the neighbouring principality of Sarawak, acquired by a British soldier of

fortune \* some years ago, and the adjacent Sultanate of Brunei, together with the Portuguese section of Timor, are the only regions in Indonesia which are not regarded as officially dependent on the Netherlands. Nevertheless in the vast archipelago there still remain some unreduced tribes, and even nations, such as that of Atjeh, in the north of Sumatra.

Since Germany has in her turn become a colonial power, she has acquired or claimed territories on the African continent even more extensive than Indonesia. But their economic value may be estimated at zero compared with the Dutch East Indies, which many far-seeing politicians already regard as a not very remote inheritance of the German Empire. Possibly in anticipation of this future acquisition, the German Government has occupied a large part of New Guinea and neighbouring archipelagoes, with the view of extending eastwards this vast insular domain.

#### PROGRESS OF EXPLORATION.

The already extensive historical and geographical literature relating to Indonesia is being constantly increased by new works. Explorers, either acting independently or grouped in learned societies, are ceaselessly at work, investigating the material and moral conditions in the Malay world. Amongst the documents already published some are of the highest scientific value, for the Eastern Archipelago is one of those regions which most abound in interesting facts bearing on physical phenomena, the distribution of animal and vegetable species, human migrations, the evolution of mankind, and other problems connected with political and social economy.

But what this encyclopædic labour still lacks is the co-operation of the natives themselves. For the most part savage hunters, or toiling under hard taskmasters, they have but few representatives in the republic of letters, and those who do take part in the current of contemporary studies are not sufficiently unbiassed to judge of things as they really are.

Thanks to the facilities of locomotion and free intercourse, the time has passed when privileged companies and Governments, jealous of their commercial monopolies, prevented geographers from publishing the charts and other results of their surveys. In the sixteenth century the Dutch and Spaniards made it a capital offence for any writer to publish the logs of their navigators. Copies of charts and maps acquired at great expense were entrusted by the Netherlands Government to their skippers, to be returned to the Admiralty archives after each voyage, the punishment of the lash, branding, or banishment being reserved for the traitors who disclosed them to strangers. Even in dangerous waters, where the perils of the deep were exaggerated by legendary reports, pilots were refused to ships in distress.

But all this has changed, and at present certain parts of Indonesia are better

\* Sir James Brooke, better known as Rajah Brooke, who purchased this territory from the Sultan of Brunei in 1841.

known, at least in their outward aspects, than many regions of Eastern Europe. But on the other hand the interior of several islands is delineated on our maps, not from accurate surveys, but from incomplete itineraries or vague native reports. Nevertheless, the geodetic network is gradually spreading from island to island across the Malay lands, and sooner or later the whole of the archipelago will be represented with the same accuracy and minuteness of detail as Java and some parts of Sumatra and even of Celebes, which are already figured on excellent topographical and geological charts. Meanwhile, as to the population, it is still impossible to give even a rough estimate of the actual numbers for the whole area. The official statistics distinguish for the different islands the number of inhabitants returned by the regular census, a systematic calculation or a more or less plausible estimate. Lastly, there are regions for which not even a conjecture can be hazarded.

#### CLIMATE OF INDONESIA.

The Sunda Islands lie within the zone of the alternating trade winds and monsoons. But the normal course of the aerial currents is constantly modified by the shifting of the centres of attraction due to the returning seasons and to local phenomena. At Batavia, taken as the headquarters of the hundred and fifty-one meteorological stations scattered over the Archipelago, the "good monsoon," that is, the south-east trade wind, prevails during the northern summer months, and especially from June to September. At this time the atmosphere is usually drier than during the "bad monsoon," which mainly comprises the period from December to March, when a much larger quantity of moisture is precipitated.

Nevertheless, this contrast of the seasons is not always very sharply defined, especially in the interior of the large islands. No month is altogether rainless, and even during the so-called dry season the atmosphere along the seaboard is charged with 80 per cent. of relative humidity, while during the rainy season it is nearly at the point of saturation. For the whole of Indonesia the mean rainfall, according to Voyerikov, exceeds 120 inches. But in many regions it is very difficult to distinguish the true alternation of the seasons, and form a correct idea of the normal succession of wet and fine weather. Even to the east of Celebes the moisture is brought chiefly by the south-east trades, while the west monsoon is accompanied by clear skies. In a shifting and uncertain zone between Sumatra and Timor the two opposing currents are, as a rule, accompanied by about an equal quantity of moisture. On the other hand, in the endless labyrinth of islands, the normal direction of the lower winds and marine breezes is modified by every strait and streamlet.

In a vertical direction also—that is, ascending from the sea-level to the mountain tops—considerable changes are observed in the general course of the winds. The western monsoon affects the lower atmospheric masses only, its thickness never exceeding 6,500 feet. Hence its force is mainly felt about the foot and lower slopes of the hills, as for instance at Buitenzorg (920 feet) in the western part of Java. In this district, one of the most abundantly watered in the

whole of Malaysia, it often thunders every day for months together. So accustomed does one grow to the continual peals echoing from height to height, that the stillness of cloudless evening skies causes a feeling of surprise. But the higher aerial spaces belong entirely to the zone of the south-eastern trades, which sometimes rise, sometimes fall, and by clashing with the western monsoon occasionally produce extremely violent local cyclones. But in the higher regions they always predominate, as shown by the smoke from the lofty craters, which invariably sets towards the west. No spectacle is more impressive than that of a western monsoon driving hard towards the east, while the long streak of volcanic vapours is seen through a break in the clouds to be setting in the opposite direction across a background of blue skies. In these upper regions the atmosphere is much drier and far less frequently disturbed than lower down.

Analogous climatic changes take place in the direction from west to east. The western parts of Java are more humid than the eastern, and these receive more rain than Timor still farther east. The summer and winter temperatures also become less equable in the same direction. In the Sunda Islands the variation from month to month is less than 2° F., the extremes being greater between day and night than between the hot and cool seasons. If the nights are colder and the days warmer in the dry months, compensation is afforded by the rainy months, when the temperature varies little throughout the twenty-four hours. At Batavia the rise and fall of the glass rarely exceeds 18° F. during the course of the year; but in Timor the discrepancy is much greater, the eastern islands of Indonesia already coming within the influence of the Australian climate.\*

## FLORA.

The Indonesian flora, comprising over nine thousand flowering plants described by Miguel, belongs to the same zone as that of India. But going eastwards it becomes gradually modified, approaching more and more towards the Australian types according as the atmosphere becomes drier and the climate less equable. In Timor, for instance, the character of the vegetation is already far more Australian than Indian. Here the eucalyptus, casuarina, and acacia predominate, but instead of developing large forests they grow in open thickets, as on the neighbouring continent.

In the western regions of the archipelago vegetable life is extremely vigorous. Despite the constant clearings and incessant struggle of the peasants against

\* Temperatures and rainfall in various parts of Indonesia according to observations varying from five to thirteen years:—

	S. Lat.	Yearly Temperature.	Hottest Month.	Coldest Month.	Rainfall.
Padam (Sumatra) . . .	0° 56'	79° F.	81° F. (May)	78° F. (Nov.)	190 inches
Palembang ,, . . .	2° 50'	81°	81°·5 ,,	79° (Jan.)	120 ,,
Banjermassin (Borneo) .	3° 34'	81°	81°·8 ,,	79° (Dec.)	90 ,,
Batavia (Java) . . .	6° 11'	78°	79° (May, Oct.)	77° (Jan., Feb)	78 ,,
Buitenzorg ,, . . .	6° 37'	77°	76° (Sept.)	76° (Feb.)	180 ,,
Banjuwangle . . .	8° 17'	79°	81° (April)	80° (July)	
Amboyna . . . . .	3° 41'	78°·6	81° (Feb.)	77° (July)	150 ,,

spontaneous growths, certain Javanese forests still maintain their ground, rivalling in splendour those of Brazil and Columbia. Vast districts in Java, probably occupying one-fourth of the whole area, are no doubt covered with savannahs, where nothing flourishes except the alang (*imperata arundinacea*), in which horse and rider disappear together. In the midst of these boundless seas of a light-green herbaceous growth, little is seen except a few scattered clumps of trees. But these savannahs are due to the action of man destroying the forests, either to clear the land or to destroy the tigers and snakes, and in any case the large timber, when left to itself, never fails to recover its lost ground. Forests of acacias and mimosas, which give little shade, also flourish on the slopes of the limestone hills. But on the moist and fertile coastlands and well-watered heights the surface is overgrown with a surprisingly vigorous vegetation. Here every stem is covered with epiphytes, their branches are matted together by the creepers; while the tall palms, seeking light and air, burst through the surrounding foliage, forming, as it were, a forest above a forest.

The Sunda Islands have their peculiar species of palms, amongst others, two varieties of the sago (*metrolyon Rumphii* or *sagus*) and the *corypha* (*gebang*), which grows in a narrow zone at an elevation of about 450 feet, immediately above the coast forests. The liana-palms (*rattan* or *rotang*) twine round the other trees, hanging in festoons from top to top sometimes for a space of three or four hundred feet, and thus binding together whole forests in a compact mass into which it is impossible to penetrate without the aid of the axe or fire. Some species of bamboo also acquire the trailing habits of the lianas, occasionally growing to a length of 130 feet; others are armed with thorns and form dense thickets shunned even by the wild beasts themselves. The marvellous development of the parasitic plants in the Sunda Islands is well seen in the blossom of *Rafflesia*, which grows on the roots and branches of a species of *cissus*. In Sumatra one variety bears enormous flowers over seven feet round.

On the slopes of the mountains the various growths are disposed vertically according to the climate, ranging from the tropical zone of the coastlands to the temperate region of the topmost crests. Nevertheless, curious associations are sometimes observed amongst plants belonging naturally to different areas. Thus in Sumatra, the oak is found in company with the camphor-tree. On the same seaboard there are also met certain teaks, which in Java occur only at considerable altitudes on the flanks of the mountains. On the northern uplands of Sumatra are found certain pines intermingled with casuarinas. Here is the southern limit of those conifers, whose true home are the Himalayas.

Amid this endless variety of forms each island of the archipelago has its own share of endemic growths. Thus in the Sumatran flora, comprising over two thousand six hundred known phanerogams, Miguel enumerates a thousand and forty-nine which are not met in Java, although separated from the larger island only by a narrow strait. Even the western and eastern divisions of Java itself, differing but slightly in their climates, present considerable contrasts in their local floras. Not only the Moluccas, long famous for their valuable spices, but all

the other islands in the archipelago, possess plants which occur nowhere else on the surface of the globe. In three years the botanist Beccari discovered over two hundred absolutely new species in the single district of Sarawak, on the north-west coast of Borneo. In the same island the summits of the mountains form so many secondary islands, with independent growths recalling the types of remote lands in more temperate climates. At an elevation of 8,500 feet, on the flanks of Kina-Balu, in North Borneo, are met certain forms belonging to genera which elsewhere occur only in New Zealand.

## FAUNA.

Going eastwards the flora is gradually modified with the changing climatic conditions, whereas the transition from fauna to fauna are for the most part of an abrupt character. While the species in the western islands as far as Bali are of the Indian type, those of the eastern regions, beginning with Lombok, present the characteristics of Australian zoological life. Two worlds as different as Europe and America here lie side by side, separated only by a strait less than 20 miles broad. But the two islands of Bali and Lombok, composed largely of igneous rocks, are probably for the most part of comparatively recent origin. Hence what is now a narrow channel was formerly a wide branch of the sea.

Nevertheless the striking contrast between two faunas on the same chain of islands presenting such great uniformity in their physical constitutions must still be regarded as a most remarkable phenomenon. One of the salient features of the terrestrial crust is this very range of volcanic islands evidently springing from the same fault in the submarine bed and stretching from the islet of Krakatau to that of Nila for a distance of 2,200 miles. Yet this line of eruptive rocks is intersected precisely in the middle by an abrupt parting-line between two distinct faunas. The inference is irresistible that the formation of the Sundanese volcanoes is of relatively recent date. The sudden contrast of the Indian and Australian animal forms shows that here the distribution of land and water, as well as the planetary life itself, has greatly changed during the course of the later geological epochs.

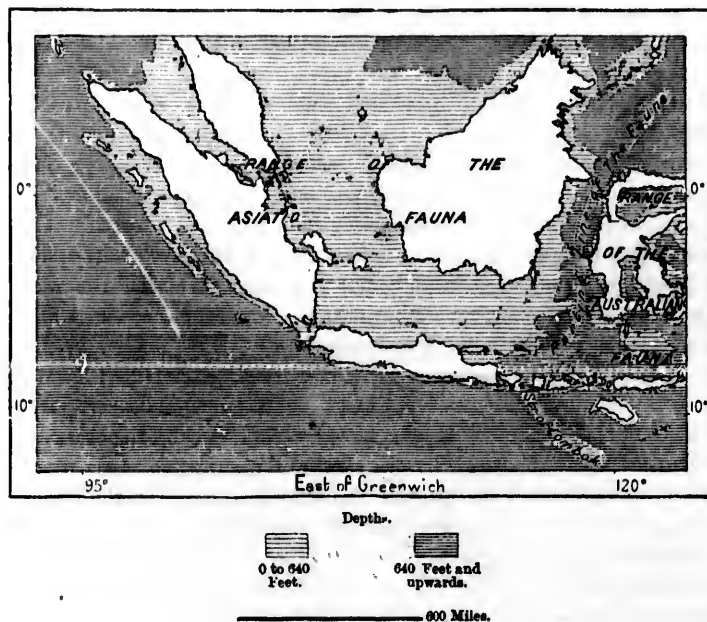
Between Borneo and Celebes, which however are separated by a much wider strait than that of Lombok, the contrast between the animal species is no less remarkable, nearly all the forms of the two regions belonging to distinct families. We must therefore conclude that here also the lands characterised by different faunas have remained disconnected since extremely remote geological times. But Celebes, unlike Lombok, formed no part of the Australian world. On all sides its isolation appears to be complete, dating evidently from a period of vast antiquity.

On the other hand both their fauna and their flora attest the ancient continuity of the three great islands of Sumatra, Java, and Borneo, which are separated only by shallow waters from the Asiatic mainland. Wallace enumerates forty-eight species of mammals common to the continental and neighbouring insular Malay lands. Sumatra, with its long mountain range disposed parallel

with the Malay peninsula, has a fauna which may be regarded as almost identical with that of the mainland. Borneo, being farther removed, already presents a certain originality in its animal forms. Still more marked characteristics are offered by Java, notwithstanding its proximity to Sumatra, with which it is farther connected by intervening islets affording resting-places to birds of passage. From the fact that Java possesses more endemic birds and insects than either Borneo or Sumatra, it may be inferred that it was the first to be detached from the mainland. Borneo doubtless still formed continuous land with Indo-China at a time when Java was already surrounded on all sides by the marine waters.

Fig. 25.—PARTING LINE OF THE INDONESIAN FAUNAS.

Scale 1 : 82,500,000.



Hence the zoological data formally contradict the Javanese tradition to the effect that the physical rupture between Sumatra and Java was quite a recent event, dating only from about the year 1000 of the new era.

But the zoological exploration of Indonesia is still far from being concluded. The region best known to naturalists is the western section of Java, although much attention has also been bestowed on the district of Padang in Sumatra, those of Sarawak and Banjermassin in Borneo, the island of Rangka, and certain peninsulas in Celebes. But all this forms but a small fraction of the vast Indonesian domain, and the future doubtless reserves many surprises for the naturalist.

At the same time the explorations already made suffice to give some idea of the teeming animal life in the western parts of the archipelago. During six years of research, Wallace alone collected over a hundred and twenty-five thousand zoological specimens. The Indonesian mammals comprise over one hundred and seventy species, amongst which twenty-four belong to the ape family. In Sumatra and Borneo occur two species of the orang-utan, that "wild man" who has been so often described, and who, by his intelligence and moral qualities seems to approach nearest to civilised man. The si-amang, nearly as tall as the orang-utan, has his home in Sumatra; while all the western islands have their long-armed gibbons and long-mouthed lemuroids.

Sumatra and Borneo are still the refuge of a species of elephant, apparently in no way differing from the Indian variety, as well as of a tapir, which is also met on the adjacent mainland. Both islands have their rhinoceroses, and Borneo and Java their wild cattle resembling those of Siam and Burmah. The Sunda group has no less than thirty-three species of carnivora, amongst which are the royal tiger and the almost equally formidable leopard. There are also as many as fifty different kinds of the bat family, and a great number of rodents, the squirrels alone being represented by twenty-five species, nearly all distinct from those of the mainland, but outwardly not unlike the tupaias, or insectivora, of which about ten varieties have been observed, mostly peculiar to the archipelago.

Besides those recently introduced by man, there are about three hundred and fifty species of birds, some of which, notably the parrakeets, are distinguished by their gorgeous plumage. The ophidians and other reptiles, somewhat rare in most oceanic lands, are, on the contrary, very numerous in Indonesia, where the estuaries are infested by crocodiles, and the forests inhabited by pythons over thirty feet long, and by the much-dreaded spectacled snake. Hundreds of species of fishes swarm in all the rivers, while thousands and thousands of the insect order have already been collected and classified in the European museums. Such is the multitude of the butterflies, that Wallace speaks of them as forming a characteristic feature of the insular scenery. The "ornithoptera," which, thanks to their size, majestic flight, and brilliant colours, make a greater show than most birds, are met in swarms about the verge of the forests and cultivated lands. A morning stroll in the more fertile districts of Malaysia is almost sure to reveal three or four, and often as many as eight species of *papilio*, of which naturalists have already enumerated about one hundred and thirty kinds. Borneo alone possesses thirty, the largest number yet found in any single island. The diversity of these species, however, diminishes gradually going eastwards, while their size increases in the same direction.

Such is the poverty of the fauna as we approach the Australian continent, that Timor offers no more than seven species of land mammals apart from fifteen kinds of bats. Passing from Borneo to Celebes, the naturalist is less struck by the reduced number of species than by their new forms. Celebes, having been longer isolated than the neighbouring lands, presents greater originality in the aspect of its fauna. Lying about the parting-line between the Sundanese and Australian



domains, it forms in some respects a connecting link between both ; but most of its species are altogether peculiar, so that this great island constitutes an independent zoological world. Of the three hundred and fifty kinds of birds inhabiting the Sunda group, ten only have reached Celebes, where there are no less than eighty found nowhere else. Of its twenty-one mammals, including seven bats, eleven are also peculiar to the island, while the local butterflies are distinguished from all their congeners elsewhere by the outward form of their wings.

The Moluccas, lying at the eastern extremity of Indonesia, resemble Timor and Celebes in the poverty of their mammals, of which they have only ten, not counting the ubiquitous bats, and of this number there is reason to believe that about half, amongst others the cynopithek, confined to the island of Batjau, have been introduced by man. The typical forms of this insular group approach those of Australia, being of the marsupial order, and comprising amongst others the *belideus ariel*, which outwardly resembles a flying squirrel.

On the other hand, the Moluccas have a marvellous wealth of birds, their avifauna being richer than that of the whole of Europe. Although the exploration of this region is still far from completed, naturalists have already discovered two hundred and sixty-five kinds of birds, of which one hundred and ninety-five are terrestrial, and most of which, such as the parrakeets, pigeons, and kingfishers, rival in beauty of form and gorgeous plumage those elsewhere found in the tropical zone. The numerous insects also, and especially the butterflies, form the admiration of explorers by their size and the metallic lustre of their wings. The little island of Amboyna alone contains more remarkable varieties of lepidoptera than many vast continental regions. Here, in fact, these animal forms may be said to have reached the highest possible pitch of development. Most of the species are peculiar to the Moluccas, while the genera and types connect this insular fauna with that of New Guinea. Although the Asiatic continent seems to be continued from island to island far into the Pacific Ocean, both Celebes and the Moluccas already belong zoologically to another region of the globe.

#### INHABITANTS OF INDONESIA.

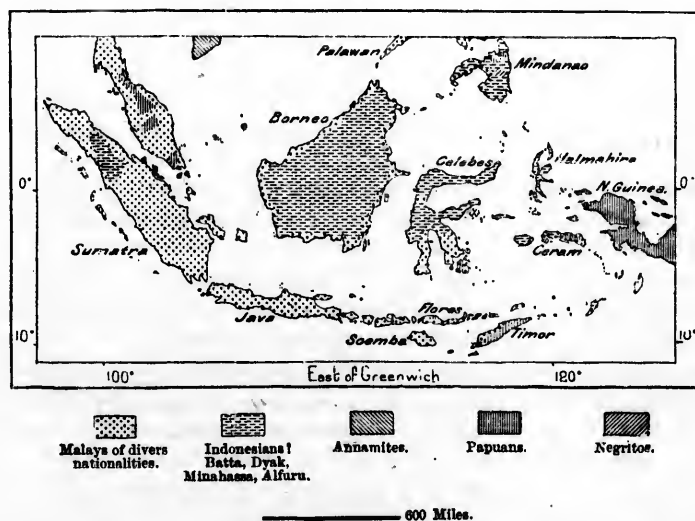
The Eastern Archipelago is shared as well by different races of mankind as by different faunas, but the parting-lines do not coincide for the human and animal forms. While the zoological domains are separated by the Lombok Strait and the broad Macassar Channel, the limits of the Malayan and Papuan races, with the allied populations, have been shifted much farther towards the east: this line traverses the islands of Jilolo and Buru, and then trends south-westwards in the direction of Timor and Sumbawa. The inhabitants of the islands lying on either side of these limits again present considerable differences amongst themselves, either offering various shades of transition between the true Malays and intruders of other races, or else belonging to a really original type, the possible survivors of some primitive stock. At least fifty languages are current in the archipelago, and each insular group requires to be studied apart with the territory occupied by it.

In the Sunda Islands and Celebes, as well as in a part of the Moluccas, the dominant, if not the exclusive race, is the Malayan, which constitutes the bulk of the population, or which at least has absorbed and assimilated most of the other ethnical elements. But whatever resemblances they may present to each other throughout the archipelago, these Malayan peoples are everywhere divided into natural groups, according to the geographical environment, their diverse interminglings, their diet and different degrees of barbarism or culture.

The Malays, properly so called, who closely resemble those of the neighbouring peninsula, and who have given their name to the whole race, occupy the coastlands of Sumatra and Borneo, with the intermediate islands. The Javanese, as indicated by their name, inhabit the greater part of Java, and have also spread farther east

Fig. 26.—INHABITANTS OF INDONESIA.

Scale 1 : 45,000,000.



to the two islands of Bali and Lombok. The Sundanese dwell in the western districts of Java, on the shores of the Sunda Strait separating that island from Sumatra. The Bughis hold the south-western peninsula of Celebes as well as the north coast, and all the adjacent islands. Lastly, each separate land has its more or less pure or mixed populations, bearing an endless variety of tribal names. The term "Alfuru," however, collectively applied in Celebes and farther east to all the wild tribes driven from the coastlands to the interior, has no racial significance. It simply indicates the social condition of the populations which have kept aloof from the Mohammedan Malays, some of which are of lighter complexion even than the Javanese, while others resemble in colour and aspect the dark Papuans of New Guinea.

Amongst the Indonesians are still found savage peoples, such as the Battas of Sumatra, the Bornean Dyaks, the "Alfurus," that is "Free" or "Wild," of Celebes, and most anthropologists are inclined to regard them as a primitive population of light colour who occupied the archipelago before the arrival of the Malays. To them is in a special manner applied the term "Indonesian," as if they were the representatives of the original masters of this oceanic region.

But in the north-eastern islands near New Guinea and the Philippines, there occurs yet another ethnical element quite distinct both from the Papuans and Malays, characterised by black or blackish skin and crisp hair. These natives, who resemble the Andamanese and the Negritos of the Philippines, would appear to be the true autochthones, still older than the fair Indonesians of Sumatra, Borneo and Celebes. In the western islands they have been exterminated, in the eastern driven to the uplands of the interior, just as the Indonesians themselves have been encroached upon in the large Sundanese islands.

This remarkable phenomenon of distinct human as well as animal species dwelling in contiguous islands, under the same or analogous physical conditions, finds its explanation in the history of the planet itself. Such contrasts are the outcome of different epochs, which are here placed, as it were, in juxtaposition. But during the course of ages all these heterogeneous elements must have long been subjected to like influences, for all, or nearly all, the current Malay, Papuan, Indonesian, and Negrito languages seem to constitute a single linguistic family, and this family itself has been affiliated by Hodgson and Caldwell to the Dravidian of Southern India.

As commonly understood, the term "Malay" is practically synonymous with "Mohammedan." The Indonesian, whether black, bronze, or fair, who accepts the Moslem faith and acquires a knowledge of the Arabic letters, becomes *ipso facto* a "Malay." Still, the great bulk of the population belongs probably to the same stock. Without prejudging the question of the origin of the Malay race now dominant in the archipelago, it may be asked where was its home in the times anterior to the historic period? Did the Malays reach this region through the peninsula named from them, or had they any other centre of dispersion, as for instance, the plateaux in the interior of Sumatra? According to Van der Tunk, their very name, interpreted by him in the sense of "wanderers," "vagabonds," would indicate their foreign origin. In all the lands occupied by them the banks of the rivers are "right" and "left" not according to the course of the stream seawards, but in the reverse way, as if the colonists had in all cases penetrated from the sea against the current into the interior. Marked resemblances have also been observed between the Malay houses and their praus, so much so that in many places their villages present the appearance of stranded fleets.

The insular as well as the continental Malays, although short, or at most of average height, are of robust constitution, with a ruddy brown, at times olive, complexion, and in the women, who are less exposed to the sun, approaching nearer to a decided yellow. The hair of the head—for all are nearly beardless—is

black, hard, and coarse to the touch; the face rather round than oval and somewhat flat, with small nose but wide nostrils, thick lips, prominent cheek bones, and black eyes. But for their complexion and dress they might often be taken for Chinese. The resemblance is even closer to the Khmers (Cambojans), with whose language the Malay presents a great analogy even in its grammatical structure.\* Physically the Malays are distinguished by their well-balanced frames, delicate articulations, small hands and feet.

Like the members of all other human families, the Malays of the different islands present marked diversities according to their pursuits or professions. The corsair or the trader cannot be judged by the same standard as the mechanic or the peasant. But the great bulk of the natives, occupied with husbandry, are sociable if somewhat taciturn, of a kindly disposition, ever ready to render each other mutual aid, extremely courteous and considerate for the privileges and feelings of others. The labourer is careful not to awake his fellow workman by a touch of the hand; the creditor hesitates to remind the debtor of his obligations; altogether the demeanour and conversation of the Malays are certainly superior to those of their white rulers and pretended "civilisers."

But although in some respects highly cultured and for centuries possessing a written literature, the Malays do not appear to be as richly endowed intellectually as other nations, notably the Papuans, who are at present greatly their inferiors in civilisation. According to those travellers who have associated most intimately with them, their chief mental defect is a certain feebleness of understanding, a lack of boldness or vigour of apprehension. They are timid, without power of independent action, hence disposed to submit unresistingly to foreign influences. Thus they formerly accepted Buddhism and Brahmanism at the hands of a few Hindu missionaries. Then came the Arab traders, who soon persuaded most of the populations to adopt Islam; and now a handful of Dutch officials, supported only by a few mercenary troops, suffices to hold thirty millions of human beings in a state of subjection little removed from slavery.

#### SUMATRA AND NEIGHBOURING ISLANDS.

Apart even from the adjacent archipelagoes geologically dependent on Sumatra, this island is one of the largest in the world, being exceeded in extent only by New Guinea, Borneo, Madagascar, Australia, and the polar regions of Greenland and the antarctic lands. Its surface, which has not yet been regularly surveyed, is estimated at over 175,000 square miles, or thirteen times the area of Holland, to which it is politically attached, if not yet completely reduced. In the northern highlands and forests it is still occupied by independent populations, and the interminable war with Atjeh, begun in 1873, has taught the Dutch people what it costs to attempt the subjugation of a brave nation determined to defend its autonomy against all odds.

Until the island is completely "pacified" it will be impossible to obtain

\* Fontaine, Aymonnier, Keane (*Australasia*).

accurate returns for the whole population. But from the partial statistics already taken in the conquered provinces, combined with the systematic estimates made for the independent districts, it may be inferred that the number of inhabitants, although still comparatively slight, has considerably increased since the middle of the present century. According to Veth, the population of Sumatra and the western islands in 1869 was somewhat less than two and a half millions; at present it certainly exceeds three and a half millions, and possibly even four millions. Were it peopled as densely as Java, which its fertile soil and abundant resources might enable it even to surpass, Sumatra would have a population of not less than seventy millions.

Sumatra presents some features in common with Madagascar. Both are nearly of the same extent and outward form, that of an elongated oval; both have one nearly rectilinear coast, that facing towards the high sea, and another, washed by shallower waters, of irregular outline and indented with creeks and inlets. These two seas encircling Sumatra, the boundless ocean to the west, the shallow island-studded waters to the east, are said by some etymologists to have earned for the island its Sanskrit name of *Samantara*, that is, "placed between two;" but there can be little doubt that its name is really derived from *Samudra*, which in Sanskrit simply means the "sea," but which was the designation of an ancient kingdom on the north coast.

During the predominance of Hindu influences Sumatra shared with the adjacent island the name of *Java*, being distinguished from its neighbour by the epithet of "Little," not as being thought smaller than the "Great Java," but because of its inferior commercial importance. The native names of Sumatra are *Pertjeh* and *Andalas*. It remained unknown to Europeans till the first years of the sixteenth century. Ludovico di Barthema visited the north coast in 1505, and four years later a Portuguese fleet made its appearance in these waters. The Dutch, present masters of Sumatra, did not present themselves till the close of the century, in 1598.

#### PHYSICAL FEATURES OF SUMATRA.

As in Madagascar, the highlands and mountain ranges, largely composed of stratified rocks resting on a granitic foundation, are developed not in the centre of the island, but for the most part in the vicinity of the western or oceanic coast. The orographic system, however, is of far more regular formation than in Madagascar, running from one extremity to the other along a scarcely deflected axis, presenting in some places only a single main range, in others breaking into two or three parallel chains. These ranges are connected by secondary transverse ridges enclosing verdant plateaux and cirques diversified by tranquil lakes and winding streams. In these upland regions, at a mean altitude of about 3,000 feet, are grouped the largest villages, and here the fertile soil is turned to best account. Here also the climate, far cooler than on the coastlands, is suitable even for Europeans, so that the elevated Sumatran tablelands would seem to combine all the advantages destined to render a country populous, rich, and prosperous.

The Sumatran mountain system certainly forms a southern and more regular



Fig. 27.—Pulo Bras Laganhouse, Sumatra.

extension of the Arrakanese, which, terminating on the mainland in the headland of Cape Negrais, east of the Irrawaddi, afterwards describes the elongated curve of

the Andaman and Nicobar Islands. The Barisan Mountains, as the Sumatran ranges are collectively called, begin to the north of Atjeh with the islet of Pulo Brass (2,300 feet), on which has been erected the beacon known to mariners as the "Sumatra Lighthouse." Eastwards stands the insular mass of Pulo Wai (1,370 feet), beyond which on the mainland rises the volcanic Selawa Janteu (5,650 feet), known to the Dutch as the Goudberg, or "Gold Mountain." This imposing and almost completely isolated cone is followed along the north coast by other crests, for the most part less elevated, and indicating the border of the still unexplored Achinese plateau. The range terminates near Diamond Cape (Jambu Ajer) in a Tafelberg, or Table Mountain, whose highest terrace stands at an altitude of 5,300 feet above the sea. Beyond the hills on the coast is seen the summit, 4,000 feet high, of the still unvisited Samalanga volcano.

But the main range, which has its origin to the west of the Goudberg and of the Atjeh valley, develops a much loftier series of crests along the oceanic seaboard. Here the Abong-Abong and Iuseh, said to be volcanoes but not yet explored, are reported to attain the respective elevations of 11,300 and 12,200 feet.

South of these lofty summits, whose cones rest on a crystalline formation some 3,000 or 4,000 feet high, the mean altitude of the highlands is considerably reduced, and here the system branches into parallel chains enclosing the Toba plateau, and *tao*, or "sea," of like name. This basin, called also Silalahi, forms a lake of clear water 500 square miles in extent, whose shores are studded with hundreds of Batta villages. In its waters are mirrored the cones of extinct or still active volcanoes, one of which, the Dolok Simanabúm, emitted dense vapours in 1881. On its flanks, as well as on those of a neighbouring volcano, may be distinguished from below a broad belt of a golden colour, consisting probably of crystallised sulphur. The Pusuk Bukit, another cone on the western margin of the lake, also possesses extensive sulphur deposits, whence the Battas draw their supplies. The island rising in the centre of the basin was itself a volcano, which has been attached by eruptive scoriæ to the mainland and to the Pusuk Bukit. Lake Toba stretches in the direction from north-west to south-east, parallel with the main Sumatran axis. Its overflow is discharged to the south-east, towards the strait of Malacca.

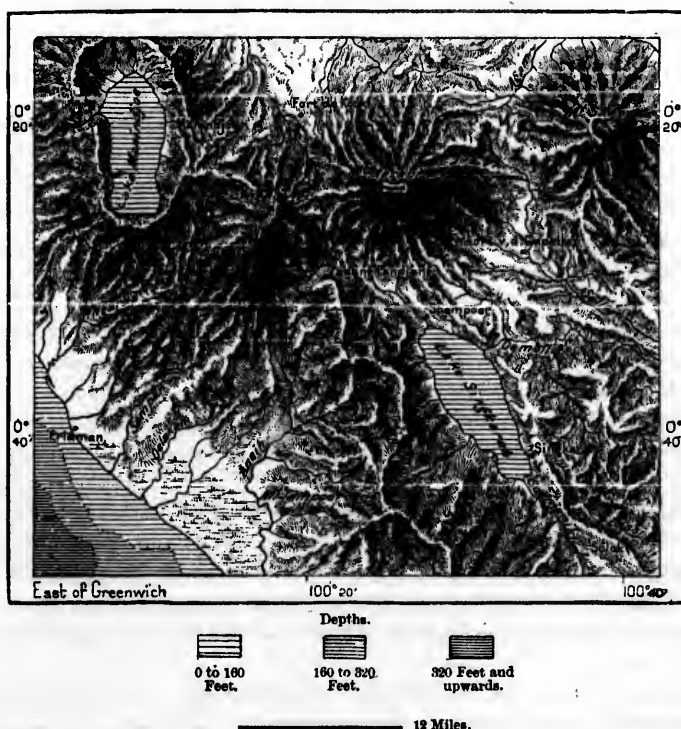
The amphitheatre of hills, whose spurs branch off towards the east coast, again converges south of the Toba plateau in a single main range, which resumes its normal direction parallel with the west Sumatran seaboard. In this part of the Barisan highlands some volcanic or other peaks exceed 5,000 feet in height. From one of the cones are emitted wreaths of sulphurous vapours, and another is pierced by a crater whose walls are lined with a yellow incrustation of sulphur.

The range is flanked on the west by superb lateral spurs, which from a distance seem to be the dominant summits. Such are the Malintang (5,000 feet), and the Pasomau, which European geographers have named Mount Ophir, not on account of its gold mines, which have no existence, but in allusion to the natural

wealth of the great tropical island. Being completely isolated in appearance, and rising just five miles north of the equator, about the exact centre of the oceanic coast of Sumatra, Ophir stands out as the most conspicuous insular landmark for mariners navigating the neighbouring waters. Hence till recently it was supposed to be the culminating point of the island, and a far greater altitude was assigned to it than the 9,600 feet to which modern explorers have reduced it. Mount Ophir has two chief summits besides several partly obliterated craters. Farther on the main range proper is interrupted by the broad valley of the

Fig. 28.—THE MERAPI VOLCANIC RANGE.

Scale 1 : 730,000.



river Masang, south of which a transverse volcanic ridge trends west and east on the border of the Padang uplands. The westernmost volcano of this system has lost its mountainous aspect, nothing remaining except the vast periphery of the base, which now forms a wooded enclosure. The crest has disappeared, doubtless blown away by some tremendous explosion, and about half of the old crater (1,520 feet) is now flooded with the oval-shaped Lake Maninju, called also Danau, or the "Sea." This basin, which discharges westwards to the Indian Ocean, is fed by a few slightly thermal and alkaline springs much frequented by the



natives. Gaseous eruptions take place from time to time in the depths of the lake, and then the atmosphere becomes charged with sulphurous exhalations, while the fish perish in thousands.

East of this lacustrine basin, which greatly resembles the Italian Lake Bolsena, rises the still perfect Singalang volcano (8,800 feet), scarcely less imposing than its eastern neighbour Merapi, whose highest peak attains an elevation of 9,400 feet. This volcano, as indicated by its very name (Moro Api, "destroying fire"), is the most restless of the seven or eight still active burning mountains in Sumatra. None other has discharged such copious lava streams over the surrounding plains, and even during the present century it has been the centre of numerous disturbances. Its summit, of a red colour and destitute of vegetation, terminates in a group of three craters, each encircled by recent lavas. The local Malay legend has converted Merapi into a sort of Ararat, whence their first parents descended as the flood-waters subsided.

The Sago volcano (7,450 feet) stands out like a bold landmark at the north-east corner of the Padang uplands. This region is throughout its whole extent a mountainous terrace-land somewhat clearly marked off by two longitudinal ridges, on the west the main Barisan range, on the east that of Ngalau Saribu. The plateau is likewise skirted on the south by another transverse chain, which like the northern ridge has also its "corner stone," the Talang or Sulasi volcano (8,440 feet), rising immediately above the west side of the city of Padang. Thermal waters and sulphurous vapours escape in abundance from crevasses of this mountain, which, however, does not terminate in a crater properly so called. On its flanks are rich sulphur beds extensively utilised by the natives.

The lowest depression of the quadrilateral of outer ridges enclosing the Padang uplands is flooded by a lake, whose long axis is disposed in the same direction as Sumatra itself and its mountain system. The Singkarak Sea, as this basin is called, teems with fish, yielding an abundant supply for a large number of the surrounding populations. Its level has been lowered some three feet by the destruction of a rocky barrier at the head of its emissary, the river Umbilien, which is one of the main branches of the Indragiri. Three other lakes, one a tributary of Singkarak, are disposed in terraces on the south-east slopes of Mount Talang.\*

South of Talang the Barisan chain presents only a single ridge skirting the seaboard at a mean distance of fifteen miles from the ocean. In this section of the system, but to the east of the normal line of crests, rises the isolated Korintji (12,200 feet), known also by the name of Indrapura, or "City of Indra"; for this peak, which contends with Luseh for the first rank amongst the Sumatran summits, was supposed, like the great mountains of India, to be the everlasting abode of the gods. Vapours are almost constantly emitted from its crater, a

\* Lakes of the Padang plateau :—

	Altitude.	Area in Square Miles.	Greatest Depth.
Maninju . . . . .	520 feet	40	510 feet
Singkarak . . . . .	1,100 "	45	890 "

chasm visited by Veth and Van Hasselt, and by them described as developing a vast circumference and several hundred yards deep.

Like the Padang volcanoes, this majestic mountain has also its little lacustrine system in the valleys excavated at its base. Here rises a torrent, which after skirting the east slope of the volcanic chain falls into the *danau* or "sea" of Korintji, whence an emissary escapes towards the river Jambi. Farther south follow other volcanoes disposed in a line with the general axis of the island, but for the most part extinct. Kaba and Dempo, however, are still the theatre of frequent and violent convulsions. Kaba (5,500 feet), which is visible thirty miles to the north-east of Benkulen, towering above the Suikerbrood ("Sugar-loaf"), terminates in two craters, one inaccessible, and both rent by crevasses, whence issue jets of vapour. In 1875 Kaba entered on a period of activity, the eruptions lasting three years, and covering the surrounding hills and valleys with sand mixed with chemical substances fatal to plants and animals alike. Even now, whenever the sandy banks of the neighbouring streams give way the fish die in thousands.

Dempo (10,560 feet), which rises some sixty miles to the south-east of Benkulen, is also the scene of constant disturbances. But Sawah, one of the old craters, no longer bursts into flames, so that the natives are able to approach without danger and offer their sacrifices in the midst of the heaths and rhododendrons. The new crater, named Merapi like the great Padang volcano, stands 830 feet higher up, and is the abode of the *deva* for whom the offerings are intended. Some sixty feet below the circular rim is seen a lakelet sparkling like a sheet of quicksilver; presently a black speck in the centre of the glittering surface begins to expand and assume the form of a funnel, in which the water suddenly disappears. In a few minutes the rocks resound as with the rumbling of thunder; the din grows nearer, followed by a flash as of lightning, and the water, transformed to vapour, issues in a dense jet from the crater, into which it again soon subsides. Thus every fifteen or twenty minutes the lake vanishes and reappears in the form of a magnificent geyser some hundred feet high.

Farther south another *ranau*,\* or "sea," floods an elevated cirque (1,720 feet), which seems to have been an old crater, and which is encircled on three sides by extinct volcanoes. It is extremely deep in the centre, and in one place thermal springs from the neighbouring Mount Siminung raise the temperature too high for animal life.

Southwards the Barisan system again bifurcates, one branch continuing in the normal direction south-eastwards to Cape Tjina (China), where it merges in low hills over against Princes Island and the south-west extremity of Java. The other or volcanic branch trends more to the east, where it is indicated from afar by the lofty summits of Mounts Besagi, Sekinjau, Tebah, and Tangkamus (7,520 feet). This last, better known as the Keizers Piek, or "Emperor's Peak," rises near the southern extremity of Sumatra, on the Bay of Samangka, and is probably connected by a submarine fault with the islet of Tabuan. On the mainland the vol-

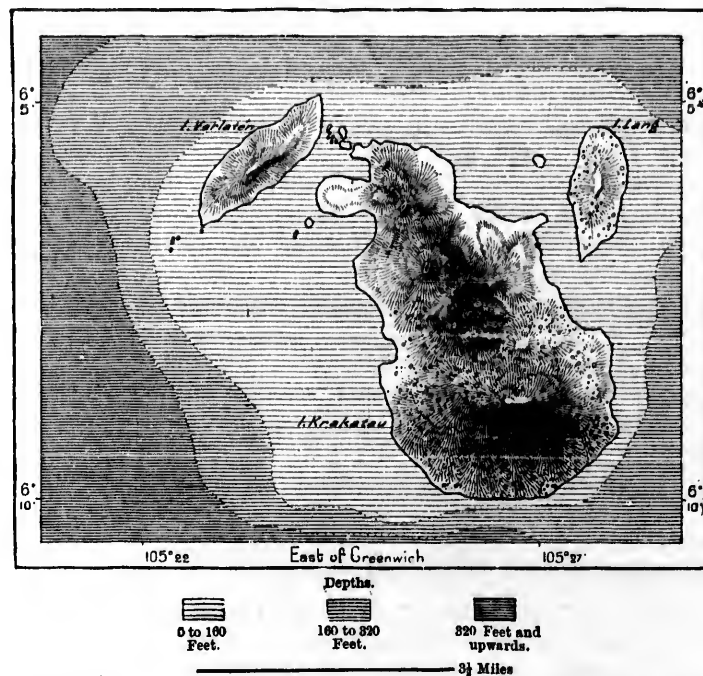
\* *Ranau*, *danau*, *tao* are various dialectic forms of the same word, meaning *sea*, or any large expanse of water.

canic chain is continued by Mount Tangka (3,460 feet), round Lampong Bay to the south-eastern headland of Sumatra, and thence through a line of islets and reefs across the Sunda Strait, here only sixteen miles wide, to the opposite coast of Java.

The extinct cone of Raja Bassa (4,460 feet), southernmost member of the chain of sixty-six Sumatran volcanoes, does not lie in the normal direction of the main axis, and seems to have originally stood on an island afterwards attached to the mainland, either by upheaval or more probably by a shower of scorix and ashes. Raja Bassa forms part of a transverse volcanic ridge, whose axis intersects that of

Fig. 29.—KRAKATAU AND NEIGHBOURING ISLETS BEFORE THE ERUPTION.

Scale 1 : 150,000.



the Sumatran system, for it runs in the direction from north-east to south-west. To this scarcely perceptible ridge belong the two islands of Sebesi and Krakatau in the Sunda Strait, and the system is also perhaps continued under the Indian Ocean for some six hundred miles to the Keeling Islands, which lie in a direct line with Raja Bassa and Krakatau.

But yet another volcanic fault intersects that of Sumatra and Krakatau in the Sunda Strait. This is the great Javanese system, running due west and east, and marked by so many formidable igneous cones. Thus at this focus of underground forces the terrestrial crust is, so to say, starred with tremendous fissures, and here the destructive agencies have at times, and even quite recently, assumed a character of stupendous grandeur.

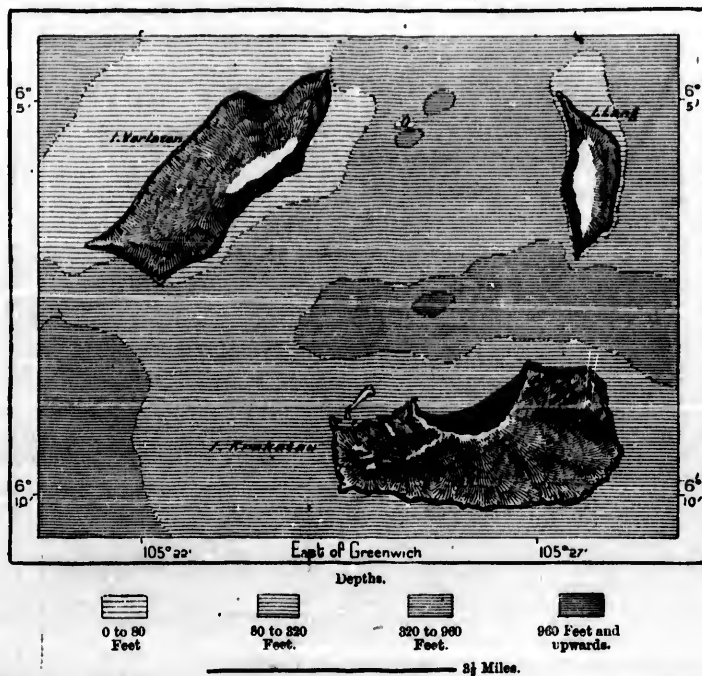
## KRAKATAU.

Till recently Krakatau, rising to a height of 2,270 feet, was hailed with joy by mariners crossing the strait, and vessels confidently rode at anchor under its shelter in depths of from 25 to 30 fathoms. The last recorded outburst, that of 1680, had already long been forgotten by the natives. But in the month of May, 1883, the fiery demon again awoke: on one of the northern shoulders the ground was rent asunder, flames burst forth, detonations and discharges of vapours and ashes followed in rapid succession.

But so far the display differed in no respect from similar manifestations

Fig. 30.—KRAKATAU AND NEIGHBOURING ISLETS AFTER THE ERUPTION.

Scale 1 : 150,000.

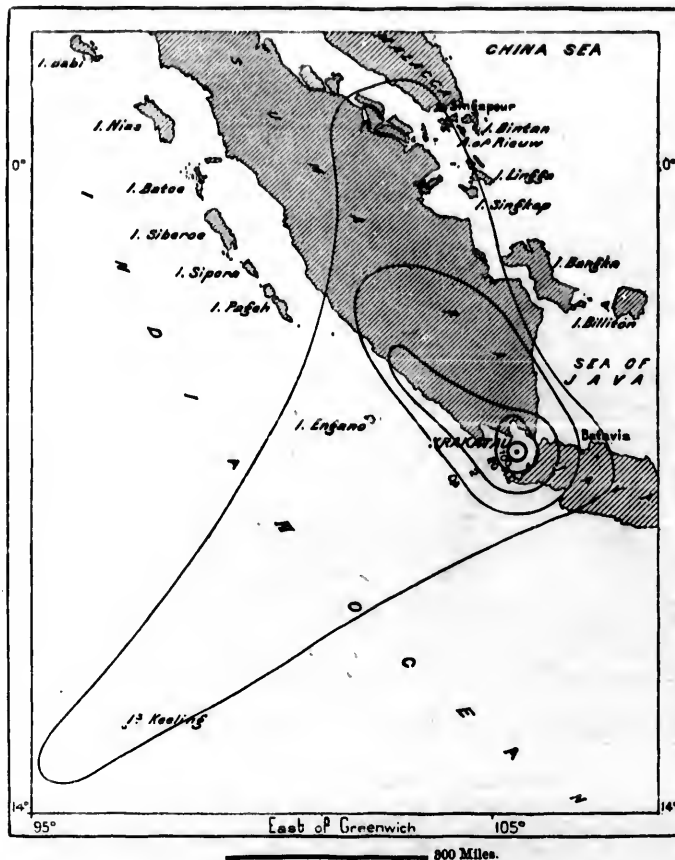


observed in so many parts of Indonesia, and excursionists from Batavia even landed on the island and approached the crater. But after three months of groanings and rumblings the volcano put forth all its strength, and in a few hours the whole topography of the Sunda Strait was changed. At Batavia, 90 miles distant, the uproar was so terrific that an eruption was supposed to have occurred in the immediate vicinity, and every moment the ground was expected to open. In all the surrounding waters, as far as the China Sea, in the Bay of Bengal, throughout half of the Indian Ocean as far as Rodrigues, the detonations were clearly heard, and everywhere the people wondered

what mighty fleets were engaged in deadly combat in the neighbouring seas. The commotion shook the atmosphere for a vast space, estimated at the fourteenth part of the planetary surface; the underground mutterings heard in the American island of Caïman Brac, almost at the antipodes of Krakatau, may even have proceeded from the same source. The clouds of ashes ejected to a height of sixteen, or according to one report twenty-one miles, fell in dense

Fig. 31.—RANGE OF DISPERSION OF THE KRAKATAU ASHES.

Scale 1 : 15,000,000.



masses over a vast space round about the island, which had been blown to pieces. Within a range of nine miles the bed thus formed was over three feet thick; in the interior of Sumatra, ninety miles off, some places were covered two or three inches deep, and the surface of the water was still powdered in the Indian Ocean beyond the Keeling Islands, a distance of 720 miles. The débris was wafted as far as the shores of Madagascar, and the displacement of rocks in the form of

ashes and pumice was estimated at as much as 630 billions of cubic feet. The whole terrestrial atmosphere would even appear to have been charged with the impalpable volcanic dust as far as the upper limits of the aerial spaces, at least according to Norman Lockyer's theory, attributing the marvellous afterglows of the following autumn months to the igneous particles ejected by Krakatau on August 26th, 1883.\* The seas also were agitated around the whole circumference of the globe, as attested by the readings of the mareographs at various oceanic stations, and in the Indian Ocean by the great marine wave which in thirteen hours was propagated as far as the Cape of Good Hope.

The reports of the fugitives from the threatened villages and of the crews of

Fig. 32.—STEAMER BORN ON THE KRAKATAU WAVE INLAND TO TELOKH-BETONG.



vessels near the scene of the disturbance created an impression that the field of destruction had even been still more widespread. But after the ashes were dispersed, and skippers could again venture into the Sunda Strait, the spectacle revealed to them seemed none the less harrowing and bewildering. The coast towns of Anjer and Tjaringi on the Javanese side, Beneawang and Telokh-Betong on that of Sumatra, had disappeared, while no trace remained of the numerous villages lately dotted along both shores. The cocoanut forests which fringed the seaboard to the foot of the hills had been swept clean away; a huge wave 100 to 120 feet high, caused by the sinking of the volcano, had dashed against the coast,

\* *Times*, December 8th, 1883.

carrying away headlands and excavating new inlets. All the works of man were destroyed, and over forty thousand persons, overtaken during the terrible morning, "blackier than the night," were overwhelmed in the deluge of waters rolling in from the sea, or in the showers of mud and ashes falling from above. Within the limits of the strait one man alone, a solitary lighthouse-keeper perched on his watch-tower 130 feet above an isolated rock, escaped scatheless in the midst of the surrounding pother. So dense was the darkness that he failed to notice the mighty wave that submerged the lighthouse all but his lantern.

Of Krakatau itself nothing remained but the southern volcano; all the northern heights, or about two-thirds of the island, some eight or ten miles in circumference, had been blown to pieces, giving place to an abyss where the sounding-line a thousand feet long failed to touch the bottom. From the breached wall of the southern volcano rolled a continual avalanche of stones, while the dust from the crumbling remains rose in clouds to the sky. But if some lands had vanished, others, formed by vast heaps of pumice and ashes, were raised from the bed of the sea. The island of Verlaten was more than doubled in size, and heights appeared where the plummet had lately revealed depths of 230 feet. Other islands, such as Sebesi, which had recently been covered with forests and human habitations, now presented to the view nothing but a bare surface of whitish rock.

To the new islands were added the floating masses of pumice, forming bars at the entrance of the bays and for weeks and months blocking the passage to the shipping. Gradually the action of the waves and marine currents swept the strait clear of these floating islands and heaps of emerged scorice; but the submarine crater which was opened to the north of Krakatau had held its ground. The geological studies made on the spot show that this crater had previously existed, and that the northern part of Krakatau was on the contrary of recent formation. What remains of the volcano and adjacent islets of Verlaten and Lang are the three outer fragments—the tripod, so to say—of a mountain over 6,500 feet high, which at some former time rose above the present eruptive crater.

#### RIVERS OF SUMATRA.

Although slower than the underground forces in their geological work, the Sumatran rivers have been more powerful agents in modifying the aspect of the land. The territory shown by its horizontal alluvial formation to be the creation of the running waters may be estimated at nearly one-half of the whole island. The sedimentary rocks are seen disposed like strands along the base of the coralline limestone cliffs, which formed the primitive coastline on the eastern slope of the Barisan uplands. Over two-thirds of the eastern seaboard is of quite recent geological formation, and is still continually growing by the addition of fresh deposits.

On the west side of the island the action of the streams is far less considerable. The catchment basins are not here of sufficient extent to convey seawards any great quantity of sedimentary matter. Nevertheless, even on this slope the

alluvial lands are also of great extent. The enormous volume of rain water precipitated on both slopes of Sumatra explains the exceptional importance of this fluvial action. On an average Padang receives a mean annual rainfall of about 150 inches; Palembang, on the opposite side, is still more copiously watered, and all the heaviest downpours fall on the advanced slopes of the mountains, so that little is lost by evaporation or infiltration before the streams reach the plains.

The Asahan, which receives the overflow of Lake Toba, belongs to the eastern slope. Farther south follows the Rokau, which enters the strait of Malacca through two muddy estuaries. It has a course of about 120 miles, nearly half of which winds through low-lying lands created and levelled by itself. Both the Siak and the Kampar disembogue in the labyrinth of marine channels washing the muddy shores of the archipelago lying to the west of Singapore. Although navigable for over 60 miles from their mouth, these two streams wind through almost uninhabited plains, whose climate is fatal to strangers.

Beyond the Kampar follows the Indragiri, which like it rises near the west coast on the Padang plateau. After traversing Lake Singkarak it flows under the name of the Umbilien through early Tertiary formations rich in carboniferous beds. Farther on it escapes from a region of plateaux through a series of falls and rapids, and after running for some distance parallel with the Kampar, mingles its waters with those of Amphitrite Bay. Near its mouth the southern and much smaller basin of the Rethel also contains some carboniferous rocks. Vessels ascend the Indragiri for many miles inland, but not as far as the neighbourhood of the coalfields.

The Jambi, whose farthest headstreams rise north and south of Indrapura, culminating point of the island, has the largest area of drainage and rolls down the greatest volume of water. At the town of Jambi, 60 miles above its mouth, it is nearly 500 yards broad and over 16 feet deep, at low water, and during the floods its volume is more than doubled. Steamers drawing three feet ascend the Jambi and its main branch, the Hari, for 360 miles from the sea, while small canoes penetrate 100 miles higher up.

The Musi, or Palembang river, which also rises on the uplands near the west coast, collects the waters of the eastern slope for a space of about 200 miles before entering the low-lying plains. Here it divides below the city of Palembang into several branches, which ramify into endless channels and backwaters amid the surrounding swamps. The Susang, or main branch, which falls into the Bangka Strait near its north entrance, preserves sufficient water to give access to large vessels during the floods, and to smaller craft throughout the rest of the year. But the other branches all merge in other streams to the right and left, developing shallow lagoons, expanding into broad morasses, or mingling with marine waters through the dense mangrove forests. These half submerged, uninhabited and, for the most part, almost uninhabitable tracts cover a total area of some 5,000 square-miles.

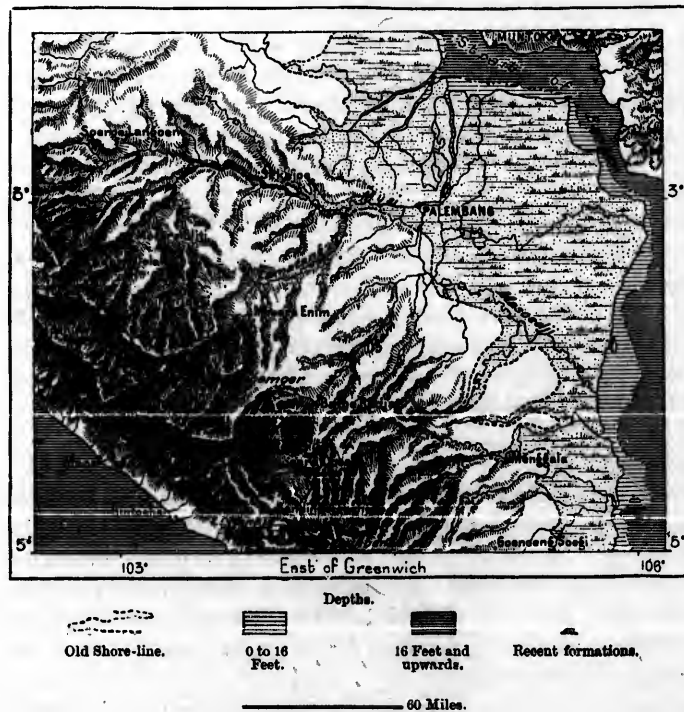
According to the local traditions, which however may have been inspired by the undeniably rapid encroachments of the land on the sea, the whole of this



region of the Musi delta has been formed during the historic period. Even the city of Palembang, now lying in the interior far above the estuary, is said to have been originally founded on the coast itself at the mouth of the river. The mangroves, by which these low-lying tracts are overgrown, contribute to the enlargement of the dry land by arresting the sedimentary matter amid their branches,

Fig. 33.—ALLUVIAL PLAINS OF THE MUSI BASIN.

Scale 1 : 4,000,000.



and by shedding their fruits beyond the river banks in the muddy waters, where they take root.

#### THE WEST AND EAST SUMATRAN ISLANDS.

West of Sumatra runs a chain of islands disposed parallel with the west coast. Abysses over 1,000 fathoms deep separate this chain from the Nicobar Archipelago; but with Sumatra it is connected by the incline of the now submerged intervening slopes. These islands form, so to say, an advanced coastline of the neighbouring mainland, and consist of the same Tertiary formations as those of the adjacent shores. Lying on a marine bed at a mean depth of not more than 50 fathoms, they stand on the very edge of the submarine Indonesian plateaux. Immediately

to the west the oceanic bed sinks rapidly, and within 60 miles of the islands the sounding line reveals depths of over 2,500 fathoms.

Beginning in the north-west with the island of Babi, the chain terminates in the south-east with Engano,\* over 720 miles distant. The isolated islet of Christmas, 300 miles farther on, might also perhaps be regarded as belonging to the

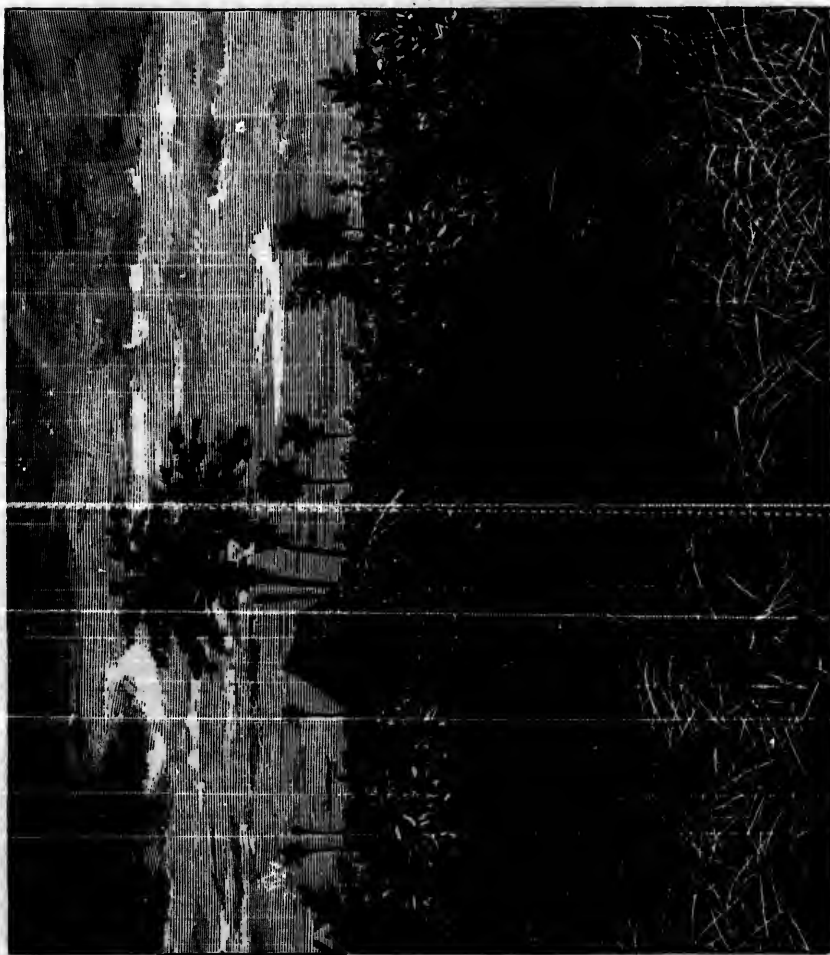


Fig. 34.—A SUMATRAN JUNGLE—VIEW TAKEN IN THE STATE OF DEKI.

same system, lying as it does in a line with its axis, but this point is rendered somewhat doubtful by the distance and the great depths of the intervening waters. Excluding this rock, the western islands, which beyond doubt depend geographically and geologically on Sumatra, have a total superficial area of about 6,000

\* Tolanjang of the Malays, Taigoeka of the natives, and probably the Engaño, or "Deception Island," of the Spaniards.

square miles, with a collective population estimated at three hundred thousand. On the other hand, the islands of the east coast, resting on the common Indonesian submarine plateau, are for the most part distinct from Sumatra, and require to be studied apart. The low-lying alluvial lands separated by shallow channels from the scarcely emerged plains which have been created by the Sumatran rivers, are certainly natural dependencies of the great island. Such are Rupert, Bengkalis, Padang, Rangsang, Rantau, and others lying about the mouths of the rivers. But those situated farther seaward, and of a hilly and even mountainous character, are of different origin, belonging physically to the Malay Peninsula. Like that region, they are of granitic structure, with surrounding laterite beds. Moreover they lie exactly in a line with the main axis of the peninsula, of which they constitute a southern extension now broken into fragments by marine erosions.

But while the sea destroys in one direction, the rivers reconstruct in another. They carry in solution the débris of the Sumatran highlands, depositing the sediment to the right and left in beds steadily advancing seawards, and thus gradually enlarging the great island towards the east. Unless the marine currents undo this work and keep the straits open by their scouring action, these must at last be silted up, and then the eastern archipelagoes of Riouw and Lingga, with Bangka and its satellites, will become attached to the Sumatran coast, lost as it were, like erratic boulders, amid the sands and clays of recent formation.

#### FLORA AND FAUNA OF SUMATRA.

Like the rest of Indonesia, Sumatra lies within the zone of alternating monsoons, the south-eastern or regular trade wind from May to September, and the north-western, bringing most of the moisture, and prevailing from November to March.

The Sumatran flora and fauna are distinguished from those of the adjacent lands by a large number of curious species. Such are the great *rafflesia*, the gigantic arum (*amorphophallus titanum*), growing to a height of over 16 feet; and those astonishing fig-trees, whose branches bury themselves in the ground, and then throw off their fruit, like so many small mushrooms. The character of the flora changes gradually southward. Thus, while the Merkus pine prevails in certain highland districts north of the Equator, no conifers at all are met farther south. Nevertheless, certain contrasts between Sumatran and Javanese floras on either side of the Sunda Straits are still striking enough to have attracted the attention of botanists. Characteristic of Sumatra, as compared with Java, is the great relative extent of the tracts overgrown with *alang* and *glaga*, grasses over three feet high, which stifle the young arboreal growths, and exhaust the soil wherever they become predominant. In Java they are arrested at about 3,000 feet, but in Sumatra they descend to within 800 feet of sea-level, and during the historic period their range has been much increased by careless husbandry.

Of all the Indonesian lands, this island abounds most in graminiferous species possessing great economic value. Here flourishes the majestic *dryabalanops*

camphor, for the produce of which the Chinese formerly paid its weight in gold ; from this region Europe also received its first consignments of gutta-percha (*gutta percha*), of which family there are several varieties. Sumatra was also probably the centre of dispersion of the cinnamon plant, of which it possesses ten species, a larger number than occurs in any other region.

The Sumatran fauna differs even more than its flora from that of the neighbouring island. It possesses the orang-utan, confined however to a district on the north-east coast, besides other remarkable apes, such as the galeopithecus, or flying lemur. The elephant, exterminated in Java, is still common in the northern jungle, where, according to the natives, two quite distinct species are found. The small species of rhinoceros met in the Sumatran forests also differs from the large Javanese variety ; but, notwithstanding the statement of Marsden, the hippopotamus does not appear to be a member of the Sumatran fauna, which, including domestic animals, comprises, according to Hagen, sixty species of mammals and one hundred and twenty of birds.

## INHABITANTS OF SUMATRA.

The Malay populations of Sumatra are diversely intermingled with other elements presenting considerable contrasts in the different provinces in their social usages and degrees of culture. Thus the Achinese, or people of Atjeh, in the extreme north, regard themselves as a nation quite distinct from the other islanders. Their nobles claim Arab descent, and really seem to be of mixed origin. For the five centuries preceding the arrival of the Portuguese, the trade of Indonesia was largely in the hands of the Arabs, who intermarried with the native women. By the end of the twelfth century the kingdom of Atjeh had embraced Islam, and later became a centre of Moslem activity, with its theologians, who cultivated Arabic letters, and its sectaries, who preached a new pantheistic creed, dying for their faith like the martyrs of the western world.

Although in recent times Arab influence has much diminished, the Achinese have preserved numerous usages introduced by their instructors ; and their Malay dialect, written in the Arabic character, has been affected by many foreign elements. The nobles wear the flowing robe and turban, like the merchants of Jeddah, although the women do not go veiled.

The Achinese, to whom the virtues of courage and industry are not denied, are stigmatised as cruel and treacherous, like all peoples who dare to defend their liberties. Skilful agriculturists, they raise heavy crops of rice and sweet potatoes, deriving from the soil the resources which have enabled them to maintain the struggle against the Dutch for fifteen years. Like the Hindus and Indo-Chinese, they are said to have succeeded in taming the elephant, employing him as a beast of burden. They also display much skill in working the precious metals, and as silk and cotton weavers, and construct solid vessels with which they carry on an extensive traffic with the surrounding lands, and occasionally scour the seas as dreaded corsairs. The chief centres of their trade beyond Sumatra are Penang

and Singapore, whence they import the opium, of which they have become inveterate smokers.

#### THE BATTAS.

South of Atjeh the hilly plateau is occupied by still independent peoples partly converted to Islam, such as the Gayus, of whom little is known beyond the name, and who are said to dwell on the banks of the freshwater lake Laut Tawar. Beyond them are the mysterious Alas, and the Batta or Battak\* people, centred

FIG. 35.—ORANG BATTAS.



about the Lake Toba basin. According to the missionary Nommensen, they number altogether about three hundred thousand, divided into two distinct groups, the northern Battas, who trade with the Achinese, and the southern, whose relations are mainly with Deli and Sibogha. Beyond the lacustrine region, which they regard as the cradle of their race, they are widely spread, as far south as Mount Ophir and eastwards to the mouth of the Bila. The natives of the Tapanuli district on the western slope are also Battas, reduced by the so-called *Padri* or "Fathers," fanatical

Mussulmans, who gave them the choice of the sword or the Koran. Altogether the pure or mixed Battas of the mainland, and exclusive of the Nias islanders, said also to belong to the same stock, are estimated at about a million.

The pure Batta type resembles that of the Bornean Dyaks and "Alfurus" of Celebes, affiliated by most anthropologists to the primitive races allied to the Polynesians, who formerly peopled Indonesia, and who, after expelling or exterminating the Negritos, were in their turn driven out or partly absorbed by the Malays. The Battas of the plateau are much fairer and taller, with more abun-

\* Batta, singular; Battak, plural.

dant hair and beard than the Malays of the coastlands, while the intervening populations present every shade of transition between the two extremes. Although the national name has been referred to the Sanskrit *Bhâta*, or "Savage," they must nevertheless be regarded as a civilised people, bearing even some resemblance in their carriage and features to their former Hindu instructors. But Indian influences, still active in mediæval times, have been for the most part gradually replaced by those of the Mohammedan Malays, and especially of the northern Achinese. Some Christian missionaries, especially Germans, have also been at work amongst them, but with little result beyond the spread of scepticism at the spectacle of so many conflicting religions.

In 1867 the Europeans first penetrated to Lake Toba, the heart of the Batta country. But when their visit was renewed six years later, a national council was held to discuss the question whether the punishment of death should not be inflicted on the strangers by whom their "holy land" had been desecrated. Now, however, they have grown accustomed to the appearance of the whites, and no longer throw any obstacles in the

way of their explorations. In 1883 the communities dwelling on the south side of Lake Toba were even obliged to yield submission to the Dutch arms.

Despite these foreign Hindu, Moslem, and Christian influences, the Batta civilisation still preserves some remarkable original features. Although engaged, like their neighbours, with tillage, cultivating both rice and maize, they are specially distinguished as stockbreeders, and possess numerous herds of horses and buffaloes, besides goats and swine. These are fattened for the national feasts, the ordinary diet being limited to fruits, corn, and roots. The islanders eschew the use of betel, so dear to the other Malays, but they are great tobacco-smokers, and masti-

Fig. 36.—ORANG ATJEH

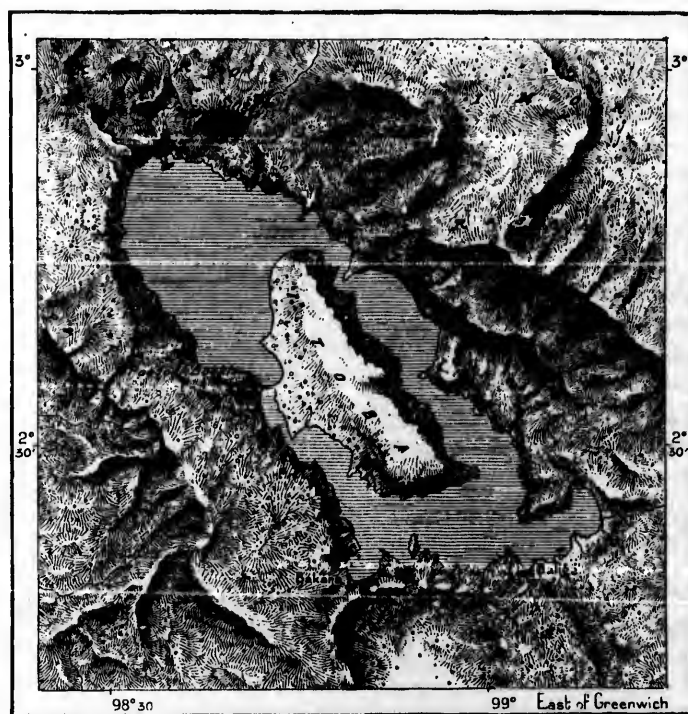


cate a mixture of lime and gambir leaves (*Uncaria gambir*). They neither tattoo the body nor practise circumcision, but mark the arrival of the youth at the state of manhood by filing their teeth.

The industries are well developed, the men being skilful workers in iron and jewellers, the women weavers and potters. They build elegant houses, some of which resemble Swiss chalets, with two stories rising above a ground floor reserved for the domestic animals. In some districts, when a man wants a house the whole community lends a hand to build one, and in several places a number of families

Fig. 37.—LAKE TOBA AND THE BATAA COUNTRY.

Scale 1 : 925,000.



reside together under one roof, a sort of stronghold surrounded by palisades to prevent surprises. Each village possesses a sort of "town-hall," where all valuable objects are kept and where strangers are publicly entertained. Amongst the most carefully preserved treasures are books and other records, carved on wood, or inscribed on bark or leaves, for most of the Battas can read and write. But unlike the coast Malays, who have adopted the Arabic characters, they still preserve the old alphabet introduced by the Hindus, but written from right to left on smooth bark, or from bottom to top on the bundles of reeds that constitute their archives.

The language, which contains many Sanskrit words, differs considerably from the coast Malay, and possesses a richer vocabulary. It moreover comprises special forms, such as the jargons of the women, magicians, and thieves. The young men and women correspond by letters written on foliage, and forwarded through a postal system which utilises as letter-boxes the hollow trunks of trees at the crossings of the highways.

The Batta commune constitutes an autonomous group represented rather than administered by a *rajah* or *pamusuk*, and deliberating in common. Village groups have also been developed, forming so many little republics connected together by a federal union; lastly, traces of an ancient kingdom seem to have survived in the expressions of almost religious veneration till lately lavished on a prince resident at Bakara, a large village at the south-west end of Lake Toba, recently conquered by the Dutch.

All the members of each community are supposed to be connected by the ties of kindred, although not holding equal social rank, and although the lower classes may even be pledged or sold by order of council for debts, crimes, or offences. The penal code is severe, beheading being till lately, and possibly still, the sentence pronounced for grave crimes, such as treason and armed revolt, but not simple murder or homicide. An extraordinary and altogether unique provision of the written code was that the outraged community should avenge itself by eating the criminal, who in some cases was even devoured alive. His nearest kin, as members of the commonwealth, had to share in the feast, and even supply the salt, lime-juice, and other condiments. But except as acts of justice, cannibalism was not practised, nor were women ever subjected to this treatment. At present the Battas assert that the custom has fallen into complete abeyance, but on this point their veracity is open to suspicion. There is reason to think that slaves are also despatched, to attend their masters beyond the grave, and that they are obliged first to masquerade at the pit's mouth. According to Junghahn and other writers, anthropophagy is of relatively recent introduction, a statement, however, which is at variance with the testimony of the old writers. Arab tradition and the first European visitors describe the Sumatran highlanders as cannibals devouring the infirm and aged. As soon as they felt themselves incapable of work, the "grandfathers" hung by their arms from the branch of a tree, while the family and neighbours danced round about, shouting, "When the fruit is ripe it falls." And when it did fall they fell upon it, chopping it into "mincemeat." Such feasts were usually held in the season when the limes ripened.

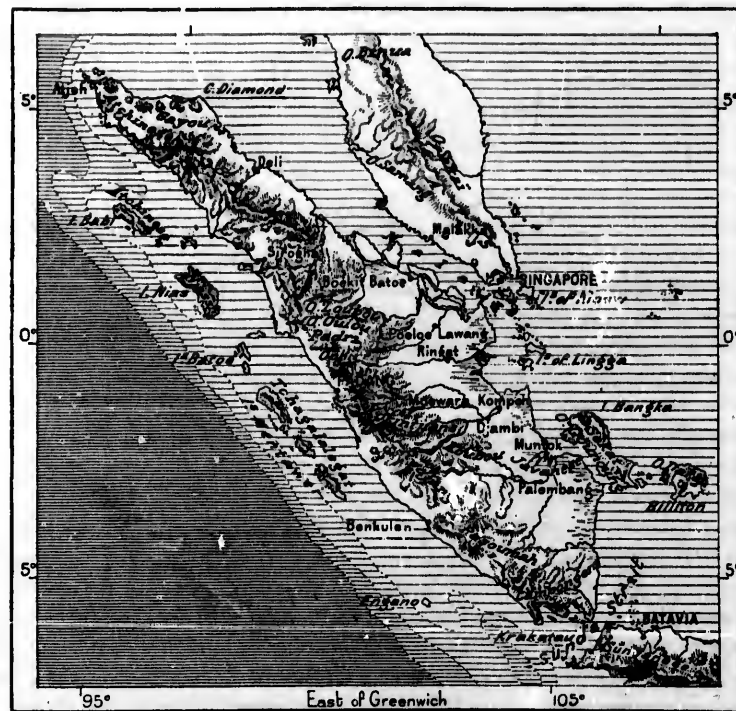
The least mercy is shown to prisoners of war, regarded as guilty of "rebellion against the conqueror." Most wars are, moreover, of a very sanguinary nature. The Batta jurisprudence not permitting a commune to be enslaved or deprived of its land, the only way of being revenged on it is by killing off a large number; and the festoons of human heads decorating the rajahs' residences sufficiently attest the zeal with which the work of extermination is carried out. In several districts this internecine strife checks the growth of the population, which is farther reduced by the prevalent practice of abortion. Late marriages are the



rule, owing to the high price of the bride, although another form of union, of matriarchal origin, also exists, according to which the husband is purchased by the wife. Being regarded as merely so much movable property, he may even be seized for debt, and bequeathed as a legacy to the testator's heirs.

Traces survive of the Hindu religions, for the Battas recognise a triune diety, Creator, Preserver, and Destroyer; and also admit the existence of other divinities and genii, to whom they give the slightly modified Indian name of *diebata* (*devaté*).

Fig. 38.—INHABITANTS OF SUMATRA.  
Scale 1: 15,000,000.



But religious worship enters very little into their daily life. They can scarcely be said to have any regular ceremonial, and there are only one or two temples in the country. The natives are mostly satisfied with invoking the little idols they always carry about with them in pouches, and are most concerned in circumventing the evil spirits by ingenious devices. Family groups and whole communes have been known to secure the protection of some powerful patron by burying a child alive, under the belief that its spirit will henceforth watch over their plantations. Chiefs and nobles are supposed to survive in the after-world.

On the day of their death a rice-field is sown, and at the harvest, presided over by the corpse, a feast is given in honour of the departed, now assumed to have taken his place amongst the benevolent genii. After the feast he is buried near the house of which he has become the guardian spirit.

To the Batta family are generally supposed to belong the little wild tribes of Orang-Ulus and Orang-Lubus, who occupy the upland valleys north of Mount Ophir, and who appear never to have been brought within Hindu influences. They have been compared with the most savage inhabitants of Borneo, like them going almost naked, dwelling in huts made of branches or in the hollow trunks of trees, and armed with the blow-pipe and poisoned darts. They cultivate no arts, not even that of husbandry, living mainly on fruits, roots, snakes, and insects, besides the rice and salt deposited by the traders in certain fixed places in exchange for the local produce brought thither by the "men of the woods." They have a large breed of dogs, who warn them of the approach of the traders, and scent out any tigers lurking about.

#### THE MENANGKABAO AND OTHER SUMATRAN MALAYS.

The ancient kingdom of Menangkabao, which succeeded the still older Hindu empire of Adityavarma, comprises south of the Batta country the most densely peopled part of Sumatra in the hilly region of the Padang uplands, and on the west slope of the island. The true form of the word is *Menang-Karbau*, or the "Victory of the Buffalo," which is explained by the local legend of a fight between a Sumatran and a Javanese buffalo terminating in the triumph of the former. This tradition may perhaps symbolise some conflict, or even a long struggle between the natives and the intruders from the neighbouring island. The natives ultimately triumphed, and their customs consequently prevailed over those of the Javanese and Hindus. They are at present regarded as Malays in a pre-eminent sense, and their speech is held to be the purest form of the Malay language.

Despite their conversion to Islam and the conquest of Menangkabao by the Dutch, the old institutions of confederate village communes and of matriarchy still hold their ground. The population is divided into *sutus* or clans, each with its own chief, chosen from some privileged family, and its council, consisting of all male adults. All the village chiefs are again grouped in a district council, the district thus organised usually taking its name from the number of *kotas* or villages of which it is constituted—the "Seven," the "Nine," the "Ten," the "Twenty," the "Fifty" *Kotas*, and so on.

No man can marry within his own kota or sutu, so that unions are all essentially exogamous. The husband helps his wife or wives in the management of the household and in cultivating the land, but his children belong to the mother, and must remain in the maternal village to inherit the maternal property. The father's inheritance, on the other hand, goes to his sister's children in his native village. Such is the *undang-undang*, or matriarchal law, and the survival of these institu-

tions, so opposed to the spirit of Islam, shows what little influence is really exercised by the official religion of the country.

Nevertheless, at the beginning of this century the rigid sect of the Orang Puti, or "White Men," also known through their proselytising zeal as "Padri," like the Portuguese missionaries, became powerful enough to overthrow the kingdom. About 1820 these eastern "Wahabites," whose reform consisted chiefly in abstaining from tobacco, betel, and strong drinks, reduced the high-priest and King of Menangkabao to such extremities that he was fain to call in the aid of the Dutch, at first allies, presently masters.

The Malay inhabitants of the upland valleys and plateaux south of Padang greatly resemble the Battas, without, however, showing any traces of cannibalism. The Korintjiers (Korinches) settled about Mount Indrapura; the Rejanges (Rejangs), "guardians of the frontier" between the provinces of Palembang and Benkulen; the Pasumahs of the district dominated by the Dempo volcano; lastly, towards the southern extremity of Sumatra, the Abungers, or "Highlanders," and the Lampongers, or "Lowlanders," all appear to have formerly enjoyed a high degree of civilisation. From their ancestors they have inherited a writing system derived, like that of the Battas, from the Sanskrit characters, and all can still read and write.

In the forests here and there occur colossal statues, which, strange to say, present neither the Hindu nor the Malay type. Amongst several Rejang tribes the mothers flatten the nose and compress the skull of their children, and the practice of filing the teeth is very prevalent. According to Van Hasselt, the Lampong Abung peoples come from Menangkabao. Amongst them marriage is also exogamous, and the price of the wife is relatively so high that the husband takes years to work off the charge. But on the other hand she becomes his slave, and the jewels and coins with which she is decked on the wedding day all belong to him. Later he also indemnifies himself by the sale of his own daughters. The eldest brother is required to take over all the widows of the family; but the women of the upper classes usually marry, as in Menangkabao, according to the matriarchal system, and retain possession of the land and offspring. In the coast-towns, where Islam has prevailed over the primitive heathendom, unions are contracted in the Arab fashion. The married alone are buried with honour, for they are the "parents of the people;" all others are thrown to the bush.

The natives of the Siak, Jambi, and Palembang districts, on the east coast, are for the most part immigrants from the neighbouring islands, being the descendants of traders who founded factories about the river mouths. On these coastlands Hindu influences long survived, thanks to the proximity of Java, whence colonists continued to settle in Palembang down to the middle of the sixteenth century. In general the usages on this seaboard differ little from the Javanese, and even the current speech retains many words introduced from the neighbouring island.

In the interior dwell a few thousand Orang-Kabu, believed to represent the aborigines gradually driven inward from the coast. They lead a wandering life in the midst of the forests; but physically they differ little from their Malay

neighbours, except that they are more robust and of lighter complexion, and their superiors in the qualities of truthfulness, honesty, and courage. Armed with a simple stake they boldly attack the tiger, but, like the northern Orang-Lubu, avoid all personal contact with the Chinese and Malay dealers. The Kubu language is closely related to the current Malay speech.

#### THE NIAS AND MENTAWAY ISLANDERS.

The natives of the West Sumatran islands are of diverse origin. Those of Simalu (Babi) in the north descend from Menangkabao immigrants mixed with Achinese blood. The Banjak islanders are also sprung from Malays and Achinese, who arrived from the mainland about two hundred years ago. Bangkara, the westernmost member of the group, is still uninhabited, and is even avoided, through dread of the "evil spirits" by whom it is supposed to be peopled.

The Ono Niha, or "children of men," as the Nias islanders are called, number, according to Von Rosenberg, about two hundred and forty thousand souls, who, however, have not all been yet brought under the Dutch administration. Most writers agree with Junghuhn in regarding them as of Batta stock. But although the physical and moral resemblances are numerous, the contrasts are also very striking. Even the northern and southern Nias people themselves differ greatly in their usages, and do not recognise themselves as of common kindred. If the Ono Niha are really of Batta origin, the separation must have taken place in extremely remote times.

Both branches of the Nias group are usually cheerful, agreeable, courteous, easily led by motives of self-love, always anxious to please, but extremely indolent, except in some of the southern districts, where war is not carried on, as elsewhere, by a system of ambushes and nightly surprises. Hereditary hatreds are perpetuated sometimes to the utter extinction of one or the other of the hostile factions. The villages, especially in the north, attest the state of constant terror in which the people pass their lives. Nowhere is an isolated hut to be seen, all being grouped together on natural or artificial eminences encircled by ditches and palisades. The dwellings themselves are raised on rows of piles, amid which the pigs act as scavengers, thriving on the kitchen and other refuse. A ladder and trap give access to the house, which affects the form of a large oval basket with a high-pitched roof thatched with reeds, the projecting gables being everywhere decorated with the jawbones of hogs, attesting the wealth of the owner. To these the southern village chiefs add the heads of their human victims, while the whole is protected by effigies of the tutelary deity against the machinations of the foe and the malevolent spirits. At one end of the village stands the smith's house, to which a magic virtue is also accredited, and for further security the entrance of the enclosure is guarded by lofty statues of the tribal god and his wife.

The Nias islanders are clever artisans, as shown by their well-constructed houses and strongholds, their elegant and highly tempered weapons. They work copper with taste, weave and dye their textile fabrics, make highly prized matting

and extract cocoanut oil for exportation. Gold, either in fragments or wrought into jewellery, is their only currency; and the chiefs delight in decking their hair with golden plumes and attaching a golden crescent like a moustache to the upper lip. The southern districts are traversed by a few carefully paved roads skilfully constructed over the crests of the hills. But, unlike the Battas, they have not acquired a knowledge of Hindu letters, and their ancient usages have been slowly modified under exclusive Malay and Mussulman influences.

At present their religious system has approached the vanishing point. The main function of the *éré*, priests or priestesses, usually chosen by the chief from his own family, is to invoke the *bela*, or intermediate spirits, who are familiar with both the good and evil genii, and who can therefore be enlisted as helpmates and accomplices in all undertakings. The priests also bless the nuptials by pressing together the heads of the betrothed and offering some flesh to the protecting deity. Marriages are exogamous and always a matter of purchase. But the price is generally so exorbitant that the husband often runs great risk of forfeiting his own and his children's freedom, especially as the amount of the debt is doubled every year. Whole families have thus fallen into slavery for a liability originally contracted by the purchase perhaps of a few pins or a coil of metal wire. The albinos, somewhat numerous among the southern Niassi, are accredited to some prowling demon, and usually badly treated. Adultery involves heavy fines and often capital punishment, while girls who have had an "accident" are strangled and thrown to the bush.

The priests are above all medicine-men, that is, exorcists. For every ailment there is a wicked spirit, whom the infallible priest never fails to expel by his incantations, but who is replaced by other devouring genii, that is, whenever the malady persists and is followed by death. When the end approaches, the friends and kindred gather round the bed, howling and yelling till the patient breathes his last. In the south these wailings are followed by an honourable funeral, the body being borne through the village and the weapons of the deceased exposed along the route. At the extremity of the coffin is placed the effigy of a bird carved in wood; then the bier is suspended beneath a canopy of foliage, and the friends lie in ambush along the wayside to surprise and behead a few passing men and women to the greater glory of the departed. In the case of a great chief custom requires at least some twenty heads, to raise which indiscriminate warfare is waged against the surrounding villages. Sometimes they are satisfied with slaves, who, however, must die a lingering death under torture in order to render the sacrifice more agreeable to the cruel demons.

The inheritance usually passes from father to eldest son; but the rule is not absolute, and whatever child contrives by means of a reed to capture the dying man's last breath, or persuade the assistants that he has done so, becomes *ipso facto* a claimant for the fortune and paternal or political power of the deceased. Chiefs, all powerful in theory, are nevertheless often fain to share the sovereignty with their rivals, and, as a matter of fact, they rarely venture to decide in weighty affairs without consulting the notables, or even all freeholders. In the assemblies

all speak freely, at times coming to blows. It is also usual to deliberate fasting, in order to guard against the violent scenes that might be caused by the abuse of palm-wine.

Formerly an extensive traffic was carried on in Niassi slaves, whom hundreds of praus came to kidnap round the coasts of the island. Sir Stamford Raffles was even "censured" by the East India Company for obstructing this trade during the British occupation. At present many of the islanders emigrate to take service in Malay or European families, and amongst them are nearly always chosen the carpenters, masons, and thatchers.

The natives of the Mentawey Archipelago are also "savages," differing greatly, however, from the other west Sumatran islanders. According to Von Rosenberg, who visited them between the years 1847 and 1852, they are not Malays at all, but a branch of the East Polynesian race. Their idiom, remarkable for its softness and abundance of vowels, appears to differ completely from the dialects of Sumatra and neighbouring islands. Like the Polynesians, the Chagalalegats, as they call themselves, delight in waving plumes, foliage, and flowers. They deck their hair with bright corals, and cover the breast with tattoo markings in the form of shields, like the Tonga and other Pacific peoples. Certain food is strictly tabooed for the women, while the profane are warned off from certain mysterious recesses of the forest.

The Mentawey people do not blacken their teeth like most of the Malay tribes, but file to a point the front teeth. The youth of both sexes join together in all gymnastic exercises, but after marriage the women keep discreetly apart. Divorce is unknown and adultery punished with death. Like their neighbours of the Pagah group, the Chagalalegats are extremely pacific, never warring amongst themselves, nor fortifying their villages, which, however, they take care not to build on the coast, but always on the bank of some small inland stream. Till lately their arms were the bow and poisoned arrows. Although much dreading the evil spirits, they at times consult them in the depths of the forest, where the replies are uttered in a harsh, quivering voice. The souls of the dead, also greatly feared, are supposed to become demons, and a neighbouring uninhabited island is the special abode of these departed spirits.

Even the little island of Engano, at the southern extremity of the insular chain, has its peculiar race, on insufficient grounds affiliated by some writers to the Papuan stock. These rude islanders were still in the stone age till the middle of the present century, when they learnt the use of iron. They went naked, whence the term Pulo Telanjang, or "Naked Island," applied by the Malay traders to their little territory. The Kerikjéé, as they call themselves, were also unacquainted with tobacco and strong drinks, but were, on the other hand, scrupulously honest, theft being unknown amongst them. They bury their dead in a fishing-net, doubtless to enable them to continue to procure themselves food in the next world; but the fruit-trees, field, and garden-plot of the departed are laid waste, being henceforth useless to him.

## TOPOGRAPHY OF SUMATRA.

Being still destitute of easy highways, and inhabited by diverse tribes and nations without any political cohesion, Sumatra has developed on its seaboard but few considerable towns, while in the interior the largest centres of population are little more than villages. Nevertheless several epochs have witnessed the growth of large kingdoms, whose capitals have successively been important commercial marts.

The old Atjeh empire, which, according to the chroniclers, arose about the beginning of the thirteenth century, was of considerable extent. At the time of its greatest prosperity, in the first decades of the seventeenth century, it embraced about half of the island, and held several secondary states in vassalage. From Egypt to Japan ruling princes sought its alliance; its army comprised hundreds of fighting elephants and disposed of two thousand guns. The sultan, who, despite his Arab name claimed descent, like so many other Eastern potentates, from Alexander of Macedon, exercised almost absolute power, at least in the districts in the vicinity of his residence.

At present the Atjeh frontiers, as arbitrarily laid down by the Dutch across a territory of which they are not even masters, includes only the northern extremity of the island, from south of Langsar Bay on the east, to Silekat Bay on the west coast. The island of Babi, with a few adjacent islets partly inhabited by Achinese, also forms part of the State. Although the population has been more than decimated during the long war with the Dutch, it is still believed to exceed half a million. The Achinese, properly so called, are divided into three clans, the "twenty-two," the "twenty-five," and the "twenty-six," *sagi* or *mukims*, that is, communes, each governed by two *panglimas*, or hereditary chiefs, who naturally check each other's power, while the whole body of the *panglimas* constitute the national council. Moreover, each village enjoys local self-government, being administered by its elders, without whom the chief can decide nothing. This independent communal life explains the astonishing vigour with which the natives have hitherto defended their liberties against the foreign aggressors.

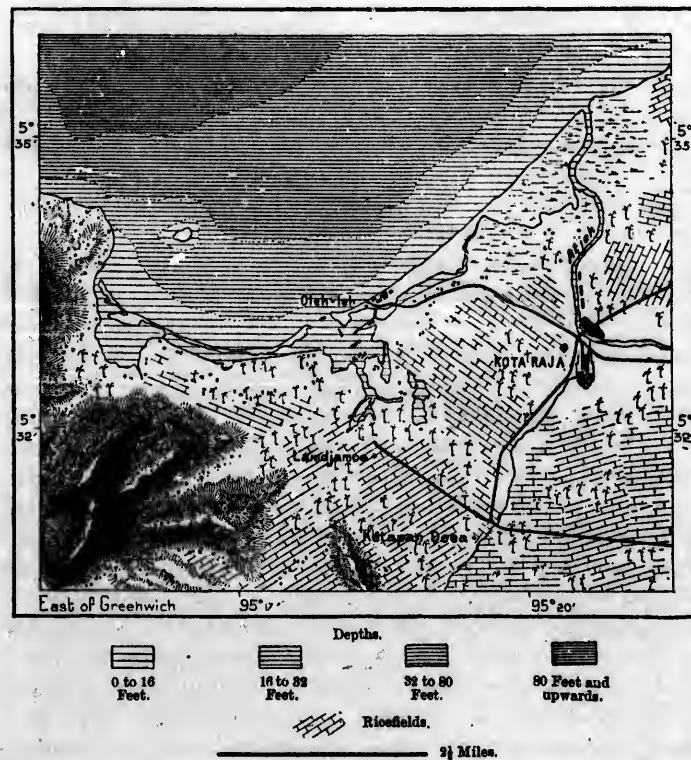
Since the first treaty of commerce, signed in 1509 with the Portuguese, the Achinese have always maintained either pacific or hostile relations with the Europeans. But about the middle of the present century the State had fallen into complete decay, and the Dutch had seized several places on the seaboard. In 1872 the moment seemed favourable to punish the sultan for the piratical doings of his vassals, with whom he was probably in league. Thanks to a treaty with the English, yielding to them her possessions on the coast of Guinea as a set-off against any further claims on their part to the northern parts of Sumatra, Holland hoped soon to make an end of the Achinese; but their first expedition ended disastrously. Further equipments, a regular campaign, and a siege of forty-seven days, were required to reduce the *kraton*, or chief native stronghold, which, however, was not followed by the submission of the sultan. After fifteen years of incessant warfare, which has cost Holland an expenditure of £20,000,000 and over one hundred

thousand lives, and double that number to the natives, the inland districts still remain unreduced, and will probably maintain their independence until the country is opened up by good highways ramifying in all directions.

The capital of Atjeh, formerly known as the *Kota-Raja*, or "Royal City," and now called *Groot Atjeh*, is built in the form of a regular quadrilateral, three miles from the coast, at the entrance of an extremely fertile valley watered by the river Atjeh. Southwards rise two isolated bluffs, the "father and mother of the river," as the natives call them. Numerous villages are scattered round the

Fig. 39.—KOTA-RAJA AND OLEH-LEH.

Scale 1 : 120,000.



enclosures, and the entrenched camp is defended by a ring of forts connected together by railways. Another line, the first constructed in Sumatra, also connects the city with its marine quarter, *Oleh-leh*, standing on a narrow beach between the sea and a sluggish backwater communicating eastwards with the Atjeh.

Before the war, Kota-Raja is said to have had a population of thirty-five thousand; in 1882 it had already recovered much of its importance, and in 1886 contained nine thousand four hundred natives, besides two thousand five hundred



Chinese. Pepper, the *lada* or *piper nigrum*, introduced from India, is generally cultivated in the district, yielding in times of peace as much as forty-five million pounds, or two-thirds of the quantity consumed in the whole world. According to Van der Tunk the native idea is that the Europeans, living in a cold and damp climate, stuff their mattresses with this spice to keep themselves warm at night.

East of Atjeh, on the Areca coast, as it is called, because it is fringed with the Areca or betel-nut palm, the Dutch hold two other stations, *Segli*, near the northern slopes of the Goudberg, and *Eli*, south of Diamond Point. In the neighbouring district of Pasei formerly stood the city of *Sumadra*, whence the island takes its name. On the west or "Pepper coast," which is subject to slow upheaval, the chief port is *Kluang*, noted for its vast caves frequented by myriads of edible-nest builders. Some 60 miles farther south lies the port at the mouth of the *Tenom* where the British ship *Nisero* was wrecked in 1883, and the whole crew captured and subjected to great hardships in captivity. Three years previously two French travellers in search of gold mines had been assassinated on the same river. Yet within thirty miles farther south the little port of *Malabuh* (*Analabu*) is occupied by a Dutch garrison. To escape from foreign rule most of the natives have fled to the coast town of *Wailah*, between Tenom and Malabuh. The latter place, which has some gold-washings and coal-beds, is followed southwards by the port of *Tampat Tuwan*, which trades with the neighbouring island of Babi.

*Singkel*, formerly capital of a kingdom and now the chief town of a division of the Tapanuli province, lies on an island at the mouth of a river surrounded by pestiferous swamps. Nevertheless, the place is visited by some Chinese traders, who take camphor, benzoin, and holothurians in exchange for opium and rice. *Baros*, lying in a more healthy district farther south, was also a royal residence before the arrival of the Dutch, and at present does a considerable trade with *Gunung Sitoli*, capital of Nias. Beyond it follows *Sibogha*, on an inlet of the deep and spacious Tapanuli Bay, one of the best harbours in the world, affording excellent anchorage close in shore. *Sibogha* is one of the points whence travellers penetrate inland to the Batta country. On the eastern and south-eastern heights of the neighbouring plateaux lie several commercially and strategically important places, such as *Sipirok*, *Padang Sidempuan*, and *Pertibi*, noted for its Buddhist ruins. Southwards in the direction of Padang follow the little-frequented ports of *Natal*, *Ajer Bangis*, and *Priaman*.

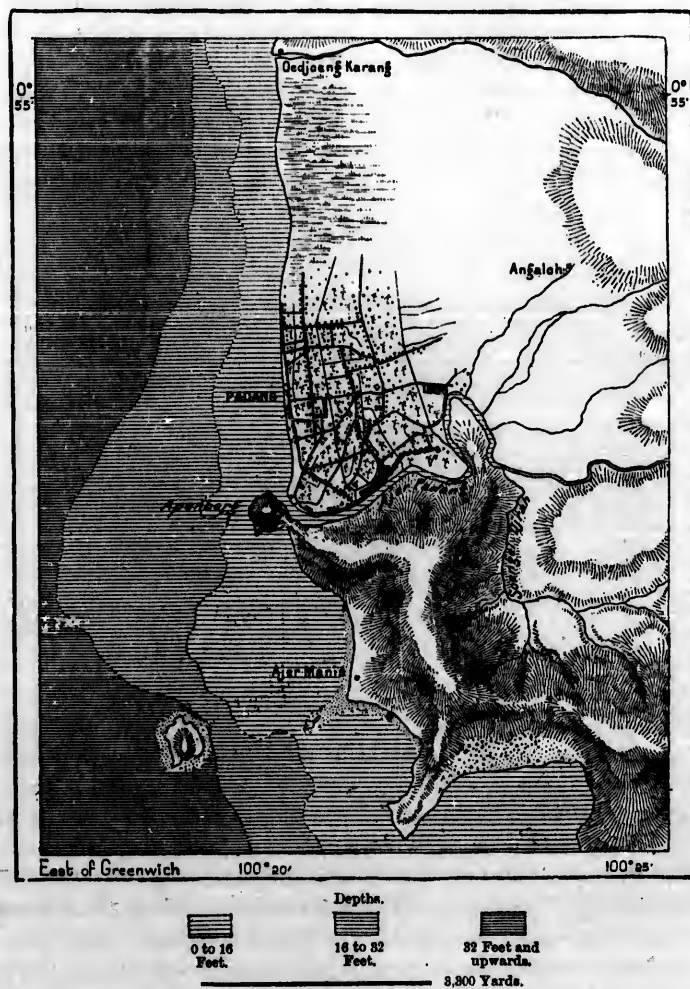
*Padang*, the most flourishing place on the west coast, presents the aspect rather of a large park than of a great commercial mart. Except in the central quarter occupied by the public buildings, the only structures are the low dwellings of the Malays, Javanese, Chinese, and Niassi Islanders, overshadowed by cocoanut-palms and mangoes, and surrounded by gardens, ricefields, and plantations of all the tropical growths valuable for their bark, gums, flowers, and fruits. In the distance rises the smoking cone of Talang, and southwards, beyond the little river Padang, stands the Apenberg, or "Ape Hill," so named from the quadruped who here dwell peaceably under the protection of the natives. The exports, averaging

about £600,000 yearly, consist almost exclusively of coffee shipped for the United States.

But Padang owes its importance less to the fertility of the surrounding plains than to its favourable position at the converging point of the routes radiating

Fig. 40.—PADANG AND ENVIRONMENTS.

Scale 1 : 85,000.

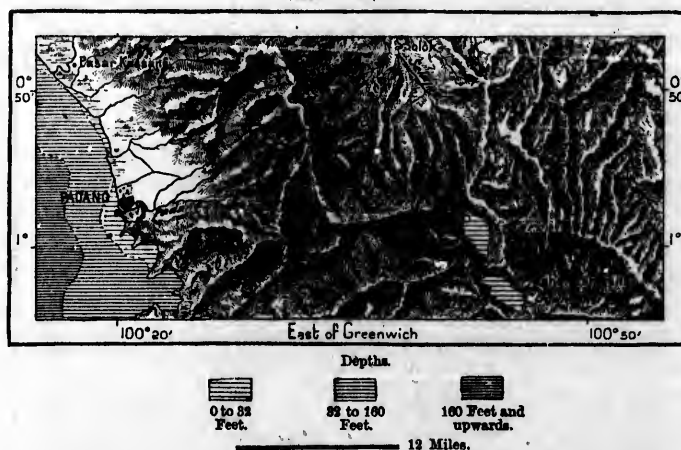


towards the thickly peopled and salubrious Menangkabao plateau, which serves as a health-resort for the Government officials. On these Padang uplands, where the Dutch have been firmly established for over half a century, the chief military station is the fortress of *Kock*, lying some 3,000 feet above sea-level at

the foot of Mount Merapi in the Agam district. In case of foreign invasion this place would at once become the strategic and administrative centre of the whole island. In the vicinity is the Karbawen-gat Gorge, whose rocky walls have been excavated to a depth of 500 feet in the thickness of the plateau.

*Padang-Panjang*, another large place, where most of the Dutch officials reside, occupies the edge of the plateau at the west foot of Merapi. On another slope are seen the ruins of *Priangan*, formerly capital of the Menangkabao empire. *Paja-Kombo*, capital of the "Fifty Kotas," lies much farther to the east on the opposite side of Mount Sago. This district is the Sumatran "earthly Eden," where the cultivated plants of the temperate zone flourish side by side with those of the tropics. Here were also situated the gold mines, which at one time made Sumatra famous throughout the East, but which are now abandoned. The deposits of magnetic iron, however, are still utilised, which occur in the neighbourhood of

Fig. 41.—HIGHLANDS EAST OF PADANG.  
Scale 1 : 750,000.



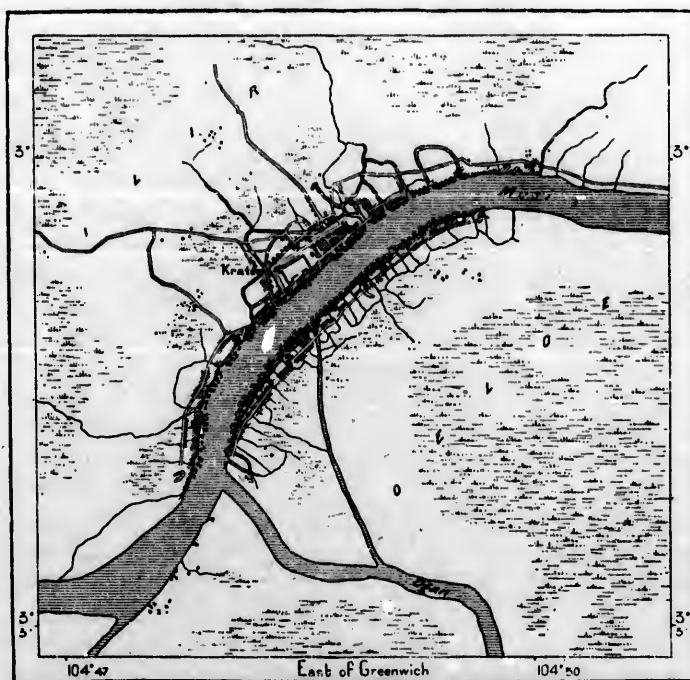
*Fort Van der Capellen*. On the banks of the Umbilien, east of Singkarak, are extensive coal measures of excellent quality, the contents of which have been estimated at about twelve billion cubic feet. Mainly with a view to opening up these mineral resources, a line of railway has been projected to connect the plateau either with Padang or with the more southern *Brandewijn Bay*. But the engineering difficulties have hitherto prevented the execution of this costly undertaking, and it is now proposed to reach the coalfields from the opposite side of the island by the navigable river Hari, main branch of the Jambi, which flows within thirty-five miles of the locality. The slopes are crossed by excellent carriage roads, one of which connects Padang-Panjang with the coast, passing by a profound ravine whence are commanded some lovely prospects seawards.

South of Padang follow the little ports of *Painan* and *Mokko-Mokko*, and the decayed city of *Benkulen* (*Bangkahulu*), capital of a Residency. According to the

local saying, "Benkulen is a small place with big houses, where small people bear big titles." From the end of the seventeenth century till 1824, it belonged to the East India Company, which had made it the capital of its Indonesian possessions. But the harbour has gradually silted up, and the local trade has withdrawn a few miles farther south, to the more convenient *Silebar Bay*. The town is unhealthy, and in 1714 the English had already removed their residence to *Fort Marlborough*, some miles farther north. The houses, injured by earthquakes, are often left unrepaired, and the neglected appearance of the place is increased by the general

Fig. 42.—PALEMBANG.

Scale 1 : 75,000.



poverty of its Malay and Chinese inhabitants. The surrounding district is not very fertile, and the neighbouring coffee plantations have been abandoned.

Despite the excellent commercial position of the ports, lying in deep inlets at the southern extremity of the island, the local trade chiefly in pepper, and *dammar* resin, has been little developed. Even before the Krakatau eruption, which spread havoc along the seaboard, the region of the Lampongs, or "Lowlands," did not contain a single important town. At present the chief centre of population is *Telokh-Batong*, a group of eight villages skirting Lampong Bay and a neigh-

bouring streamlet. Numerous thermal springs of varying temperature bubble up at the foot of the volcanoes in the surrounding district.

The chief southern trading-place and the largest city in Sumatra, is *Palembang*, which lies on both banks of the Musi just above the delta, and at the converging point of all the main routes from the interior. Palembang covers a large surface, the thirty-six *Kampongs*, or quarters of the *Ibir*, comprising a space of over five miles on the north or left bank, while the opposite side is occupied by sixteen other quarters, grouped collectively under the name of *Ulu*.\* The few European buildings are disposed on the north side, round about the kraton, or citadel, which the Dutch have gradually transformed to a residential palace. As in the Chinese city of Canton, many of the natives live permanently afloat, residing on *rakits*, or bamboo rafts, moored to the banks of the river, which is here 1,000 feet wide, and from 30 to 50 feet deep. Some of the rafts are large enough to bear houses, containing several families, and according to the local tradition, the first of these structures were built by the Chinese traders, to whom the sultan had refused permission to reside ashore. At present they are inhabited not only by the Chinese, Malays, Arabs, and Hindus, but even by some Europeans, for the sake of the refreshing breezes, which blow alternately up and down the stream. Nearly all the shops are afloat, so that most of the business is conducted in small river craft, which glide along the narrow channels winding between the little houses, painted in bright colours, and surmounted by curved roofs. During the floods some of these dwellings break from their moorings, and drift with the current far below Palembang. Children also frequently fall overboard, and become a prey to the numerous crocodiles infesting the river.

The inhabitants of Palembang, who claim descent from a Javanese colony of the fourteenth century, still speak an idiom differing greatly from the Malay dialects of Sumatra, and resembling the current speech of Central Java. Their commercial relations are also chiefly with that island, to which they forward the tobacco, rice, india-rubber, gutta-percha, benzoin, and other produce floated down from *Muwaru Dua*, *Muwaru Inini*, *Muwaru Bliti*, *Muwaru Rupit*, and other inland towns, usually situated at the *Muwaras*, or confluences of the main stream with its tributaries. This produce is shipped in large vessels which ascend the Musi to Palembang, 60 miles from its mouth. The gold workings, whence Palembang takes its name, are now of little value, and the local industries are mainly confined to lacquerware and furniture, manufactured by numerous Chinese artizans.

In the neighbourhood are the tombs of the sultans, amongst which Europeans are surprised to find that of Sikandar Alam, "Alexander the Great," the traditional ancestor of so many Eastern dynasties.

North of the ancient kingdom of Palembang, the sultanate of Jambi, reduced by the Dutch in 1858, also possesses a considerable town, *Muwaru Kompeh*, situated, as implied by its name, at the confluence of the Kompeh with the Jambi. This important trading-place lies, like Palembang, above the fluvial delta, and 45

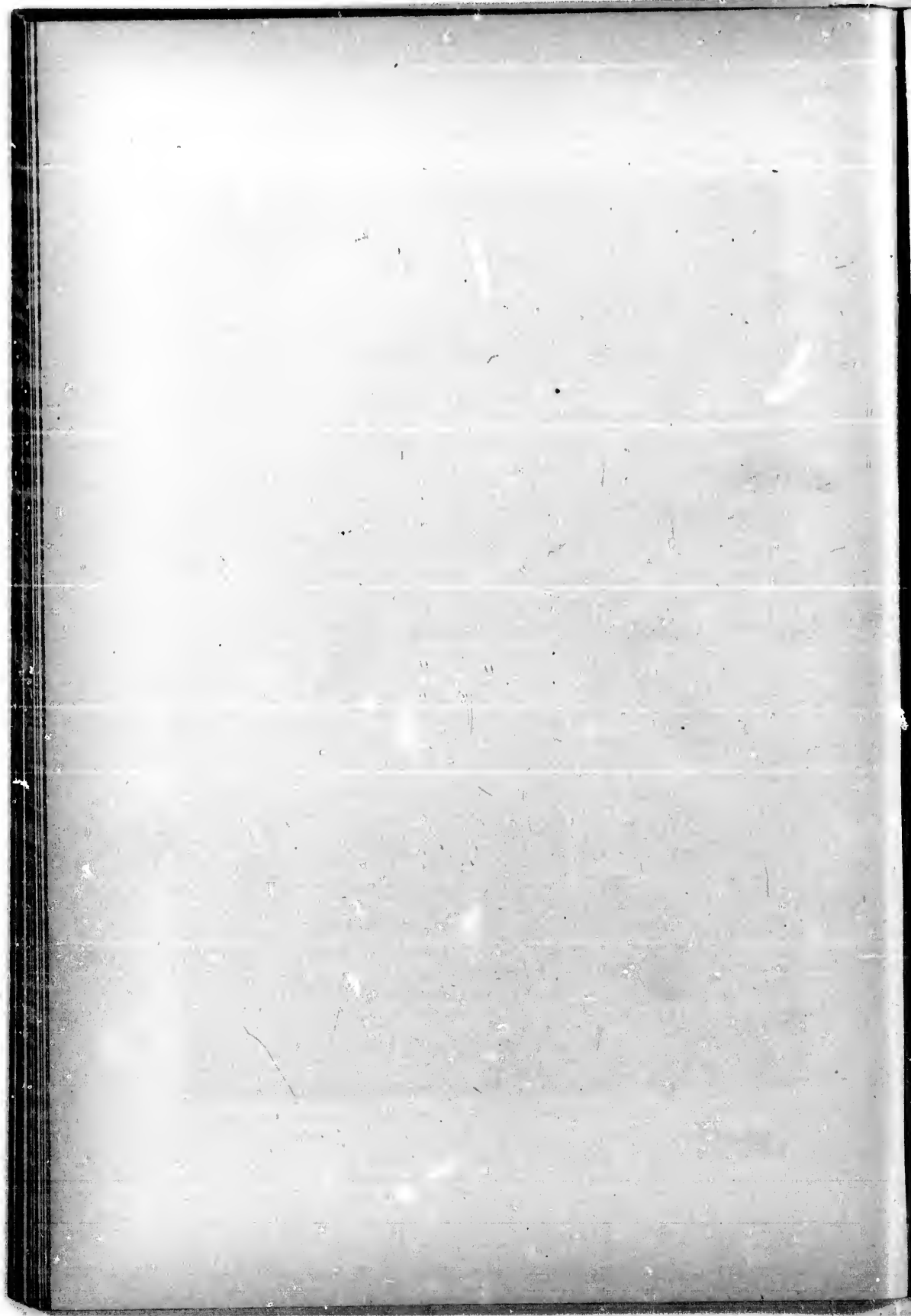
\* The two Malay terms *Ibir* and *Ulu*, of such frequent occurrence on the maps of the Eastern Archipelago, have the respective meanings of "lower," "below," "left," and "upper," "above," "right."

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PALEMBANG—VIEW TAKEN NEAR THE KRATON, IN THE SACRED GROVE.

Eastern Archi-  
rove," "right,"



miles below *Jambi*, the administrative capital and residence of the sultan. Here also a portion of the population lives on rafts moored to the banks of the stream, and, as in the southern province, some Hindu remains are still seen in the neighbourhood. Several petty states still maintain their independence in the upper part of the *Jambi* basin, the exports of which are directed almost exclusively to *Singapore*.

*Ringat*, capital of the ancient kingdom of *Indragiri*, whose southern frontiers are marked by the course of the *Jambi*, has lost all its former greatness and splendour, and is now reduced to a mere group of villages on the right bank of the *Indragiri*. Its communications with the sea are entirely cut off by the alluvial matter gradually deposited in *Amphitrite Bay*, at the mouth of the river. An analogous position is occupied on the river *Kampar* by *Pulu Larang (Palalavang)*, which was also an ancient capital. *Siak*, another old metropolis, now held by the Dutch, although 60 miles from the mouth of the river, still communicates freely with the sea. But trade is here centred chiefly in *Pekan Baru*, which lies above *Siak*, near the advanced spurs of the *Barisan* range. This place has been selected as the future terminus of the railway intended to connect the *Ombilien* coal-fields with the eastern slope of *Sumatra*.

Several little ports on this seaboard, notably *Bukit Batu*, have begun to take an increasing share in the local coasting trade. *Bengkalis*, on the island of the same name, possesses the advantage of a perfectly sheltered roadstead, and promises to become a busy seaport, since these waters have been cleared of the pirates by whom they were till recently infested.

On the *Sumatran* side of the *Strait of Malacca* the chief agricultural and commercial centre is the group of villages and plantations which takes the name of *Deli*, from a petty state occupying this part of the island. Since the sultan placed his territory under the protection of *Holland* in 1862, numerous planters have settled in the district, the soil of which is unusually fertile. The first European speculators directed their attention mainly to the nutmeg, pepper, and other spices; but they have gradually abandoned these products, and now occupy themselves exclusively with the cultivation of tobacco for the *Amsterdam* market, where it is highly appreciated. The production has increased enormously during the last few years; but unfortunately most of the plantations have been bought up by a powerful financial company, to which the Government has granted several exclusive privileges, rendering all free competition impossible. Freehold plots cannot be obtained, and the Chinese and Hindus are expressly denied the right to purchase land in the district. The first plantations had been worked by slaves, whom the company has now replaced by "contract labour." But the Malay and *Batta* natives can no longer be procured in sufficient numbers, so that over 25,000 Chinese coolies have had to be imported. An attempt—not, however, attended by much success—has also been made to introduce Javanese from *Samarang*, and thus turn to the benefit of *Sumatra* a part of the yearly increasing surplus population supplied by the neighbouring island. Some *Klings*, or *Kalingas*—that is, Hindus from the *Madras* presidency, for the most part mixed with other races—also

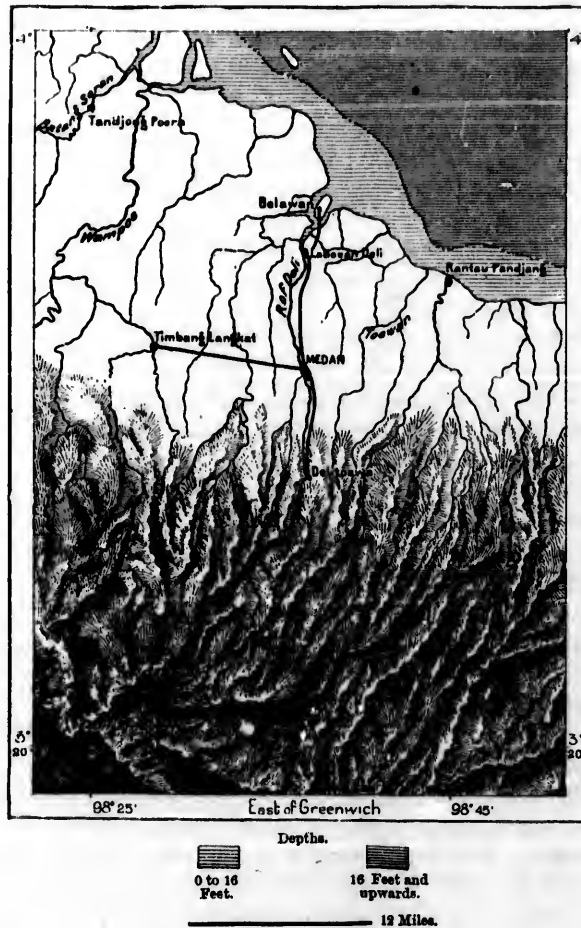


contribute to swell the number of half-enslaved gangs engaged on the Deli plantations.

These plantations are continually advancing in both directions, northwards into the Langkat and Atjeh territories, southwards into the sultanate of Sirdang.

Fig. 43.—DELI.

Scale 1 : 650,000.



The small breed of Deli horses coming from the Batta country are highly valued on the Singapore and Pulo Pinang markets.

*Labuan*, the outport of the Deli state, lies near the mouth of the Deli, in a swampy district, and on a muddy inlet where the shipping has to ride at anchor three miles from the shore. A railway runs from Labuan up the river southwards

across the numerous kampongs and plantations belonging to the company. At *Medan*, central village and administrative capital of the Oostkust or "East Coast" province, a branch from this line penetrates westwards into the Upper Langkat valley.

## ADMINISTRATION OF SUMATRA.

A uniform administration has not yet been introduced into the island. The inland district of Atjeh, as well as the more inaccessible regions of Battaland, still enjoy complete political independence; while other provinces, such as Padang, Benkulen, and Palembang, are entirely reduced. Intermediate between these two extremes are several other territories governed indirectly through vassal princes, who pay to Holland the *hassil*, or fixed portion of the produce, but who still retain great personal privileges, as well as a considerable portion of the local revenue. Every degree of transition thus exists between the old *régime* of the Malay potentates and total subjection to the laws promulgated by the Dutch governor of Batavia.

The petty states situated east of the Padang plateau still follow the *adat*, or "customs," of the ancient kingdom of Menangkabau. Nearly all the kingdoms on the east slope have their more or less autonomous sultans and council of notables. The *sukus*, or clans, have similarly their elected chiefs, who receive their investiture at the hands of the Government, and who serve as intermediaries between the people and the Dutch authorities. Several united *sukus* constitute a *marga*, or secondary group, tribe, or principality, corresponding to the French canton, and administered by district chiefs who act on the one hand as spokesmen for the people, and on the other as agents for the central power. Formerly every *marga* had its special laws and customs recorded on bamboos or the leaves of the borassus, and jealously preserved from generation to generation.

The main divisions of Sumatra, with their areas and estimated populations, will be found tabulated in the Appendix.

## SUNDA ISLANDS, BETWEEN SUMATRA AND BORNEO.

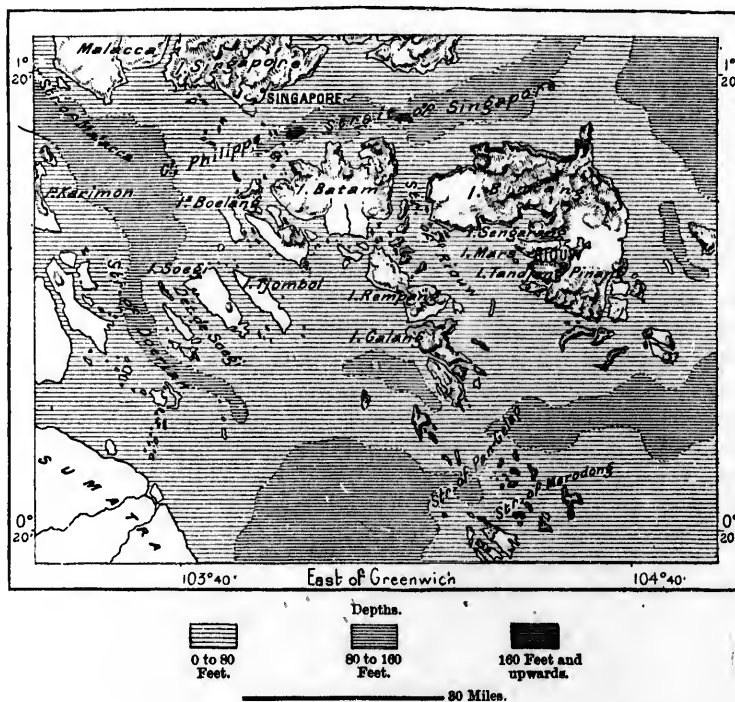
The Riouw and Lingga archipelagoes, which form a southern extension of the Malay peninsula, occupy a considerable area, but are far from rivalling in population, products, or commercial enterprise the little island of Singapore, detached by Great Britain from the Dutch East Indies, and by her developed into the chief centre of trade at the southernmost extremity of the Asiatic continent. Like Singapore, both insular groups appear to be mere fragments of the adjacent mainland, and both are known to the Malays by the name of Tanah Salat, or "Land of Straits," from the numerous channels and passages winding between these groups of islands, islets, and reefs. Of all the channels, the most frequented is that of Riouw, which connects the roadstead of Singapore with the open sea stretching eastwards to Borneo.

Both archipelagoes contrast sharply with the alluvial islands on the Sumatran

coast. Belonging geologically to the Malay peninsula, and like it consisting mainly of granite and sandstones, they rise in undulating cliffs, above which appear a few higher summits, or "mountains," as the natives call them. One of the eminences in Bintang attains a height of 1,700 feet, which is still 2,000 feet lower than the peak of Lingga (3,700 feet), culminating point in the island of like name, in the southern group. Notwithstanding their healthy climate, due to the absence of marshy tracts, a large number of the islands are still uninhabited, and

Fig. 44.—RIOUW ARCHIPELAGO.

Scale 1 : 1,540,000.



entirely clothed with a dark forest vegetation. The neighbouring waters are even still imperfectly surveyed, and consequently avoided by the Malay seafarers.

The primitive population of the islands consists of Malays, and the Lingga archipelago, which presents a type of remarkable purity, is even traditionally regarded as the cradle of the race. The Riouw dialect is one of the richest in literary products, such as chronicles, dramas, and poems. But in the Riouw, or northern group, the Malay stock is already largely intermingled with diverse foreign elements—Javanese, who ruled over the islands when the Mojo-Pahit kingdom flourished; Bugi traders from Celebes, who occupy several villages; Chinese, who, as in Singapore, have already acquired the numerical preponderance in many places.

Both in the towns and rural districts these Chinese are divided into two distinct nations, each with its "captain,"—the Chinese of Canton and those of Amoy, the latter contrasting favourably with the former for their peaceful habits, love of work, and sobriety.

This steady inflow of the "Celestials" is due to the development of trade, which is much more active in the Riouw than in the Lingga archipelago. The Chinese are here also occupied with the cultivation of *gambir*, of which Riouw has practically the monopoly. This product, called also *terra japonica* and *catechu*, is obtained from a decoction of the leaves of the *uncaria*, or *nauclea gambir* of botanists. The island of Bintan alone yields about sixteen million pounds yearly, forwarded chiefly to Batavia, Macassar, and Banjarmassin, where it is used in the preparation of betel. Riouw is also one of the most important pepper-growing regions in Indonesia.

Some places have also deposits of tin, amongst others the two Karimon islets in the Strait of Malacca, and the large island of Singkep, in the southern archipelago south of Lingga. The straits yield large quantities of holothurians and of the agar-agar (*fucus saccharinus*), for which Chinese epicures pay a high price.

*Riouw*, capital of the archipelagoes, and, till recently, of the East Sumatran Residency, is situated in the islet of Tanjung Pinang, close to the west side of Bintang, largest member of these insular groups. The town, whose name is often extended to the two adjacent islands, stands on the east side of the Riouw Strait, the Rhio of the English charts. It comprises several distinct quarters, stretching around a shallow roadstead; which, however, is well sheltered from all winds by the adjacent islets of Mars and Sengarang. Although declared a free port in 1828, Riouw has not been able to compete with its British neighbour Singapore, to which vast emporium it sends the tribute of all its exports by a regular line of steamers.

## BANGKA.

The large island of Bangka, with an area of about five thousand square miles, and administratively constituting a Residency of itself, might seem at first sight to form a mere geographical dependence of Sumatra. Nevertheless it is entirely distinct from that region in its geographical constitution, forming, like the Riouw and Lingga groups, a fragmentary extension of the Malay peninsula. It is also disposed in precisely the same direction, from north-west to south-east, parallel with the main axis of Sumatra. The corresponding series of convex and concave curves presented by both sides of the tortuous and shallow strait separating Bangka from the alluvial lands of Palembang, is due not to a rupture produced between rocks of identical formation, but to the action of the alternating marine currents uniformly distributing the sedimentary matter brought down by the Palembang rivers.

Unlike Sumatra, Bangka has neither volcanoes nor igneous rocks, and is almost destitute even of thermal springs. The chief formations are granites, quartz, feldspars, thrown together without any apparent regularity. The undulating hills are

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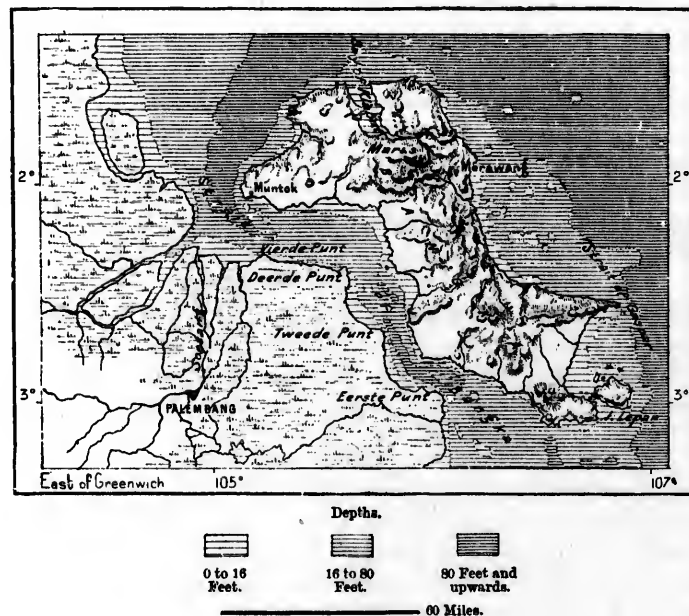
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not disposed in ridges, but scattered in disorder over the surface, and nowhere attain 3,000 feet in height. Mount Maras, the culminating point (2,800 feet), rises above the south side of the narrow Klabat Bay, in the northern part of the island. But the steepest cliffs are those of the east coast, facing the high sea.

Although presenting the same climatic conditions as those of the opposite Sumatran seaboard, Bangka already offers some marked contrasts in its flora and fauna. All large animals, such as the elephant and rhinoceros, and even the tiger and buffalo, are absent from its forests. The inhabitants, although very mixed, are mainly of Malay stock, as in the other Indonesian coastlands; but here the

Fig. 45.—BANGKA.

Scale 1 : 3,200,000.



Javanese element is less numerous represented than in the Palembang district, being partly replaced by some scattered settlements of Malays from the north, and commonly known as Orang Sekat, or Orang Laut, that is, "Men of the Sea." They are akin to the Bajaus of Celebes, and the Orang Kwata, or "Men of the Estuaries," who carry on a little trade with the East Sumatran coast. When at anchor they seldom leave their praus, eight or ten of which constitute a sort of floating kampong, or community, with its special customs and council of elders.

The Orang Sekat live exclusively on fish and the species of fucus called agar-agar, and to this diet must be attributed the so-called *gadus*, a peculiar malady to which they are occasionally subject. Having remained pagans, they are often

accused by their Mohammedan neighbours of being addicted to piracy, whereas they are, on the contrary, strictly honest in all their dealings, depending for a livelihood solely on fishing and trade. The inland populations, known as Orang Gunung, or "Highlanders," resemble the Battas both in physical appearance and usages.

Of the Chinese, who form nearly a third of the whole population, about one-half are natives of Bangka, this section taking the name of Pernakan, and constituting a group quite distinct from the Sinkee, or Chinese immigrants from Canton and Fokien. They mostly marry half-caste native women, and speak both Chinese and Malay, but on the whole preserve the original Chinese type. Since 1850 the population of the island has more than doubled, but is still slight, scarcely exceeding twelve persons to the square mile. Agriculture is almost entirely neglected, everything being sacrificed to the tin-mining industry, the most productive in the whole world.

The valuable tin deposits, said to have been discovered about the beginning of the eighteenth century, belonged at first to the sultan of Palembang, master of the island. In 1740 the Chinese, already at that time exclusively employed to work the mines, raised about 1,550 tons, while the present annual yield of this state monopoly often equals the value of the capital invested. But the miners continue to be neglected, and have to be kept under control by the Dutch garrisons stationed in the mining districts.

The stanniferous beds, of which there are several hundreds, occur in all parts of the island, but are specially abundant on the north-east side, round about Merawang. As in the Malay peninsula, the ores are contained in the alluvial soil which, to a depth of from 14 feet to 35 feet or 40 feet, overlies the dark-coloured clays at the foot of the granite hills. Here and there the streams carrying down the alluvial matter have excavated deep cavities or "pockets," in which the metal has accumulated in considerable quantities. Besides tin, Bangka also possesses deposits of silver, copper, lead, arsenic, and iron, none of which are much worked, except the last-mentioned, which is highly valued for the manufacture of small arms.

*Muntok*, capital of Bangka, lies at the north-west extremity, over against the Palembang river delta. During the British occupation it was known as *Minto*, in honour of the Governor-General of that name, but has since resumed its old Malay designation. Muntok, which comprises a strongly fortified European and a native quarter, with a total population of about 3,300, has the advantage of a well-sheltered but somewhat shallow roadstead, which is the centre of a brisk trade with Sumatra, Riouw, and Singapore.

#### BILLITON.

Billiton, or Blitong, which is about one-third the size of Bangka, is connected with the south-east side of that island by about a hundred islets, rocks, and reefs, endangering the navigation of the intervening Gaspar Strait. It presents the

same geological formation as its neighbour, and, like it, possesses tin-bearing alluvial deposits. Its culminating point, the twin-crested Tajem, has an altitude of 3,100 feet.

Owing to the numerous corsairs infesting the surrounding waters, Billiton was till recently destitute of trade, and almost of inhabitants; even in 1856 the population still numbered less than twelve thousand, or scarcely six persons to the square mile. But since the development of its tin mines, this number has been tripled, and the port of *Tanjong Pandang*, converging point of all the main routes, is now the centre of a considerable local trade, largely in the hands of the Chinese, who form about a fourth of the whole population. The output of tin, which in 1853 scarcely exceeded forty tons, has since then increased a hundredfold, and yields enormous profits to the chartered company. As in Bangka, the miners work on their own account; but they are obliged to sell the tin at a price fixed beforehand, and to purchase their supplies in the company's stores. Owing to this oppressive truck system, most of them are burdened with heavy debts to the end of their days. Since the formation of this company, Billiton has been an administrative province independent of Bangka, with an "assistant resident" stationed at *Tanjong Pandang*.

#### ISLANDS IN THE BORNEO SEA.

The Sea of Borneo, communicating northwards with the China Sea, is studded with small archipelagoes, each comprising numerous islets, for the most part uninhabited. Such are *Tambelan*, midway between Lingga and Borneo; *Anambas*, off the Malay peninsula; *Natuna*, in more open waters, equidistant from the Malay peninsula and Borneo; *Serasan*, west of the principality of Sarawak, in Borneo. This last group is also known as the *Pirates' Archipelago*, although the people of the only inhabited island are now exclusively occupied with the preparation of cocoanut oil.

Of all these islands the largest is *Bunguren*, called also Great Natuna, which has an area of 640 square miles, and in Mount Ranay attains an altitude of 3,380 feet. The inhabitants of the cultivated islands, estimated by Hollander in 1878 at twelve thousand souls, are exclusively Malays, who trade with Singapore and Riouw, taking rice, hardware, and European textiles in exchange for their fish, sago, and cocoanut oil. The people of Great Natuna build praus described by Laplace as of admirable workmanship. This group depends politically on Riouw and is administered by members of the sultan's family, vassals of Holland.

#### BORNEO.

The formerly powerful kingdom of Brunei gives its name in a somewhat modified form to the great island of which it occupies the north-west coast. Kalamantin, or Klematan, is a native term current in some districts, and occasionally applied to the whole island. But Borneo is of such vast extent compared with all the surrounding lands, that to its inhabitants it seemed almost boundless, and far too large to be designated by any special name. Hence they

distinguished the various provinces alone by particular appellations, to which a more general meaning was afterwards given by foreigners. Excluding the continental and polar regions, this island is in fact exceeded in size by New Guinea alone; but thanks to its more compact triangular form, it presents far more the appearance of a continent than does that elongated and deeply indented region.

Borneo evidently constitutes the central nucleus of the former Austral-Indian land, which comprised Java and Sumatra besides the Malay peninsula and intervening shallow waters. The basin of these waters has, so to say, scarcely yet been excavated by the geological agencies, and still reveals the old form of the continent, over one-third of which is represented by its largest fragment, Borneo. With the adjacent islets, such as Maijang and the Karimata group, near the south-west coast, Pulo Laut and Seboku at the south-east corner, and a few others, it has a total area of nearly 300,000 square miles, or about two and a half times that of the British Isles. Excluding minor indentations, the coastline has a development of not less than 3,800 miles.

This central region of Indonesia, although one of the most fertile, and abounding in all kinds of tropical produce, is nevertheless almost a wilderness, so slight is the population compared to its superficial extent. Java, seven or eight times smaller, exceeds it ten or twelve times in the number of its inhabitants; even the thinly peopled island of Sumatra is more than twice as populous, at least, if any confidence can be placed in the summary estimates and conjectures of travellers. This relative and absolute disproportion must be attributed to the zone of swampy and malarious forests which encircles nearly the whole of the coastlands. Village communities could scarcely be developed in these insalubrious regions, where most centres of population have remained in a rudimentary state, lacking the elements of progress which are acquired by mutual intercourse and commercial relations. The riverain populations have risen little above the primitive social condition of fishers and hunters. The period of agriculture, properly so called, has begun only in a limited number of clearings, and in many districts such is the savage state of the natives, that the various tribal groups still regard each other simply as so much game. Head-hunting is the only object with which many tribes approach their neighbours.

#### EXPLORATION OF BORNEO.—POLITICAL DIVISIONS.

The social state of the people has naturally been a great impediment to the exploration of the country, of which down to the beginning of the present century little was known beyond the seaboard. Sighted by the Portuguese probably in the first years of the sixteenth century, Borneo remained unknown to history till 1521, when the survivors of Magellan's expedition round the globe presented themselves before Brunei. Soon after this event, Jorge de Menezes established a factory on the west coast; the Dutch made their appearance in 1598, and they were soon followed by the English. But all attempts at exploration were successively abandoned either for lack of means or owing to the opposition of the natives and Chinese immigrants.



Permanent European settlements on the coast were first made in 1812, when the English occupied Pontianak and Banjermassin, which were two years later surrendered to the Dutch. These two stations, and those subsequently founded at other places along the seaboard, became the points of departure for the various expeditions that have since been sent to the interior for military, geographical, or scientific purposes. No systematic survey has yet been undertaken; but the different itineraries of independent explorers already intersect each other at several points. Except the more central regions, nearly all the unexplored districts have also been at least viewed from a distance, and described from the reports of the natives.

The routes followed by travellers have mainly been the watercourses, which for the most part flow in a sufficiently deep and gentle current to be ascended in boats a long way from their mouths. These highways were taken by von Martens, and many others, who penetrated into the heart of the island from Pontianak; by Schwaner, who traversed nearly the whole of the Barito, Kahajan, and Kapuas fluvial basins; by Karl Bock, who on the east side visited the "Land of Cannibals," watered by the Kutei River. Land journeys have been relatively more frequent in the northern parts, where the streams, being less developed, present fewer facilities for reaching the hilly regions of the interior. The memorable excursions of A. R. Wallace were made round about Sarawak, and since the British occupation of the northern territory, the network of itineraries has been extended over the whole of that domain.

The Dutch, masters of all the rest of Indonesia, except the eastern half of Timor, have not had time to establish their rule over the whole of Borneo. They have, however, gradually reduced or annexed all the section lying south of the equator, as well as about half of the northern districts. But possession of the north-west and northern parts has been secured by the English, through various treaties with the Sultan of Brunei, former suzerain of the whole of this region. In 1846 the British Government obtained the absolute cession of the island of Labuan, at the entrance of Brunei Bay, despite the protests of the Netherlands. But the Sultan had already granted to James Brooke the principality of Sarawak, comprising the southern part of his kingdom. In return for a yearly subsidy, this soldier of fortune, commonly known as Rajah Brooke, thus became master of an extensive territory, which has since been gradually enlarged at the expense of the sultan's domain.

On the opposite side of Brunei the sultan has also yielded the northern part of the island to a powerful British company, which has already obtained a royal charter from the Crown of England. A part of this territory having also been claimed by the sovereign of the Sulu archipelago, that potentate, like his Brunei colleague, has been bought off by a pension. Thanks to this purchase of the land, Spain, which had meantime become the suzerain of the Sulu prince, has henceforth been excluded from all claim to the possession of any part of Borneo. Lastly, the sultanate of Brunei itself depends for its very existence on the sufferance of England, and it is now proposed to unite it to the other territories of the two

companies, under the direct protectorate of Great Britain. But a frontier question still remains to be settled between the Dutch Government and the North Borneo Company, arising out of a misunderstanding as to the identity of the river Sebuku, which is accepted by both sides as the boundary line.

#### PHYSICAL FEATURES OF BORNEO.

With the exception of Celebes and Halmahera, the Indonesian islands present, as a rule, extremely simple outlines. Some even affect the form of geometrical figures, such as parallelograms, ovals, trapeziums, and, as in the case of Borneo, triangles. At first sight the observer is struck by the contrast presented by these massive contours, compared to those of the eccentric island of Celebes, with its curiously radiating peninsulas. But a superficial study of the Bornean mountain ranges shows that a slight subsidence of the land would suffice to give the great island a coastline analogous to those of Celebes and Halmahera. Reduced to its framework of hills, Borneo presents in the first place a main ridge, disposed from south-west to north-east, in the direction of the Philippines. But from the central part of this ridge branch off three divergent chains, terminating at the principal headlands of the island, and separated from each other by the alluvial plains of intervening fluvial basins. The primitive aspect of the island has thus been gradually modified by erosions and sedimentary deposits, which during the course of ages has rendered less and less distinct its original stellar formation.

The main range begins some 30 miles from the Philippine waters in a superb mountain, culminating point not only of Borneo, but probably of the whole of Indonesia. Kina-Balu, or the "Chinese Widow," as it is named from a curious local legend, was first ascended by Low in 1851. Belcher's trigonometric measurements give it an altitude of 13,300 feet, although travellers who have approached nearest to the summit estimate its height at not much more than 11,000 feet. Seen from one of the bays indenting the west coast, Kina-Balu seems to rise almost vertically above the surrounding heights, terminating in an irregular crest, which is surmounted by distinct prominences resembling towers. Formerly its slopes were clothed with dark forests up to a height of 10,000 feet; but the woodlands have almost everywhere been cleared by the highland peasantry, the primeval brushwood surviving only on the more inaccessible precipices. The prevailing formations are granites and crystalline rocks, although according to Little, who ascended Kina-Balu in 1867, a crater of vast size opens on its flanks, while fragments of lavas are strewn over the surrounding granites.

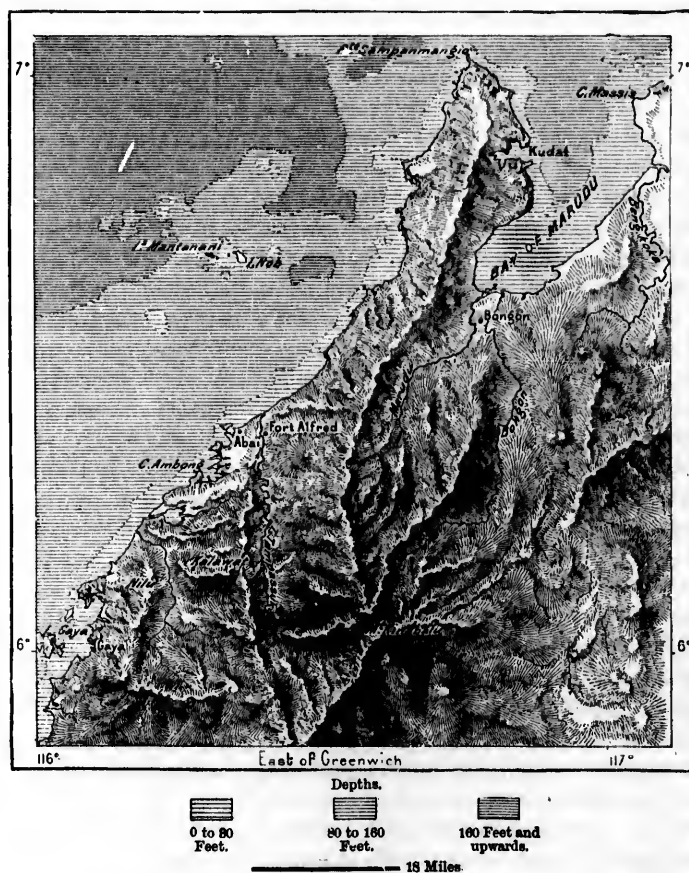
Till recently geographers spoke of a large lake situated at the east foot of the mountain with a circumference of about 100 miles. But no such lake exists, nor is there anything to justify the report beyond a fen or morass flooded during the periodical inundations of a neighbouring stream. The belief in this pretended lake may possibly be due to the Malay term *danau*, that is, "lake," or "sea," applied to one of the surrounding districts.

South of Kina-Balu the divide between the eastern and western slopes falls

abruptly, the pass crossed by Wittl being little over 2,000 feet high. But farther south this explorer failed to discover any pass lower than 3,900 feet, while some of the summits in this section of the chain attain elevations of over 6,500 feet. Towards the south-west the main range is still for the most part unexplored, nothing being known beyond the names of a few peaks visible from the sea.

Fig. 46.—KINA-BALU.

Scale 1 : 1,280,000.



Everything is vaguely designed on the maps, except in the basin of the river Brunei, south and south-east of the capital, where Mounts Malu and Marud both exceed 8,000 feet in height.

The central nucleus of the whole orographic system, whence flow south-west, west, and east the upper affluents of the three great Bornean rivers, has not yet been visited by any Europeans, and is known only by name. According to the

natives the Batu Tabang, culminating point of this mountain group, is so high that "from its summit heaven might easily be reached." From a distance it is said to appear always "white," either because rising above the snow-line, or more probably because usually wrapped in vapour. However this be, the nearest mountains that have hitherto been explored are distinguished rather by their picturesque outlines and eccentric forms than for their great elevation. According to Schwaner, none exceed 4,650 feet, while the ranges branching off towards the headlands on the seaboard would appear to be almost everywhere still lower. Even the Lupar chain, running south-west and west, completely disappears in some places. Between the river of like name traversing Sarawak and Lake Sring, in the Kapuas basin, the slopes are scarcely perceptible, whereas towards the north-east the horizon is bounded by the blue crests of the "Thousand and One Hundred Mountains." Farther on the western chain is again interrupted at several points; but towards its extremity it develops a superb amphitheatre around the Sarawak country, terminating on the coast at the sharp headland of Tanjang Datu. The two loftiest summits of this waterparting are Penrisan and Pu, 4,750 and 6,000 feet respectively.

South of the Batu Rajah, or "King Mountain" (8,300 feet), the range skirting the east side of the Kapuas basin appears to have no peaks rivalling in altitude those of Sarawak and the central nucleus. It is continued southwards by a line of crests from 2,000 to 2,600 feet high, and thence between the Kapuas and Barito basins not by an uninterrupted chain, but by a series of groups separated from each other by broad depressions, and thus forming so many isolated masses. The south-eastern range forming the divide between the Barito and Mahakkam basins is somewhat loftier, the Batu Budang attaining, according to Schwaner, an elevation of 4,550 feet. But southwards it falls rapidly, in its central parts presenting nothing but rounded hills, scarcely more than 600 or 700 feet high. One of the gaps in this chain is occupied by the Jallan-Batu, a chaos of limestone blocks of every form and size, covering a space several hundred square miles in extent. Trees have sprung up between the boulders, and here and there in their fissures or on their summits. The mountains of which these calcareous masses at one time formed part have been gradually disintegrated and carried away by the running waters, leaving nothing but these scattered fragments of more durable rocks.

As it approaches the sea, sweeping round to the south-west of the alluvial Banjermassin plains, the range again develops an unbroken chain of crystalline formation, terminating in the promontory of Cape Satoi. In the same way the hills skirting the north side of the Mahakkam basin merge eastwards in the granite Lakuru chain, terminating in a bold headland on the coast.

Besides the fully developed continuous ranges, Borneo is diversified with a large number of isolated groups dotted over the plains, like the archipelagoes in the surrounding waters. Most of these groups are of slight elevation, although some few rival in altitude the summits of the main ranges. Such are Mounts Balik Pippan and Bratus, in the Mahakkam basin, the latter, according to Bock, about 5,000 feet high.

Several of the summits in Central Borneo consist of granite and other crystalline rocks, as sufficiently attested by the débris washed down and strewn over the plains by the running waters. But in the regions near the seaboard nearly all the hills are of sedimentary formation. Of these the calcareous rocks are very prevalent, their innumerable caverns affording shelter to myriads of the esculent swallow. Other deposits of various ages contain rich beds of coal and lignite, and many parts of the island abound in thermal springs. Although surrounded by a semicircle of igneous islands, Borneo appears at present to contain no active volcanic centres; but this region also had at one time its eruptive craters, and the scoræ and other traces of extinct fires may still be seen here and there, as in the neighbourhood of Kina-Balu and in the Montrado uplands.

The outlines of the Bornean seaboard have frequently been modified. If there was a time when it formed continuous land with Sumatra and the Malay peninsula, it was also at other epochs reduced to the mere skeleton of its mountain ranges, destitute of the argillaceous, shingly, and alluvial plains at present filling up the spaces between its divergent chains. It was probably during these epochs that its volcanic cones blazed above the neighbouring marine waters. Then also were deposited the horizontal beds on which are strewn the ferruginous pebbles washed down from the hills, and among which are collected the precious metals, gold, platinum, quicksilver, as well as diamonds of the purest water. Gold washings occur in most provinces—the British territory in the north, Sarawak, Montrado, the Pontianak and Banjermassin district. The Malays and Dayaks are moreover acquainted with numerous mineral deposits, which they jealously conceal, either in the hope of retaining a monopoly of the mines or else in order to keep the foreigners from their territory. The diamond mines are usually found in pockets of argillaceous soil at some distance from the auriferous beds.

#### RIVERS OF BORNEO.

Thanks to an abundant rainfall, Borneo is watered by a considerable number of broad streams flowing in all directions seawards. Nevertheless the north-west slope between the main range and the coast is too narrow for the development of any great watercourses. Here the most copious is the Brunei, or Borneo, which falls into the estuary at the capital of the state of like name. Farther south, but on the same north-west slope of the island, are the navigable rivers Rajang and Lupar, besides the Sarawak, which, although of small size, is better known from the town of that name situated on its estuary, the scene of so many stirring events in recent years.

One of the three largest rivers in Borneo is the Kapuas, whose catchment basin lies between the two south-western mountain ranges, and which flows mainly towards the south-west. The chain of large lakes which formerly marked its course have been gradually filled in by alluvial deposits, and are now represented only by so-called *danaus*, such as the Sriang and Luar, periodically flooded shallow lagoons occurring at intervals along the riverain plains. Before reaching the low-lying

coastlands, the Kapuas contracts to a narrow bed between two neighbouring hills, beyond which it ramifies into two main branches and numerous smaller channels, forming an extensive delta with a coastline of no less than 70 miles. This alluvial tract projects considerably beyond the original shore-line, and according to the local traditions mentioned by Temminck, has advanced several leagues seawards during the historic period. The island of Majang, opposite the southern branch of the delta, is already almost entirely connected with the mainland, while the sedimentary deposits continue to encroach upon the sea still farther southward, in the direction of the Karimata archipelago. The province of Pulu Petak was formerly an island, as indicated by its very name, which means an island destitute of all vegetation.

The section of Borneo lying south of the equator is the most abundantly watered part of the country. Here follow in rapid succession the rivers Kotaringin, Pembuan, Sumpit, Katingan, Kahajan, and Barito, all, like the Kapuas, lined by occasionally flooded morasses, all steadily advancing beyond the normal coastline, and all presenting navigable highways far into the interior. Of these southern streams the largest is the Barito or Banjer, known also by several other names in the various districts through which it flows. Rising in the central nucleus of highlands, it first forces its way eastwards over a series of falls and rapids, through deep and almost inaccessible gorges, beyond which it winds across the plains southwards to the coast at Banjermassin. Swollen by a large number of affluents, it is everywhere navigable in this section of its course, and about 60 miles from the sea ramifies into two also navigable branches, of which the eastern receives the Negara and Martapura tributaries, while the western joins the Kapuas, which formerly reached the coast in an independent channel. But the alluvial matter brought down by both of these rivers has gradually filled in the intervening marine inlet, and this eastern Kapuas has thus become a tributary of the Barito, a fate which must also, sooner or later, overtake the Kahajan, or Great Dayak.

The Barito delta has a superficial area of over 800 square miles, while the trenches enclosing it east and west are, in some places, considerably over half a mile wide. During the inundations the floodwaters of the Barito and Kapuas intermingle, converting the intervening plains into a vast sheet of water, estimated by Schwaner at no less than 13,000 square miles in extent. Like the Mississippi and other large rivers flowing through low-lying tracts, the Barito frequently shifts its course, forming new channels, especially at the sharp turnings, and thus giving rise to shallow lagoons and backwaters, analogous to the "false rivers" of the Mississippi valley. Here and there these *danaus*, or "seas," are again scoured by the recurring inundations, and uniting with other lagoons or flooded meres, stretch away between their wooded banks beyond the horizon.

In the east equatorial region the only large river is the Mahakkam, called also Kutei, from the vast plain which it traverses on its south-easterly course seawards. After escaping from the rugged uplands, it spreads out to the right and left in vast lagoons bounded by a fringe of forests, and in some places so broad that the opposite shores are invisible. These lacustrine basins, the remains of an ancient sea, are

gradually diminishing in extent, their muddy banks steadily advancing towards the central parts, which Karl Bock found to be still over 80 feet deep. Below the region of lakes, which are connected by narrow channels in an endless labyrinthic system, the Mahakkam, after re-uniting with its chief affluent, continues its winding southerly course between low ranges of carboniferous hills. But beyond an

Fig. 47.—BARITO DELTA.

Scale 1 : 1,400,000.



abrupt bend to the east its two banks, diverging to a distance of one or two miles, acquire a completely alluvial character ; and here the nipa palm is the only arborescent growth. Here also it becomes a tidal stream, flowing, so to say, beyond the mainland, and, like the Mississippi, ramifying into numerous "goose feet" amid the surrounding marine waters. An exceptional spring tide, some 5 or 6 feet

higher than usual, would suffice to again submerge the whole of this newly-formed delta.



Fig. 48.—SCENE IN BORNEO, NEAR SARAWAK.

North of the Lakuru hills none of the eastern streams, such as the Kelai, the

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Kajang, the Sebuwang, or the Kina-Batangan, are comparable in the extent of their catchment basins to the Mahakkam and other large southern rivers. Nevertheless all have a copious discharge, and all are navigable, although their estuaries are much obstructed by the coralline formations which abound on the north-east coast.\*

Few regions of the globe can compare with Borneo in the number of their navigable highways; hence it is not surprising that hundreds of Malay and Chinese traders have, as in Sumatra, utilised these streams for their floating habitations, the materials for which are yielded in abundance by the surrounding forests. Erecting their little houses, and at times a whole village, on their firmly constructed rafts, they descend with the current, casting anchor wherever there are prospects of doing a little trade in honey, gums, skins or other local produce. After weeks or months of this wandering life they reach some larger emporium on the lower course, where they sell their wares, houses and all. If the venture has proved profitable, they again ascend the river in boats, build another floating domicile and renew their barter trade with the natives.

#### CLIMATE OF BORNEO.

Although intersected by the equinoxial line Borneo has a far less torrid climate than that of Aden and the coastlands on the Red Sea. Like the other Indonesian regions it enjoys the refreshing marine breezes, which are attracted from all quarters towards the centres of rarefaction. On the seaboard the glass seldom indicates 95° F. in the shade and usually does not exceed 90°, while the thermometer normally oscillates between 72° in the morning and 89° about two o'clock in the afternoon. Hence the dangerous character of the Bornean climate is due not to its heat, but to the heavy night dews and to the malaria caused by the periodic inundations and decomposition of organic matters, especially in the interior, less exposed to the invigorating sea breezes. Here also there is little change of season, the winds being little regulated and rain-bearing clouds arriving from all quarters throughout the year.

But on the seaboard the south-east trades prevailing from April to October, are regularly followed by the west and stormy north-west, north and north-east monsoons. But even here moisture is precipitated at all times, and at Sarawak the mean annual rainfall is estimated at from 150 to 200 inches. Long droughts

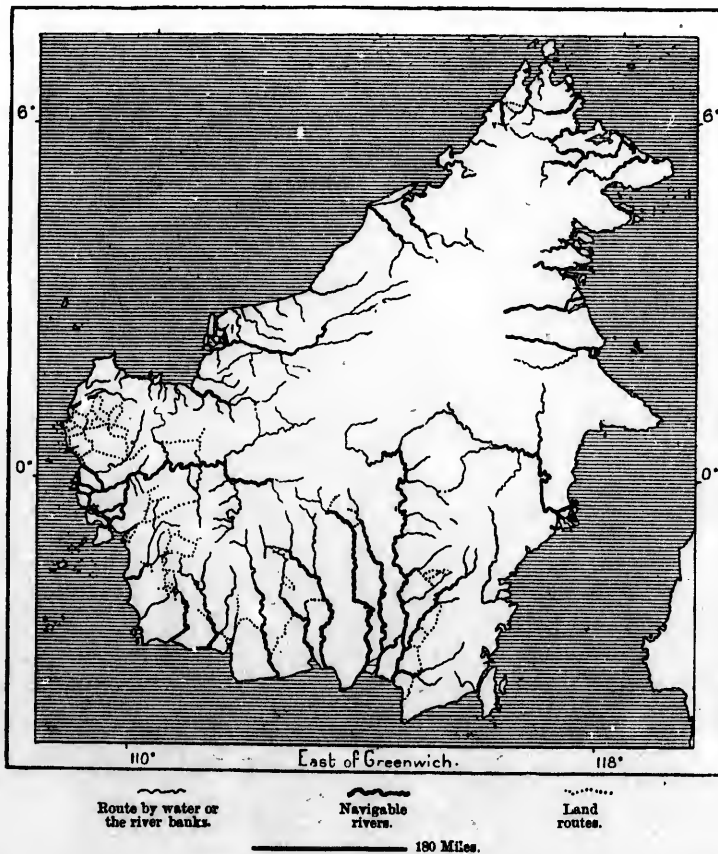
#### \* Chief Rivers of Borneo:—

	Approximate Length. Miles.	Approximate Area of Basin. Square Miles.	Length of Navigable Course with Affluents. Miles.
Brunei or Limbang . . . . .	120	4,000	60
Rejang . . . . .	300	10,000	130
Lupar . . . . .	180	4,000	30
Kapuas . . . . .	480	30,000	360
Katingar . . . . .	270	8,000	120
Kahajan . . . . .	330	9,000	150
Barito . . . . .	550	40,000	600
Mahakkam . . . . .	570	32,000	360
Kina-Batangan . . . . .	330	8,000	270

also occasionally occur, as in the year 1877, when the great Sriang lagoon in the

Fig. 49.—NAVIGABLE STREAMS AND CHIEF ROUTES OF EXPLORERS IN BORNEO.

Scale 1 : 12,000,000.



Kapuas basin was completely dried up. In the Kutei district Bock traversed forests killed by the heat, and destitute alike of vegetation and animal life.

FLORA.

But these are rare exceptions, and on the whole Borneo may be described as one vast forest, so dense and continuous that, according to one observer, apes might pass from one extremity of the island to another by swinging from branch to branch. The forest growths are interrupted only in some few districts by tracts covered with the herbaceous *alang* plant.

Although differing little from that of the other large islands, the Bornean flora comprises a few peculiar forms, especially trees yielding good timber, gums,

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and resins. On the flanks of Kina-Balu, noted for its numerous varieties of the pitcher-plant, botanists have observed a remarkable intermingling of Indian, Malayan, and Australian species. On the muddy coastlands flourishes the valuable sago tree (*Metroxylon sagus Rumphii*), which yields its nutritive sap in such abundance that the province of Sarawak alone supplies more than half of the sago exported from tropical lands. A single plant of average size furnishes a thousand cakes, with a total weight of about seven hundred pounds, a quantity sufficient to support one man for a twelvemonth, yet not needing more than some ten days' easy labour for its production.

#### FAUNA.

Like its flora, the fauna of Borneo possesses several species giving it a peculiar physiognomy. Almost every island has some characteristic animal, and the contrasts presented by these insular faunas has enabled naturalists to conjecture the relative ages when the islands became detached from each other. Thus Sumatra and Borneo must have still formed continuous land when Java was already a separate region. Hence the narrow Sunda Strait would appear to be older than the broad but shallow Sea of Borneo. This inference is confirmed by the conformity of the faunas between Borneo and Sumatra, and their relative difference between the latter island and Java.

Amongst the animals which appear to have originated in Borneo, the most remarkable is the mias, or orang-utan, that is, "man of the woods" (*Simia satyrus*), also met in North Sumatra. He is found in every part of Borneo, but all attempts to tame him have hitherto resulted in failure. Nearly all the captured specimens die of consumption, even when retained in the vicinity of their native forests. The Dayaks assert that the mias fears neither rhinoceros, tiger, nor wild boar, and that he will even face the crocodile and python. It was long doubted whether the elephant and rhinoceros formed part of the Bornean fauna, but although they have disappeared from the Dutch provinces, they are still met in herds near Sandakan, in British territory. The Bornean tiger is a distinct species, and here also occur two varieties of the crocodile found nowhere else.

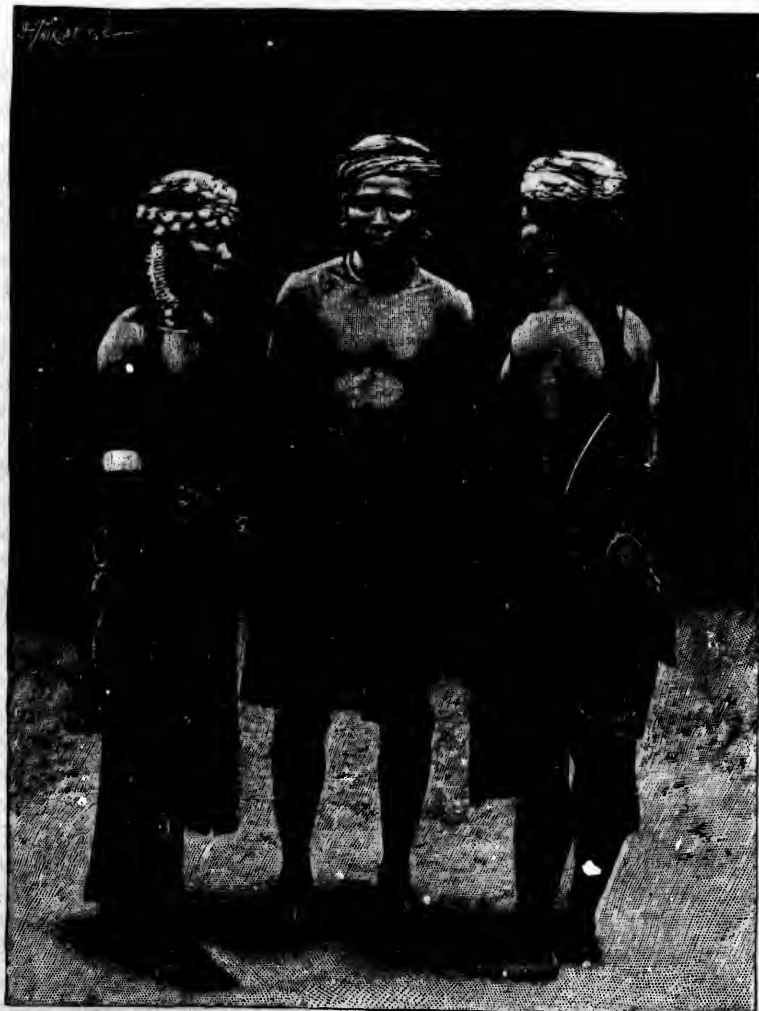
#### INHABITANTS OF BORNEO.

Mention is often made of a peculiar race of aborigines dwelling in the midst of the forests, and the natives themselves are fond of talking about the Orang-Buntut, or "Tailed Men," said to dwell in the central regions. Many Arab, Malay, and native travellers claim to have seen them, squatting on little stools with holes made for the convenience of inserting their caudal appendix. Even recently the explorer, Carl Bock, searched, though in vain, for these tailed people amongst the inhabitants of the highlands, between the Barito and Pasir basins.

But apart from these Buntut, Borneo still harbours many absolutely savage peoples. Such are the Puans of the central regions, and the Njavongs of the Kahajan basin, who live in the forests unsheltered even by a screen of foliage from sun or rain. Their only garment is a loin-cloth, their weapon the blow-pipe,

through which they shoot little darts poisoned with a mixture of nicotine and other ingredients. They shun Europeans, Malays, and Chinese alike, trading with them only through intermediate agents. Their complexion is lighter than

Fig. 50.—DAYAK TYPES, BORNEO.



that of other Borneans, and the women especially, thanks to the shade of the dense forests, have clear skins of a somewhat greyish yellow colour. Their chief food is the flesh of apes, snakes, and frogs. But whether these or any other peoples of the interior are to be classed with the fair Indonesians or the dwarfish Negritos is still a moot point.

The great bulk of the inland populations are collectively known as Dayaks, a term the primary meaning of which appears to be "Men," "People," but which for the Malays has simply the sense of "Wild," or "Heathen." In any case, many tribes are certainly grouped under this general designation, which differ in their origin, physical appearance, and customs. The special names by which they are known to their neighbours are for the most part taken from the districts, mountains, or rivers inhabited by them. Thus have been named the Orang-Kapuas, the Orang-Barito, Orang-Mahakkam, Orang-Bukit, or "Highlanders," Ot-Danom, or "Uplanders;" in the same way are distinguished the "Sea," "River," and "Land" Dayaks.

Taken collectively the Dayak populations differ from the civilised Malays by their slim figure, lighter complexion, more prominent nose and higher forehead. In many communities the men carefully eradicate the hair of the face, while both sexes file, dye, and sometimes even pierce the teeth, in which are fixed gold buttons. The lobe of the ear is similarly pierced for the insertion of bits of stick, rings, crescent-shaped metal plates, and other ornaments, by the weight of which the lobe is gradually distended down to the shoulder. In several tribes the skulls of the infants are artificially deformed by means of bamboo frames and bandages.

The simple Dayak costume of blue cotton with a three-coloured stripe for border is always gracefully draped, and the black hair is usually wrapped in a red cloth trimmed with gold. Most of the Dayaks tattoo the arms, hands, feet, and thighs, occasionally also breast and temples. The designs, generally of a beautiful blue colour on the coppery ground of the body, display great taste, and are nearly always disposed in odd numbers, which, as among so many other peoples, are supposed to be lucky. Amulets of stone, filigree, and the like, are also added to the ornaments to avert misfortune. In some tribes coils of brass wire are wound round the body, as among some African peoples on the shores of Victoria Nyanza.

The Dayaks are much subject to skin diseases, due perhaps to the lack of salt in their diet. Victims of goitre also are as numerous in the Kutei basin as in certain Alpine and Pyrenean valleys. Even before the arrival of the Dutch the natives practised a sort of inoculation against small-pox, which in Borneo is of a very virulent character.

The Dayaks believe in the existence of a supreme being, the Sang-Sang, who reveals his pleasure to the priests and communes with them in a "heavenly tongue." But the confidence of the people is chiefly in the bilians or priestesses; who understand how to conjure the evil spirits, dispel maladies, forecast the future, solve riddles and extemporise songs. They are brought up from infancy by the priests, and always chosen from the slave class, for they are common to all the married men of the community according to a fixed tariff. One of the marriage customs, probably of Chinese origin, is scarcely elsewhere equalled for refinement of cruelty. The wealthy Ot-Damons confine their daughters when eight or ten years old in a narrow, dimly lit cell, which they never leave for the next seven or eight years. During this period they are allowed to see

neither parents nor friends, not even their own mother; their only occupation is the weaving of mats, and their food is administered by a slave. When at last released from her prison, pale, emaciated, tottering on her small enfeebled feet, the maiden is considered a worthy prize for the wealthiest suitors; a "piece of man," that is to say a slave, is immolated, and her person sprinkled with his blood.

Many Dayak tribes are still addicted to head-hunting, a practice which has made their name notorious, and which but lately threatened the destruction of the whole race. It is essentially a religious practice, so much so that no important act in their lives seems sanctioned unless accompanied by the offering of one or more heads. The child is born under adverse influences unless the father has presented a head or two to the mother before its birth. The young man cannot become a man and arm himself with the *mandau*, or war club, until he has beheaded at least one victim. The wooer is rejected by the maiden of his choice unless he can produce one head to adorn their new home. The chief fails to secure recognition until he can exhibit to his subjects a head secured by his own hand. No dying person can enter the kingdom beyond the grave with honour unless he is accompanied by one or more headless companions. Every rajah owes to his rank the tribute of a numerous escort after death.

Amongst some tribes, notably the Bahu Trings, in the northern part of the Mahakkam basin, and the Ot-Damons of the Upper Kahajan, the religious custom is still more exacting. It is not sufficient to kill the victim, but before being dispatched he must also be tortured, the corpse sprinkled with his blood, and his flesh eaten under the eyes of the priests and priestesses, who perform the prescribed rites. All this explains the terror inspired by the Dayaks in their neighbours, and the current belief that they are sprung from swords and daggers that have taken human form.

A regular head-hunting expedition is so much regarded as a pre-eminently religious act, that amongst the primitive tribes it must be preceded by a general confession. All sinners confess their shortcomings, submit to the *pomali*, that is, the *taboo* of the Polynesians, and do penance in the forests in order to be "restored to grace." When thus cleansed from all moral stain, they engage in their funeral dances, don their warlike costume of the skins of wild beasts, and put on their masks representing the open jaws of a tiger or crocodile. Thus disguised they sally forth to fall upon some distant tribe of friends or foes, and gather their harvest of heads or of victims reserved for the feast. The skulls of the enemy are usually held in the greatest respect; every attention is bestowed on them; at every meal the choicest morsels are placed in their mouth; they are supplied with betel and tobacco; they are treated as chiefs, in the hope that they may forget their own and attach themselves to the new tribe. "Your head is ours now; help us to slay your former friends," is the language addressed to them.

With the gradual spread of Islam the Dayaks of the British and Dutch possessions are slowly abandoning their bloodthirsty usages. At the same time the head-hunters themselves, strange to say, are otherwise the most moral

people in the whole of Indonesia. Nearly all are perfectly frank and honest. They scrupulously respect the fruits of their neighbours' labour, and in the tribe itself murder is unknown. For a period of twelve years under the rule of Rajah Brooke only one case of homicide occurred in the principality of Sarawak, and in this case the criminal was a stranger adopted by the Dayaks. The natives also contrast favourably with the Malay, Chinese, or European immigrants for their temperance and forbearance. Although cheated and plundered on all sides, they preserve their good temper and cheerful disposition, indulge freely in merry-making, and display much ingenuity in inventing all kinds of games.

Born artists, they not only raise their dwellings on piles high above the periodical floods and beyond the reach of nightly marauders, but also dispose the bamboo frames and gables in forms pleasing to the eye. They are eager collectors of porcelain and "old china," and to certain choice pieces are attributed divine properties. The tombs of their chiefs, and in some districts those of their dogs, are solidly constructed of iron-wood and embellished with carvings representing heads, birds, dragons' mouths, rivalling those of Burmah and Siam in delicacy of detail and instinctive harmony.

In the centre of most villages stands the *balai*, or "chief house," a round or elongated building, erected, like all the others, on piles, but containing a vast apartment where the unmarried young men and all strangers pass the night, and which serves as an exchange, forum, and council chamber. Some of these Dayak palaces, occasionally treated as citadels, have a circuit of no less than 1,000 feet. Keppel saw one on the banks of the Lundu which was over 600 feet long, and which accommodated a whole tribe of four hundred souls. The natives also give proof of their engineering skill by throwing cleverly constructed bamboo bridges across rivulets, and sometimes even across rivers considerably over 300 feet broad. But they never lay down roads, and rarely even paths, almost their only highways being the water-courses. Their best tracks are made of the stems of trees placed endwise, over which they run rather than walk. At the least alarm the trees leading to their village are scattered and the track destroyed.

The Sarawak Dayaks are good husbandmen, raising on the reclaimed land two crops in rotation, first rice, then sugar-cane, maize or vegetables. Then the ground lies fallow for eight or ten years, during which it is again invaded by scrub and even forest growths. The granaries are a kind of basket fixed on high trees and approached by ladders or inclined planes of bamboo. The inland Dayaks are chiefly occupied in collecting the natural products of the forest, ratan and gutta-percha for the European market, swallows' nests and bezoar stones for the Chinese. When absent from their homes in search of these objects, the women send little lamps of cocoanut shell adrift on the stream, as is also practised on the banks of the Ganges. These floating lights, burning in honour of the spirits of air and water, intercede with them for the absent toilers in the forests.

Notwithstanding the almost inexhaustible natural resources of their fertile domain, even those half-civilised Dayaks who have given up the practice of head-hunting do not appear to increase in numbers. Their abundant crops

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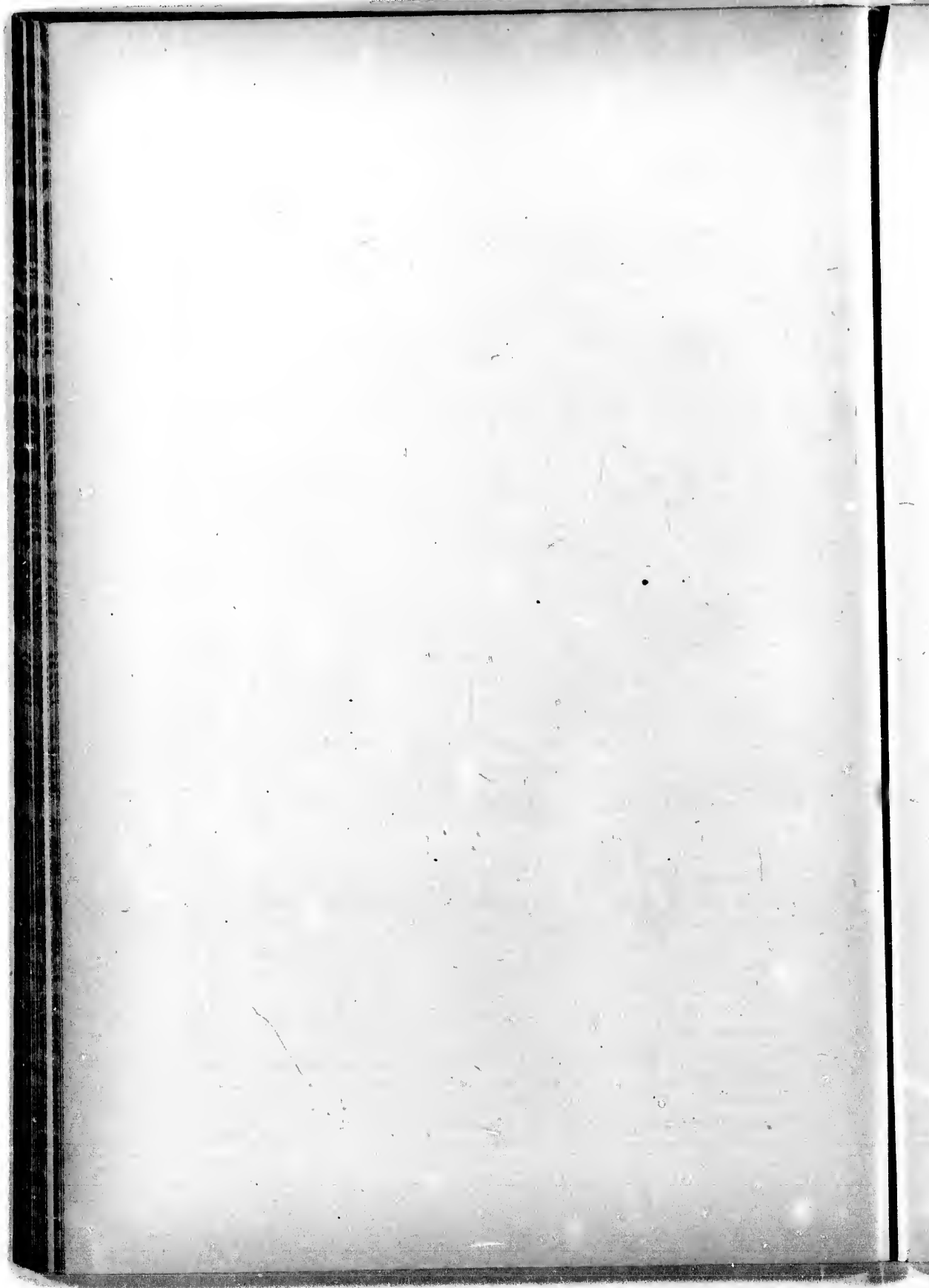
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DAYAK WOMEN, BORNEO.





yield ample both for their own wants and for a considerable export trade; celibacy is unknown, all marrying in the prime of life; yet their villages still remain scattered in small groups over vast spaces. This arrest of growth must be attributed partly to destructive epidemics, partly to the slight fecundity of the women. The families average not more than from two to four, which, according to Wallace, is due to the life of hardships to which the women are condemned. Although otherwise highly respected by their husbands, all the hard work falls to their lot, and they thus become exhausted and prematurely aged. The consequence is that in the whole of Borneo the full-blooded Dayaks are estimated at not more than about a million altogether.

The Mohammedan Malays, who are disseminating the tenets of Islam amongst the aborigines, are nearly all settled on the seaboard and along the banks of the rivers. Attracted by the profits of trade, they advance slowly from market to market towards the hilly regions of the interior, gradually transforming and assimilating the Dayaks by crossings and the influence of their higher culture. Although numerically inferior, they have already acquired the predominance, and every day adds to their ascendancy. The Moslem element is also augmented by Bugis and Bajaus from Celebes, by Javanese, Illanos from the Philippines, and a few Arabs. But more numerous than all together are the Chinese, who are settled chiefly in the seaports, and who even enjoy a monopoly of several industries, including that of gold-mining. The Europeans had scarcely established their permanent factories in Borneo when the Chinese made their appearance, and soon developed considerable settlements. From them the Dutch met with the most active resistance during their gradual conquest of the southern provinces.

Of pure Chinese there are over thirty thousand, but with the half-castes they may be estimated at about two hundred thousand, the great majority of whom have been settled in the island and intermingled with the Malays for several generations. The Dutch and English do not number more than a few hundred altogether; but they hold the political power, in consequence of which thousands of the natives have begun to speak their languages and adopt their usages.

#### DUTCH BORNEO.

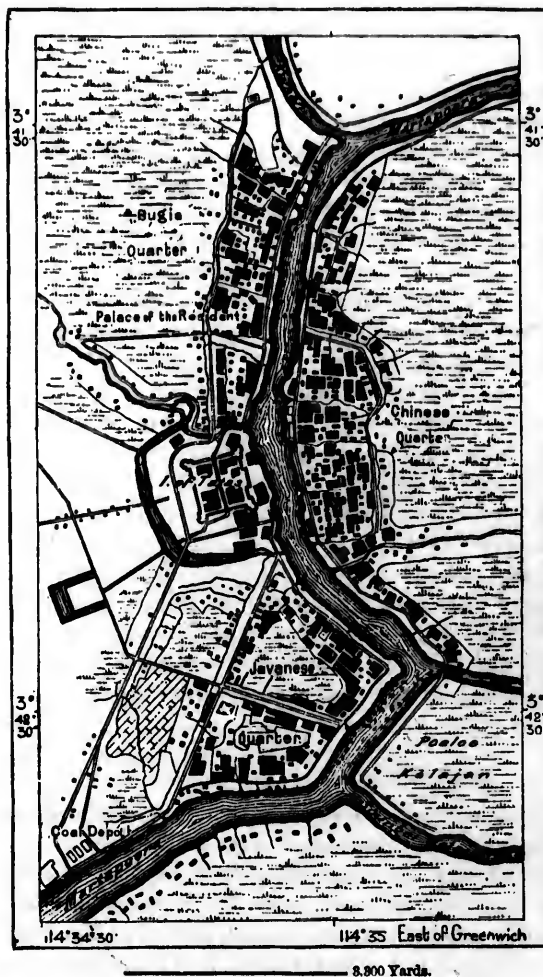
On the east coast *Pontianak* was the first town visited by its present masters, and it still continues to be the capital and commercial centre of the country. In 1856 it was ceded by the local sultan to the Dutch, by whom it has been made a free port. The wooden houses of Pontianak are disposed in two groups on either side of the Kapuas River, at the confluence of the Landak, about 10 miles from the coast. Some Hindu ruins, temples and statues, are seen here and there in the surrounding forests.

North of Pontianak, in the petty states subject to the Dutch about the Sarawak frontier, the Chinese element preponderates. Attracted to *Sambas* and *Montrado* by the rich gold and platinum mines, to *Landak* by its diamond fields, and now to the banks of the Kapuas by its coal deposits, they have gradually driven back the

Dayaks, and towards the middle of the present century had even constituted themselves in independent republics. In these *kongsi*, or brotherhoods, the "older brothers" and the "younger" co-operated together, and pauperism was unknown.

Fig. 51.—BANJERMASSIN.

Scale 1 : 86,000.



Animated by a common spirit of solidarity, they defended themselves with the greatest courage, and expeditions of several thousand men were required to enforce submission to the Dutch rule. As in most other Chinese settlements, the staple trade of Sambas and Montrado is of opium.

*Sukadana*, situated on a lateral branch of the Kapuas delta, was formerly capital of one of the largest states in Borneo; now it is a mere village facing the picturesque *Karimata* archipelago. These islands were at one time densely peopled, but are now almost uninhabited. The culminating peak of the chief island has an altitude of 3,310 feet.

Between the Kapuas and Barito deltas every estuary has its market, every petty state its capital, where a Dutch official is now seated by the side of the descendant of the old sovereigns. But the coast population

is so scanty that none of these places are now anything more than humble villages. Yet the upper valley of the Kahajan abounds in gold dust, which is collected by the Dayaks, who have hitherto prevented the Chinese from penetrating to their territory.

Farther east the chief emporium is *Banjermassin*, or simply *Banjer*, capital of

the south-western provinces, and the largest city in the whole of Borneo. Although



Fig. 52.—VIEW OF THE RIVER AMANAT, DUTCH BORNEO.

commanding the entrance of the Barito, it does not stand on the estuary itself, but more to the east in a district intersected by a labyrinth of ever-shifting channels

and backwaters. Here the Barito is joined by the Martapura, on which stands Banjermassin, the "Venice of Borneo," whose carved wooden houses line both banks for a space of over 2 miles. But these land residences are nearly everywhere concealed by the *rakits*, or floating structures, anchored in mid-stream. The river is also animated by craft of all kinds, boats, canoes, sampans, decked praus with raised cabins darting about in all directions.

The Dutch occupy the island of *Tatas*, surrounded by the Malay and Chinese quarters, for all have their special districts, even the monkeys, who occupy the Isle of Flowers, where they receive the attentions of the natives. Banjermassin, which is accessible to vessels drawing 15 or 16 feet, is one of the busiest of the secondary ports in the Eastern Archipelago. Till recently it largely exported diamonds collected on the banks of the Martapura; but since the discovery of the Cape mines this trade has ceased to be profitable, especially as the Sultan claims all stones of more than five carats. Yet such was the reputation of the Banjermassin market that the local Chinese dealers imported crystals from the Cape to be afterwards exported as Martapura diamonds. In this district is also collected much gold dust, and the *Pangaron* coal mines above *Martapura* were lately yielding a yearly output of over 10,000 tons. *Martapura* was formerly the capital of the State, and the Sultan has still a palace in the place; it lies 30 miles above and to the east of Banjermassin.

The most thickly peopled and civilized region in Borneo is the basin of the river Bahan or Negara, where the Hindus appear to have first settled. Since the middle of the century the population of this small fluvial valley rose from 60,000 to over 300,000 in 1878; consequently this part of Borneo is now relatively as densely inhabited as Java. *Amuntai* on the left bank of the Bahan, *Negara* and *Margasari* lower down on both banks, are all large trading and industrial places. The armourers of Negara were famous throughout Indonesia before the manufacture of arms was suppressed by the Dutch; but the district still produces all the earthenware used in the country.

Farther east some Javanese immigrants cultivate the fertile plains of the *Kendangan* district, on the banks of the beautiful Amandit river. The new town of *Muwara-Bahan*, or *Marabahan* (*Bekompai*), at the junction of the Bahan and Barito, is the outport of the trade of Banjermassin with the Bahan basin. Its population is rapidly increasing, thanks to the spread of Islam amongst the surrounding Dayak tribes. Higher up, the only important place in the thinly peopled upper Barito valley is the village of *Lutuntur* (*Lokhton Tuor*), at the Teweh confluence, 200 miles from the coast.

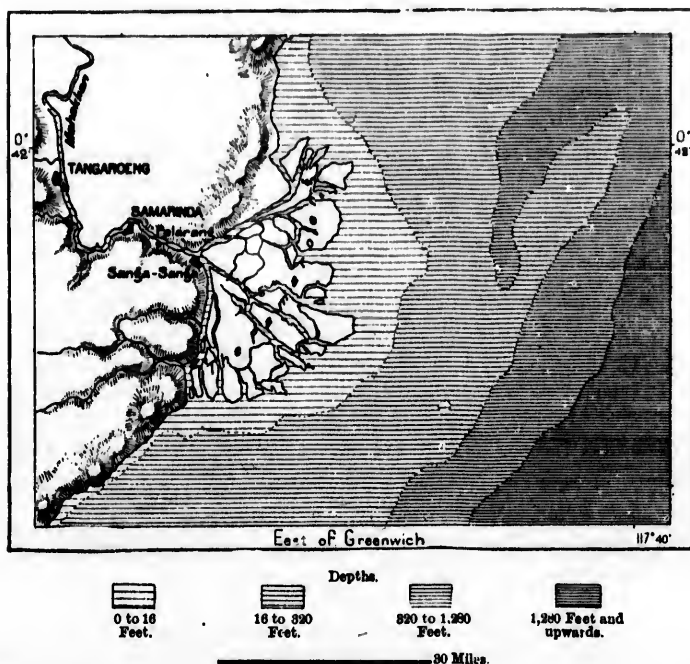
The various petty states on the south-east coastlands are still semi-independent. *Pasir*, capital of one of these states, is one of the chief places in Borneo. Lying at the head of a delta navigable by small craft, *Pasir*, or the "Sands," as it is named from the surrounding dunes, carries on a brisk trade with the opposite coasts of Celebes, whence it has received numerous immigrants.

Several important towns follow along the lower course of the Mahakkam in the kingdom of Kutei, which since 1844 has been half subject to the Dutch. *Tangarung*,

the capital, lies about 60 miles above the estuary on the right bank of the Mahakkam, which is here a broad, tidal stream. But nearly all the trade of Kutei is centred in *Samarinda*, which lies lower down near the fork of the delta, where large Chinese junks ship the gutta-percha, rattans, timber, honey, edible birds'-nests and other produce brought down on rafts from the upper regions of the Makakkam basin. Samarinda is the residence of the Dutch political agent, and of the Mohammedan imâm, from whom the natives learn to write Arabic and recite verses from the Koran. Here the Bougis from Celebes have settled on the right bank, where they have set up a strong republic, administering their own laws and enjoying complete

Fig. 53.—LOWER COURSE OF THE MAHAKKAM.

Scale 1:1,500,000.



self government. The Chinese and Malays occupy the left bank, residing either in floating houses or in dwellings raised on piles. Here are no roads or even tracks, all the communications between the different quarters being carried on exclusively by water. The town itself is one vast cemetery, headstones or carved boards marking the graves of the dead round about the abodes of the living. The few steamers touching at Samarinda find in the immediate neighbourhood, and especially at *Pelarang*, 5 or 6 miles farther down, a supply of coal in the rich mines, the property of the Sultan. *Sanga-Sanga*, at the head of the delta, was the royal residence before Samarinda.

The little port of *Sankolirang*, on one of the inlets north of the Mahakkam delta, is now a mere fishing village; but to judge from the surrounding ruins it was at one time an important centre of Hindu culture in East Borneo. *Sambiliung*, *Gunong-Tebur*, *Bulangan* and *Tidung*, petty states following north of Kutei as far as British North Borneo, are amongst the least known parts of the island. A few Dutch officials are stationed at two or three points along the coast, in order to maintain the right of possession against the pretensions of the Sultan of Sulu, the claims of Spain, and the further annexations by England. A large part of these territories, long harassed by corsairs, is almost uninhabited.

#### ADMINISTRATION OF DUTCH BORNEO.

The Dutch portion of Borneo is divided into two provinces, that of the west with capital Pontianak, and that of the east with capital Banjermassin. As in Sumatra, the Dutch functionaries establish their direct authority very gradually. Sultans and rajahs are still at the head of the different states, although several of them, "protected" by a Dutch garrison, are practically mere pensioners of the government. Others, on the contrary, such as the Sultans of Pasir and Kutei, being more removed from the centre of authority, are still real sovereigns, although gradually sinking to the humble position of vassals. Even in the towns, where the Dutch have long been indisputable masters and strictly obeyed, they prefer to rule through native agency. The Chinese *kap-thai* and *kapitan*, the Malay *panumbahan*, *pangeran* and *tomongong*, are held responsible for the conduct of their subordinates. The Dutch Resident abstains from direct interference in the local affairs of each nation, so long as it keeps the peace and pays the imposts regularly.

The Dayaks of the interior are liable only to a poll-tax, although the chief charged with its collection contrives too often to levy it four or five times over. The sultans farm the opium crop and the customs, and according to Bock their surest source of revenue is usury. They lend to their subjects at exorbitant interests and on solid security.

In the Appendix will be found a table of the Dutch administrative divisions, with their approximate areas and populations.

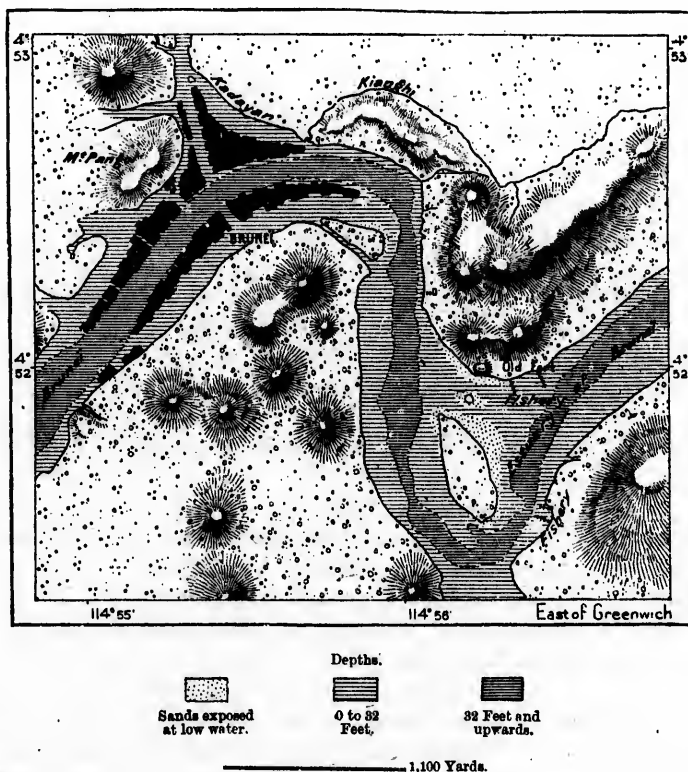
#### SULTANATE OF BRUNEI AND BRITISH BORNEO.

During the first half of the century, nearly all North Borneo was still subject to the Sultan of Brunei, at that time the most powerful potentate in the island that bears his name. At present his dominions have been enormously curtailed. Hopeless of resisting the demands of those more powerful than himself, he has gradually ceded most of his empire to the British. First went the island of Labuan, commanding the approach to his capital; then followed the southern region of Sarawak, surrendered to a soldier of fortune, and lastly the whole of the north handed over to an English financial company. What remains is scarcely a fourth of his former possessions, and even this is already under the effective suzerainty of England, pending its official annexation to the British Empire.

Like most places on the coast, *Brunei*, the Sultan's residence, is an amphibious town, but presents a more singular aspect even than Pontianak or Banjarmasin. The picturesque Malay structures are not here mingled with flat European houses. The stream, at this point considerably over a mile wide, is lined by long avenues of inhabited boats, while the neighbouring bay is crowded with Chinese junks and praus from Mindanao. After two years of navigation amid the oceanic wastes, the

Fig. 54.—BRUNEI.

Scale 1 : 35,000.



companions of Magellan were surprised at the spectacle presented by this great city, which, according to Pigafetta, at that time contained "twenty-five thousand hearths." The present inhabitants, reduced to about ten thousand, are described as mild and timid, impoverished, crushed by heavy imposts, all slaves of the Sultan. Their chief industry is the manufacture of arms and copperware. The neighbouring Kadyan and Murut tribes have already been partly converted to Islam.



## LABUAN.

At the time of its cession to Great Britain in 1846, Labuan, the island of the "roadstead," was completely uninhabited and covered by dense forest. But in annexing it to their colonial empire despite the claims of the Dutch, the English hoped it might become an important station on the highroad between Singapore and Hongkong. It lies, however, somewhat out of the direct track of shipping, while its coal mines, actively worked for some years, have been deluged by the tropical rains of those regions. They are of older formation than those of the mainland, which belong to the Jurassic and even more recent epochs. The island is inhabited chiefly by Malays and Chinese, and although provided with a governor and legislative council, had only nineteen Europeans in 1884. Since the suspension of mining operations its trade has considerably diminished.

## SARAWAK.

The territory of Sarawak, lying between the state of Brunei and the Dutch possessions, and skirted on the west by the main Bornean range, forms part of the British colonial empire only since the year 1888. It belongs to the Brooke family, which holds it as a fief, and the head of which takes the Indian title of Rajah. But these English vassals, more powerful than their Malay suzerain, have steadily enlarged their dominion since 1841, and Sarawak is at present more extensive, more densely peopled, and far more opulent than Brunei itself. But it is still very sparsely inhabited, containing perhaps not more than 300,000 souls in a total area of 36,000 square miles. A recent treaty secures to England the control over its internal administration.

Like most other towns on the Bornean seaboard, the capital, *Sarawak* (properly *Kuching*) lies on a navigable river, some distance from the coast, and above the delta, whose two chief branches are accessible with difficulty to large vessels. Commanded by woodland heights and surrounded with gardens and orchards, the town presents a pleasant aspect; although its British residents regret that the capital has not been placed some 20 miles to the north-east, on the breezy and salubrious slopes of a headland at the entrance of the Moratabas river. But it is now too late to displace a town which possesses some fine buildings, warehouses, covered markets, docks, rich plantations, and quite a network of well-kept roads. Its Dayak, Malay and Chinese population is rapidly increasing both by immigration and excess of births over the mortality, and Kuching, an obscure village in 1850, has now over 20,000 inhabitants.

Some antimony and quicksilver mines in the upper basin of the river formerly yielded large profits, but have now lost much of their value. They are, however, still occupied by Chinese miners, who also work the gold washings, and the diamond and coal fields of the Sadong valley. The most promising districts at present are those of Lundu, west of Sarawak, where the planters cultivate rice, gambier, and pepper. One of the bays on the Lundu coast is noted for its turtles,

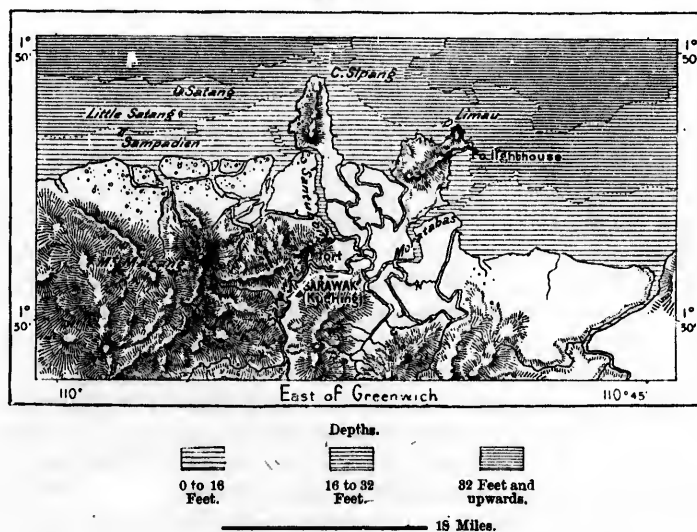
the fishing of which is strictly regulated, and a close season enforced for the collection of the eggs.

East of Sarawak the broad and fertile Lupar valley, with its rich coalfields, has probably the brightest future prospects, thanks to its easy natural communications with the Kapuas basin and the interior of Borneo. *Simangang*, its capital, is a large Malay village 80 miles above the estuary at the head of the fluvial navigation.

The Rejang basin, comprising the northern portion of Sarawak, has already developed a considerable export trade, especially in sago and bilian (ironwood).

Fig. 55.—SARAWAK.

Scale 1 : 900 000.



This trade, carried on by Chinese junks, is centred chiefly in the port of *Rejang*, on the southern branch of the delta. *Sibu*, another Malay town at the head of the delta, is the great market for the interior, and here the Government has built a fort to overawe the surrounding Dayaks. The Milanos, one of their most numerous tribes, have been partially converted to Islam. They are a repulsive race with coarse limbs, uncouth carriage, and milky-white, unwholesome complexion. The custom of treading out the sap of the sago-palm has given them broad, flat feet, while the heads of their children are deformed by means of boards, like those of the North American Flatheads. At the death of a rich Milano his sago plantation is cut down, so that his estate may accompany him to the next world.

The increasing trade of Sarawak is furthered by about a hundred European, Chinese, and Malay vessels, besides a regular service of steamers plying between Kuching and Singapore. With the traffic the revenue also increases, leaving an

annual surplus devoted to public works and instruction. The rajah exercises almost absolute power, choosing his own council of Europeans or Malays, and holding himself responsible to no man. By a slow process of extinction slavery died out with the year 1838. The regular army of about three hundred native soldiers draws its officers from a civil and military school attended by one hundred and fifty students.

The territorial divisions of Sarawak, named from the chief rivers watering them, are, Lundu, Sarawak, Sadong, Batang Lupar, Saribas, Kalukah, Rejang, Mukah, and Bintulu.

#### NORTH BORNEO.

The British territory of Sabah, better known as North Borneo, has been constituted by successive acquisitions by purchase. In 1865 a United States consul had already obtained from the Sultan of Brunei the grant of a portion of this region, and founded an American company for its development. But these essays ended in financial ruin, and an English corporation had little difficulty in securing the privileges of the bankrupt American speculators. Fresh concessions made in 1877 and 1878 enlarged the area of the districts detached from Brunei and ceded to a small group of British capitalists, who also obtained from the Sultan of the Sulu Archipelago the domains which he possessed or claimed on the mainland. By means of a few pensions they thus acquired a whole kingdom, for which they, moreover, procured recognition and a charter from the English Crown.

The limits of the new state are fixed on the west coast by Mount Marapok near Brunei Bay, and on the east side by the course of the Sibuko River. Numerous travellers have been encouraged by the Company to explore the interior, to trace the rivers to their sources, scale the mountains and passes, study the mineral and agricultural resources of the land, and select the best sites for future plantations.

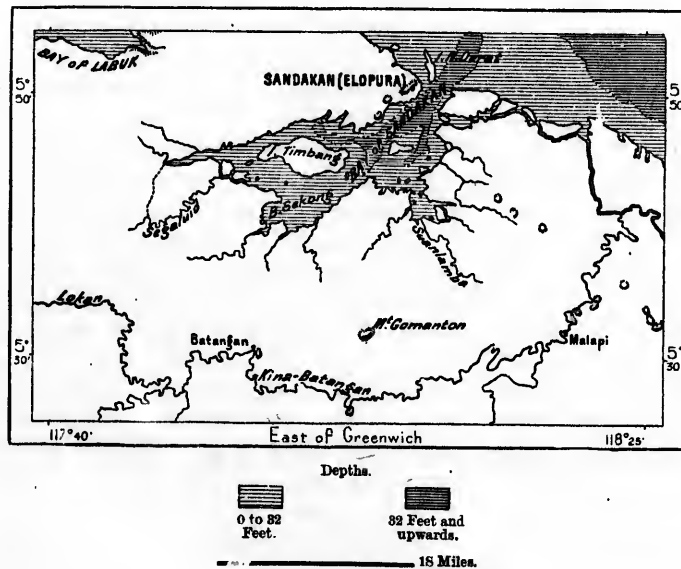
Thanks to these explorations North Borneo is now known to be the finest, most picturesque, and promising region of the whole island, although at the time of the British occupation one of the least peopled. In the Kina-Batangan basin Fryer found only three villages and one isolated house for a space of two hundred and ninety miles, and the whole population, scattered along the coasts and river-banks, scarcely numbered one hundred and fifty thousand souls ten years ago. But the suppression of tribal wars and piratical expeditions, the introduction of vaccination, the arrival of Chinese immigrants, and the establishment of orderly government have been followed by a rapid increase of the free and enslaved inhabitants. By the terms of its charter the Company engages to prevent all foreigners, European or Chinese, from holding slaves; but it is not bound to suppress servitude amongst the tribes.

In any case the social condition of the people cannot fail to be rapidly modified under the influence of the Chinese, who flock to the recently founded towns and take the management of all new enterprises. To the Chinese is even attributed the old Bornean civilisation, traces of which still survive here and there, and which is

recalled by the names of Kina-Balu and Kina-Batangan. The local Dayaks are commonly designated by the collective terms, Dusun and Idaan. The Bulé-Dupis tribe, near Sandakan Bay, appears to be distinguished from all the others by their almost white complexion and "European profile." They are regarded as almost pure representatives of the Indonesia type, but seem doomed to extinction.

For their new capital, *Elopura*, the English have selected a favourable site on the magnificent Sandakan Bay, an inlet on the north-east coast, the entrance of which is completely sheltered from all winds, and which ramifies for over 20 miles inland between sandstone cliffs terminating in wooded heights. On the silt at the

Fig. 56.—SANDAKAN.  
Scale 1 : 900,000.



entrance there is a depth of no less than 26 feet at low water, and shipping can moor at the landing stage in 23 or 24 feet. In the course of eight years Elopura, or Sandakan, as it is more commonly called, has become a flourishing little seaport with over 5,000 inhabitants, of whom two-thirds are Chinese. In the immediate vicinity it possesses abundant elements of future commercial expansion—coal in the hills skirting the roadstead, ironwood and other natural products in the surrounding forests. Large tobacco plantations have been made on the opposite side of the port, and the sago-palm now thrives in this part of Borneo, where it was hitherto unknown.

Through coast lagoons or backwaters Sandakan communicates directly with the

mouth of the Kina-Batangan, the largest river in North Borneo, and navigable by steamers a long way inland. At *Malapi*, the riverain port, the Chinese have a depôt for the edible nests collected in the caves of Mount Gomanton, lying some miles farther west. The entrance to one of these limestone caves rises to a height of 900 feet, and in the evening the dense clouds of esculent swallows take three-quarters of an hour to pass through this vast portal to their roosting-places. The annual sale of the nests yields £5,000 to the Chinese dealers. Other caverns, occupied some by swallows, others by bats, occur in all the spurs of the North Bornean ranges and especially in the river gorges, and all contain rich deposits of guano still untouched.

The Segama basin, south of and parallel to the Kina-Batangan, also possesses gold-washings, which are said to be very rich, and already attract numerous Chinese miners. A carriage road has been constructed from Sandakan Bay to these mines.

One of the vital points of the new colony lies at the southern extremity of Marudu Bay, where the river of like name reaches the coast. Here the village of *Bongon*, the commercial centre of the whole country and already surrounded by extensive tobacco and sugar plantations, is the natural emporium for North Borneo and the islands of Mallawalli, Banguay, and Balambangan, which form an extension of the mainland towards the Philippines. In 1773 the English had already founded a settlement in Balambangan; which, however, lasted only two years. The port of *Kudat*, in Marudu Bay, although neglected till 1881, seems destined one day to become one of the chief commercial centres in the Eastern Archipelago. Formerly the two rivers Tampusuk and Tarawan were notorious resorts of the Illanos (Lanon, Lanun), pirates from Mindanao, against whom the English had to send several expeditions.

On the west coast Gaya Bay, still more spacious than Kudat, offers one of the best anchorages in the China waters. The whole British fleet might here easily ride at anchor, and supply itself with coal from the beds in the surrounding cliffs. Yet the British settlement has been founded, not on this magnificent bay, but at *Mempako*, facing Labuan.

The rapid development of trade in North Borneo is mainly due to the tobacco plantations on the east coast. The Sagut and Labuk fluvial valleys yield a fine elastic leaf much prized, especially for wrapping cigars. In 1887, about 200,000 acres were already planted, and in that year 150,000 additional acres had been bought by speculators for the same purpose. Thanks to this rapid increase of productive land, the public revenues have also been considerably augmented, though still failing to balance the expenditure. There is no army properly so called, and only a few hundred police, raised chiefly amongst the Dayaks of other parts of Borneo. All the tribal chiefs are required to take an oath of allegiance to the Company and pay the poll-tax.

The state is divided into the four administrative provinces of *Dent* and *Keppel* on the west coast, *Alcock* in the north-east, and *East-Coast* in the east and south-east. In the last-mentioned is situated the capital.

## JAVA AND MADURA.

In the Indonesian tropical world Java ranks only fourth for size; but it contains over two-thirds of the whole population, while the relative value of its productions is still more considerable. For a period of at least twenty centuries it has surpassed all the other regions of the archipelago in population, abundance of resources, and the progress of civilisation. First visited and colonised by the Hindus, it soon became the centre of their influence in Indonesia, and from that period the Javanese have enjoyed a material and social pre-eminence in this region. Their tribes, to whom the Buddhist missionaries had brought the words of peace and universal brotherhood, became fused in a united nationality, thus entering on a new historic era unattainable by the barbarous and savage inhabitants of the adjacent islands. Under the subsequent Arab and Dutch sway the impulse given by the first Indian civilisers made itself still felt by the Javanese populations.

According to some authorities the very name by which the island is still designated is of Hindu origin. The term *Jabadiu*, known to Ptolemy, is merely the vulgar form *Java-jipa*, the "Island of Barley," apparently so named by the Hindu immigrants from a cereal which looked like the barley of India, but which was probably millet (*panicum italicum*). Nevertheless other etymologists sought an explanation of the word *Java* or *Javi* in the native languages. The Sundanese of the western districts called themselves Jelma Bumi, that is, "Men of the Soil," designating their neighbours of the central and eastern provinces as Tyang Javi, or "Foreigners," and the region itself as Tanah Javi, that is, "Foreign" or "Outer Land." This hypothesis is strengthened by the fact that other outer regions, notably Sumatra and Bali, also bore the name of Java, and at the dawn of modern history, the Australian continent itself is vaguely indicated under the appellation of "Great Java."

But at the close of the sixteenth century, when the first Dutch traders founded their factories in the present Java, it was already known by this name throughout its whole extent. It is the Zabaj of the Arabs, and to it the term Nusa Kendang, or "Island of Great Mountains," seems also at one time to have been commonly applied.

At present this marvellous region is almost as well known as the lands of West Europe. The works relating to it are already numbered by the thousand, it has been studied from every point of view, and explored in all directions by eminent geologists, geographers, naturalists, anthropologists, historians, and engineers. Its triangulation has been completed since 1882, and its relief in all its details is figured on carefully prepared topographical charts. Each volcano has even been specially described in section, plan, and elevation, so that all changes of form may henceforth be recorded with as much precision as those of Vesuvius and Etna.

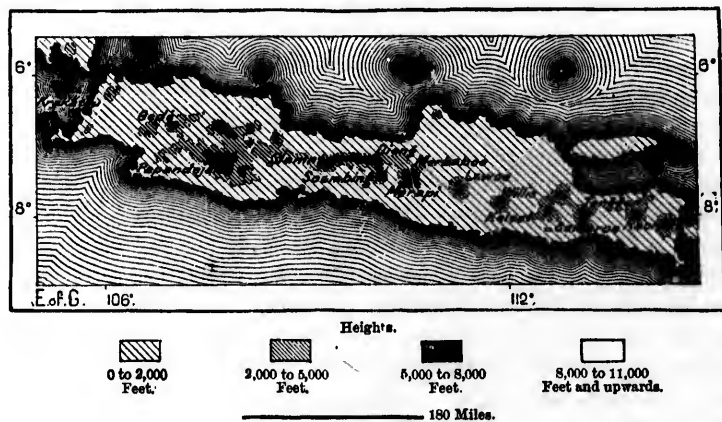
Java was formerly supposed to consist exclusively of eruptive rocks upheaved from the bed of the Indian Ocean. But we now know that about three-fifths of the surface is composed of sedimentary rocks, plains, and uplands, and that the whole island is continued northwards in the direction of Billiton and Borneo, and

north-westwards towards Sumatra, by a level marine plateau covered by less than 50 fathoms of water. Above this flooded plain rise a few low insular groups, such as the "Thousand Isles," north-west of Batavia, and the twenty-six islets of Karimon-Java, north of Semarang Bay. Bawean, with its fringing reef and cone 2,000 feet high, is distinguished by its igneous origin from all the other islands in these waters. Farther east the Solombo group, about midway between Madura and Borneo, is very low, nowhere presenting any eminence, except on Great Solombo.

Madura itself may be regarded as a simple dependence of Java, forming its north-eastern extension. On their north side both mainly consist of low-lying plains continued under the water by reefs and sandbanks. The south coast, on the contrary, is steep and rocky, plunging abruptly into the oceanic depths. Both

Fig. 57.—CHIEF VOLCANOES IN JAVA.

Scale 1 : 10,000,000.



seaboards are indented by bays and inlets penetrating some considerable distance inland, although as a whole the island presents the almost geometrical aspect of a long quadrilateral, nearly parallel with the equator. West and east it extends from the Java-hoofd (Java head) in a straight line for 620 miles to Java's Oosthoek (Java's East Point). But north and south the distance varies greatly, narrowing towards the centre to about half of its normal breadth. Excluding Madura and the smaller indentations, the coast-line has a total length of 2,100 miles.

#### VOLCANOES OF JAVA.

The western has a much greater mean elevation than the eastern section of the island, forming a plateau from 2,000 to 3,000 feet high. Here also the mountains are connected by lofty ridges or saddles, the former intervening valleys having

been to a great extent filled in by outflows of lavas and showers of ashes and scoriæ. Eastwards the island falls gradually nearly to the level of the sea; but towards the extreme east the mountains again rise with a uniform slope from base to summit. The volcanoes, which follow from one end of the island to the other, are not developed in a continuous chain, and in many places are separated one from the other by a distance of 30 miles.

But it is noteworthy that they are often grouped two, three, or four together, forming independent ridges, whose axes run, not parallel with, but obliquely athwart the main axis of the island. They are in fact disposed mainly in the direction of the axis of Sumatra, while by a remarkable contrast those of Sumatra itself run parallel with Java. Thus the crevasses through which the lavas were ejected appear to have been caused in both islands as it were by a sort of interchange of the igneous forces. The underground energies are also about balanced, for the Javanese Semeru is only a few feet lower than Indrapura and Korinchi, the highest volcanoes in the neighbouring region. Altogether the mountains of Java are not inferior in mean altitude to those of Sumatra, while the absence of subja-cent terraces gives them a greater relative elevation above their base.

Java also differs from Sumatra in the rarity of longitudinal valleys between the parallel crests and in the absence of lacustrine basins. The mean altitude of the whole island is estimated by Junghuhn at somewhat less than 1,650 feet.

Of the volcanoes, two near the north coast, Karang at the north-west corner, and Murio (Murya) in the peninsula east of Semarang Bay, appear to belong to an independent igneous system. Both occupy isolated positions on the plains, so that a rise in the former case of 1,000, in the latter of 15 or 16 feet above the present sea-level, would suffice to convert them into islands. They are still surrounded by alluvial deposits which rest against the northern flanks of hills belonging to the tertiary age and disposed parallel with the main Javanese axis. In the same way the volcanoes on the opposite side skirt the northern base of other tertiary heights which run in a line with the south coast. Java in fact, according to Junghuhn, consists of two islands merged in one; but the southern alone is intact, of the northern nothing remaining except fragments. It has disappeared between the provinces of Cheribon and Yapara, where the seaboard develops a large marine gulf, and beyond which Madura is separated by a strait from the Javanese plains.

Nevertheless, the original coastline may still be recognised, being continued eastwards by a series of small groups comprising the Sapudi, Kangean, and Pater-noster archipelagoes. Southwards is developed, like a vast breakwater, the parallel chain of large islands from Bali to Nila, forming an eastern extension of the main Javanese volcanic range. The terminal points of the disrupted northern island would appear to be Krakatau in the west, and in the east Gunung Api, or "Mountain of Fire," north of Wetter Island.

Both Karang and Murio appear to be at present in a state of repose, the former alone with the twin Pulasari cone emitting some sulphurous vapours. But in the southern chain, Salak, highest of the first volcanic group going eastwards (7,300



feet) was still active in 1699, when streams of mud and sand were ejected in such vast quantities that some of the neighbouring valleys were completely dammed up and converted into temporary lakes. The main line of the Javanese railway system passes along the east foot of Salak, here crossing the Tjitjurug pass at a height of 1,700 feet.

East of this pass follow the far loftier cones of Gedé, or the "Great" (9,800 feet), which gives its name to a whole group, and the neighbouring Mandala-Wangi, which exceeds it by 200 feet. The Gedé, properly so called, has frequently

Fig. 58.—GEDÉ VOLCANO.

Scale 1 : 80,000.



ejected scoria, and from its breached crater, about 4,000 feet in circumference, jets of vapour are still emitted; sulphur is also deposited on the encircling walls, while copious thermal streams flow from the flanks of the mountain. Gedé is connected by a narrow ridge with another and far larger crater, which from the Sala wall on the south to Panggerango on the north side has a circuit of about two and a half miles. It is wooded to the summit, terminating in an inclined terrace, whence numerous rivulets rapidly converge in a broad stream, which was till recently visited by the rhinoceros. From this terrace, the highest point of observation in

West Java, a panoramic view is commanded of both seas, with the intervening hills and plains, forests, villages, and surrounding plantations.

South of the Gedé highlands the tertiary rocks, limestones, clays, and sand-



Fig. 50.—JAVANESE LANDSCAPE—MOUNT GEDÉ, SEEN FROM BUTENKONG.

stones attain their greatest development. Nearly everywhere carved into steep cliffs 800 to 1,000 feet high, these white and yellowish formations rise in the Breng-Breng Peak to an altitude of over 6,500 feet. But farther east they disappear beneath the talus of scoriæ and lava streams of the Patuha volcano (7,800 feet).

Here the crater is flooded with an "alum lake," that is, with water saturated with sulphur and alum, at the normal atmospheric temperature. But a few miles to the north-east, at the source of the Chi Widei, lies a cirque of hot mud emitting acid vapours of a sulphurous odour, which are disintegrating the surrounding rocks.

East of Patuha the volcanic cones follow in great apparent disorder, connected with each other by elevated ridges, and enclosing upland valleys, whence the streams flow through narrow outlets to northern river basins. One of these volcanoes, the Malabar, or Rose Mountain (7,800 feet), no longer retains its conic shape; its crater is almost effaced, and its former activity is indicated only by two thermal springs. But farther south, Mount Wajang (7,200 feet) still preserves on its west flank a magnificent solfatara, a little geyser with a jet of 10 feet, recurring at intervals of two or three minutes, and a stream of sulphur and alum waters. Still more active is Papandajan, or the "Forge" (8,700 feet), whose breached crater contains nearly all the elements of volcanic laboratories, sulphurous swamps at boiling point, mud cones, snorting, groaning, and ejecting mud and stones, hot springs and jets rushing out with a hissing sound. All the voices of the volcano are merged in one deafening yet rhythmic uproar, suggesting a vast workshop with the voice of a thousand hammers mingling with its hissing jets of vapour. A rivulet which enters the "Forge" pure and limpid, emerges boiling and saturated with sulphur. In 1772, Papandajan was the scene of one of the most tremendous eruptions of modern times, but at that time the district had been visited by no European naturalist, and the reports of the natives are of a contradictory character.

North of Papandajan, but forming part of the same group, stands the Gunung Guntur, or "Thunder Mountain" (7,450 feet), which, unlike all the other Javanese mountains, is absolutely bare from base to summit. It forms a huge greyish black mass presenting a uniform surface broken only by the lava blocks half buried in the scoria. During eruptions the whole cone has been illumined by the burning ashes ejected from its crater, for Guntur ranks with Lamongan as the most active volcano in Java. The surrounding plantations have often been covered with the ashes ejected during its outbursts. In 1843 Junghuhn estimated at ten million tons the quantity of sands thrown to a height of 10,000 feet, and for a time darkening the face of the sun; yet this was only a minor display.

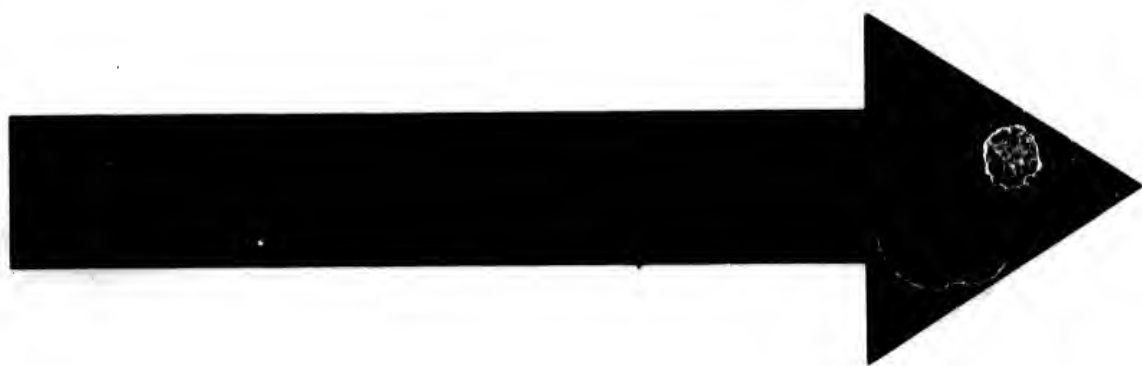
Galunggung, or the "Cymbal Mountain" (7,400 feet), although less active than Guntur, was the theatre of two terrific outbursts in 1822, when the din was heard over the whole island. The showers of stones and ashes were on both occasions accompanied by a deluge of mud, the pent-up reservoirs overflowing on the surrounding plains, and covering villages, rice fields, coffee plantations, and forests with a layer of greyish blue mud in some places 50 feet thick. All vegetation had disappeared for a space of over 12 miles, and 114 villages, with a total population of 4,000, were completely inundated. Magnificent forests have since resumed possession of the flanks of the volcano and surrounding district. A little to the west lies the Telaga Bodas, or "White Lake," where the sulphurous clays are kept at boiling point by incessant jets of vapour. In the neighbourhood is the famous Pajagalan, or "Field of Slaughter," which emits deadly exhalations,

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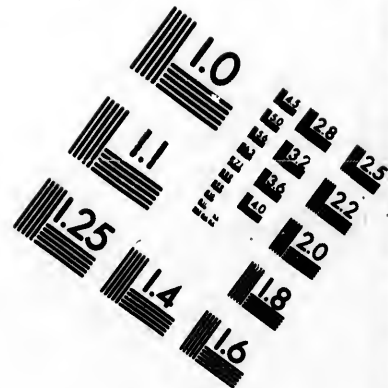
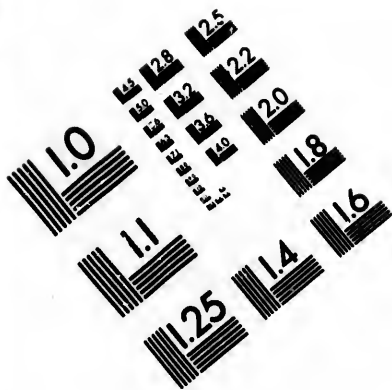
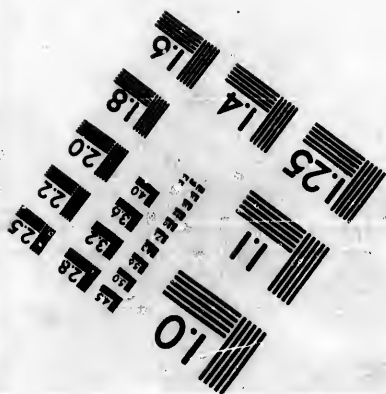
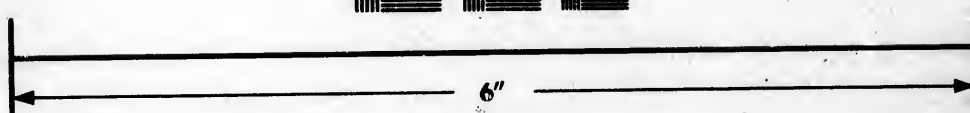
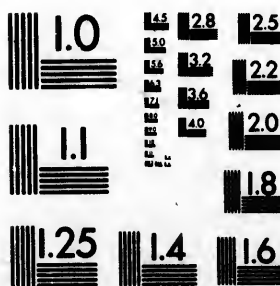


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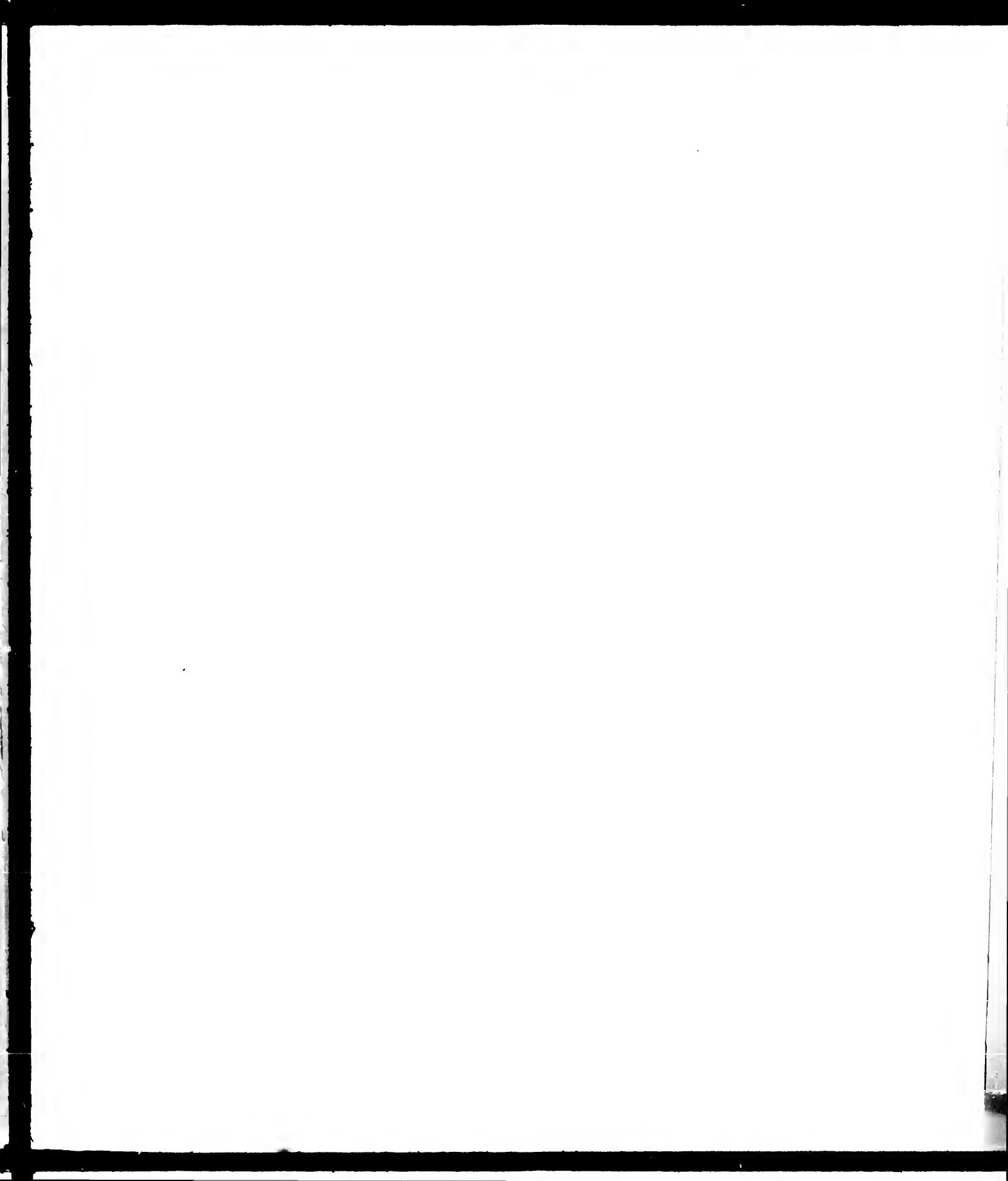
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and which is always strewn with the carcasses of wild cats, squirrels, snakes, birds, and at times even tigers and rhinoceroses, suffocated by the carbonic acid, and preserved from putrefaction. But the emanations vary considerably in quantity and even in quality, and occasionally the district may be traversed without risk.

The other volcanoes of this region, such as Tjikurai (9,350 feet), and Sawal (5,860 feet), have been quiescent throughout the historic period, and no igneous phenomena occur on the chain of hills falling gradually eastwards down to the Tanduwi delta.

The elevated Bandung plain, which stretches north of the Preang volcanoes, and in which are collected the headstreams of the Tarum, is dominated on the north by a volcanic system running west and east. Burangrang (6,840 feet), the first link of the chain, forms a trachytic mass whose eruptions were antecedent to all history; but it is followed by Tangkuban Prahū (6,900 feet), which is still active. Tampomas (5,600 feet), at the eastern extremity of the system, seems to be also extinct, although some sulphurous gases still escape from a fissure in its flank.

Gunong Tjerimai (10,200 feet), near Cheribon Bay, and also called Mount Cheribon from the town at its foot, has a perfectly regular crater some hundred yards deep, inhabited by thousands of swallows. Beyond this point Java is contracted between two gulfs, which formerly penetrated much farther inland than at present. Here the main waterparting falls to about 3,000 feet; but in the neighbourhood Mount Slamāt, a recent and perfectly regular cone, rises in isolated majesty to a height of 11,400 feet. Its slopes are forest-clad to within 2,500 feet of the crater, which ejects with the roar of a cataract a dense column of vapours, which the upper atmospheric currents always carry westwards.

The volcano, of which Prahū (8,420 feet) is but a lateral ruin, was in prehistoric times probably the culminating point of Java. But the upper cone was blown away during former eruptions, leaving nothing but fragments of its periphery, Prahū on the north, Pakuojo on the east and Wisma on the south side. All the intermediate space is occupied by the irregular plateau of Dieng, a term often applied to the whole group. This plateau, on which stands the highest village in Java, in the midst of tobacco plantations, presents some of the most remarkable igneous phenomena in the island. Here are grouped in close proximity eruptive craters, lava streams, hot lakes saturated with chemical substances, solfataras, thermal springs, rivulets of boiling water, gases and vapour jets. Here also, in a depression between two streamlets, lies the Pakaraman, or Guwa Upas, that is, "Valley of Death," described by some travellers as a desolate plain, on which no one dares to venture except at imminent peril. Yet it is nothing but a simple cavity a few yards broad, whence is occasionally emitted a little carbonic acid gas. Its celebrity is doubtless due to the religious traditions associated with the Dieng plateau, which was formerly much frequented by the worshippers of Siva, god of destruction. Even on the terminal crest of Prahū, not far from the summit, are still seen abandoned temples, while other sanctuaries are scattered round about. Structures have also been recognised which served as refuges for the pilgrims, besides a gigantic flight of steps by which the faithful reached the edge of the plateau, and an under-

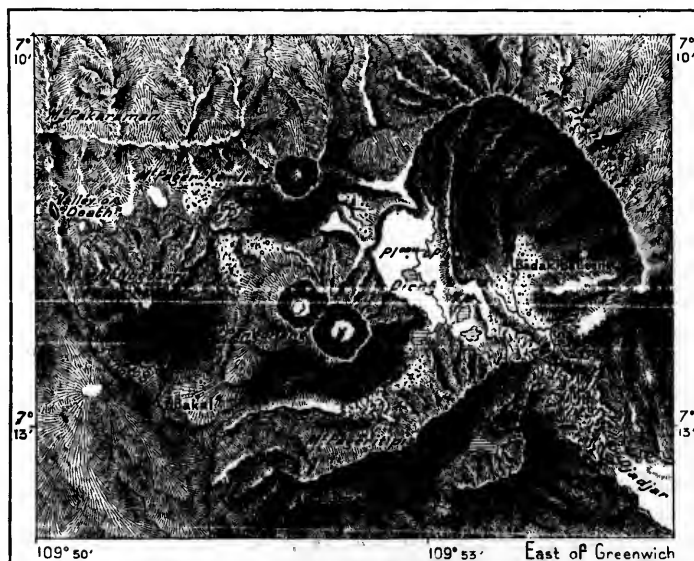


ground canal which drained a neighbouring marshy valley. In one of the caves Junghuhn even discovered a Hindu inscription, which, however, has not yet been deciphered. The importance of the architectural works attests the presence of a considerable population in these uplands during the period of Sivaite civilisation. But the volcanic eruptions, aided perhaps by the zeal of Mussulman propagandists, spread desolation over the Dieng plateau, which reverted to a state of nature till the beginning of the present century, when the first attempts were again made to bring it under cultivation.

South of this district follow the superb cones of Sindoro (10,400 feet) and

Fig. 60.—DIENG.

Scale 1 : 80,000.



Sumbing (11,000), known to navigators in these waters as the "Two Brothers." Sindoro, that is "Majestic," is the finest of all the Javanese volcanoes, with perfectly regular outlines and truncated cone, as if the summit had been cleaved by the stroke of a sword. The lavas flowing uniformly down its flanks have penetrated northwards into the breached crater of Telerep, and southwards to the more precipitous slopes of Sumbing. Although higher than Sindoro, Sumbing is less symmetrical; but it is specially distinguished by the surprising regularity of the ridges radiating in all directions from the summit to the base with intervening ravines excavated by the running waters to depths of from 250 to 300 feet. The Two Brothers appear to be all but extinct, the only indication of activity being a few

jets of vapour. Sumbing occupies almost exactly the centre of Java, and the neighbouring Mount Tidar (1,680 feet) is spoken of by the natives as the "nail" by which the island has been fixed to the surface of the globe.

Telerep is connected by a low water-parting with Ungaran (6,800 feet), which is itself connected by a range of hills with the twin cones of Merbabu

Fig. 61.—GUNONG SEWU.

Scale 1 : 75,000.



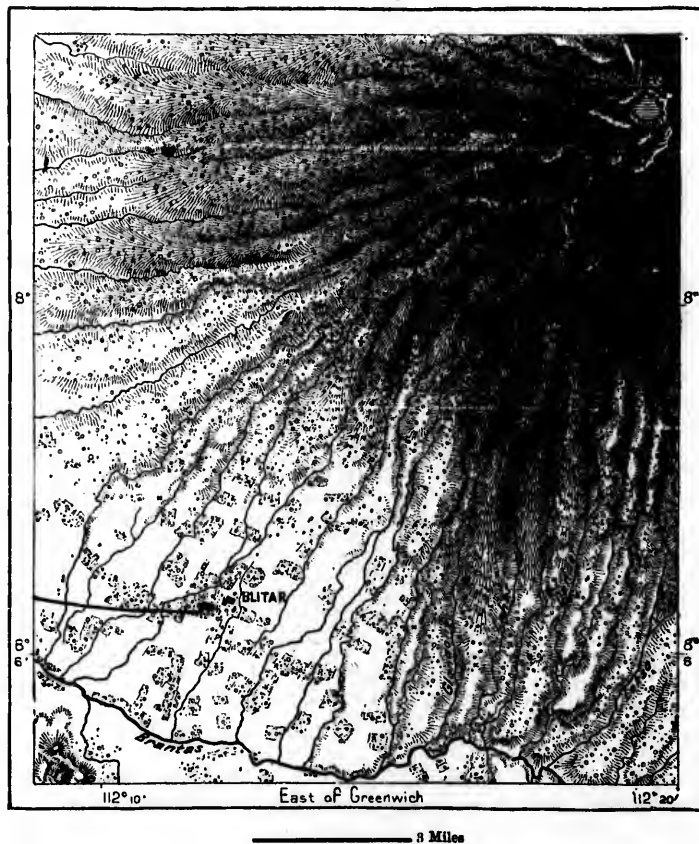
(10,320 feet) and Merapi (9,500) facing Sindoro and Sumbing on the opposite side of the broad Kadu valley. Merbabu appears to have been in repose since 1560, when the last recorded outburst took place. But Merapi, the "destroying fire," is in a continual state of restlessness, ejecting from its terminal crater a constant volume of white vapour, which sets with the trade-winds steadily towards

the west. Nevertheless, the eruptions that have taken place during the historic period have been less terrific than those of some other Javanese volcanoes. Some of Merapi's trachytic walls have a columnar formation resembling that of the Staffa basalts.

East of Merapi the igneous system is completely interrupted by the alluvial valley of the river Solo. In this part of the island the main range consists of

Fig. 62.—SOUTH-WEST SLOPES OF KELUT.

Scale 1 : 200,000.



milk-white limestone rocks known by the name of Gunong Sewu, or the "Thousand Mountains," and developing a long line of cliffs on the southern seaboard. The highest peaks rise to about 2,000 feet; but most of the "thousand" eminences scattered over the plateau range from 100 feet to little over 200 feet. They are separated by winding valleys shaded by the finest forest trees. Some of the narrow longitudinal dales, mostly overgrown with tall grasses,

are closed at both extremities, the water which accumulates during the wet monsoon escaping through underground *luwangs*, or channels, seawards. The Gunong Sewu district is described by Junghuhn as the loveliest in Java, its shady avenues, gently sloping hills, grassy dells and villages surrounded by gardens recalling the sylvan beauties of more temperate lands.

North-east of the Gunong Sewu and of a more elevated semicircle of other sedimentary hills, the Gunong Lawu rises in nearly isolated majesty to an altitude of 10,800 feet. The three domes of this volcano, which was formerly venerated by the worshippers of Siva, are not pierced by craters; but vapours still escape from the deep crevasses on the south side. The Gunong Willis (8,500 feet), some 50 miles beyond Lawu in the same igneous range, no longer presents the form of a volcano. The supreme cone was probably blown away during some prehistoric explosion, and now nothing remains except a long, irregular, and craterless eminence. Thermal springs and solfataras, however, still attest the existence of underground forces, both here and in the smaller Mount Pandan (3,000 feet), which stands out on the plains to the north of Willis.

South of Surabaya and its fluvial delta, Java is occupied by a transverse system of other volcanoes, of which the Gunong Kelut (5,750 feet), lying nearest of Willis, is the most dreaded by the natives. Its crater, at least 650 feet deep, is flooded by a fresh-water tarn, whose contents were estimated by Junghuhn in 1844 at 2,000 millions of cubic feet. During eruptions, when the igneous outlet lies below the lake, the liquid mass is converted into steam, which rises in dense volumes emitting flashes of light and then falling on the slopes in tremendous downpours of water mixed with the sands ejected by the volcano. Channels of trachytic scorïe furrowing the flanks of the mountain from summit to base recall the rush of these sudden torrents, which deluge the surrounding plains, sweeping away the crops, uprooting forest trees, and razing the villages to the ground. In 1848 the regular detonation of the gases which changed the lake into clouds of vapour, produced an uproar that was heard throughout nearly the whole of Indonesia. The Macassar people in Celebes, 500 miles off and under the lee of the explosion, were terrified by what seemed like the roar of artillery, and despatched vessels to scour the neighbouring seas.

The other volcanoes of this system are extinct, or at least have retained but a feeble remnant of their former energy. The triple-crested Kawi, whose highest peak, the Butak, attains an altitude of 9,500 feet, has preserved no solfataras, and only a solitary thermal spring; the mighty Arjuno (11,000 feet), where the Sivaites formerly offered sacrifices, emits vapours only from one fissure, while Penanggungan (5,500 feet), last of the chain south of Surabaya, appears to be completely quiescent. Nevertheless, in the main axis of the system, some 12 miles from Surabaya, two mud volcanoes have made their appearance, which are about 30 feet high, and which are usually active at the turn of the tide. From one are ejected fragments of bricks, which must come from the Hindu structures of the ancient city of Mojo-Pahit, which formerly stood much farther to the west.

The Arjuno chain is connected by a ridge scarcely 1,650 feet high with another igneous group, comprising the Tengger and Semeru volcanoes. The former has the largest crater in Java, while the latter, to the south of it, is the highest peak in the island (12,100 feet). From its crater was discharged in 1885 a lava stream estimated at over 10,000,000 cubic feet, the first of the kind recorded

Fig. 63.—TENGER AND SEMERU.

Scale 1 : 300,000.

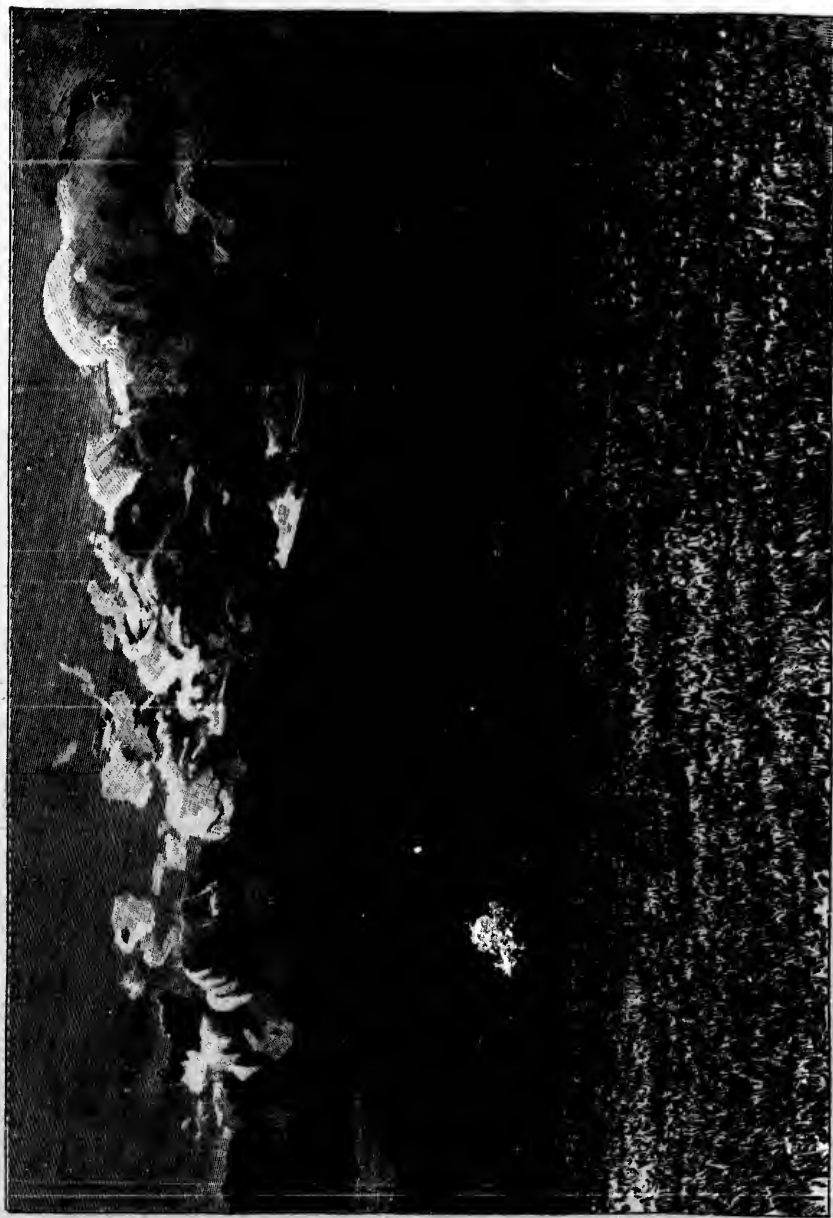


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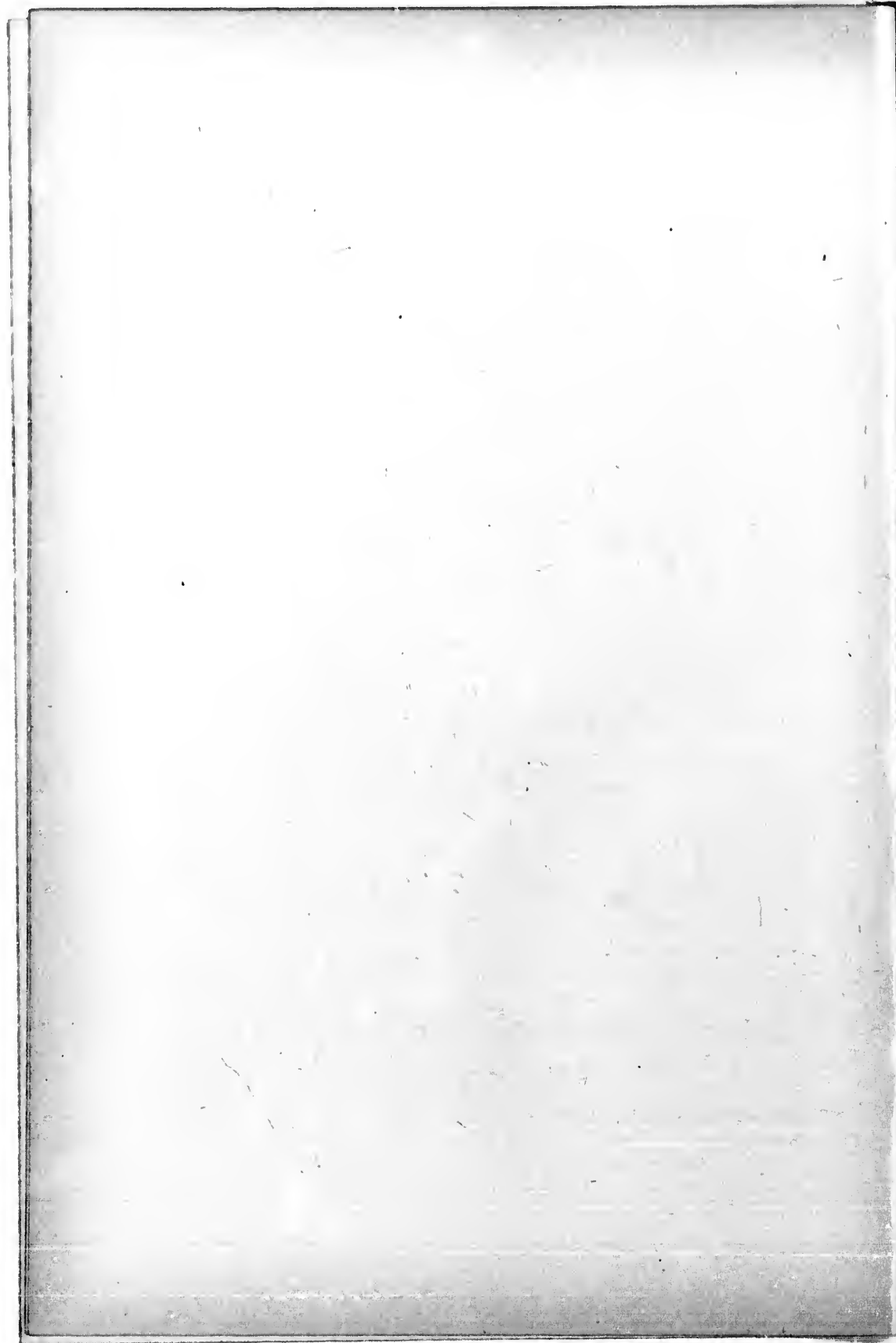
in Java, where till recently the volcanoes were supposed to eject no molten matter, but only solid substances, such as ashes and stones. Semeru takes its name from the Indian Meru, the holy mountain at all times venerated by the Hindus and Tibetans. Tengger (9,000 feet) is of extremely regular form, and from its summit are emitted at short intervals columns of vapour and scoriae, black by day, red at night. It was formerly probably as high as Semeru; but of the upper part all has disappeared except the outer walls, which form a vast enclosure about 15 miles in circuit, here and there interrupted by gaps and breaches and rising in some places 1,650 feet above the inner plain. This level plain, which was formerly the crater, and which has a mean altitude of over 6,500 feet, bears the name of Dasar, or "Sea of Sand," mostly consisting of the finest dust, movable in dry weather, but changed by the rains to the consistency of clay. From the centre rise a few sandy hills, one of which, the Bromo, still constantly ejects smoke, and has at times been the scene of tremendous outbursts. Its crater is alternately flooded by a small lake and filled by a mass of molten lava. The term Bromo is merely a corruption of Brahma. The last Javanese who professed the Hindu religion took refuge on the slopes of Tengger, and their descendants still celebrate feasts in honour of the Devo-Bromo, or "God Brahma."

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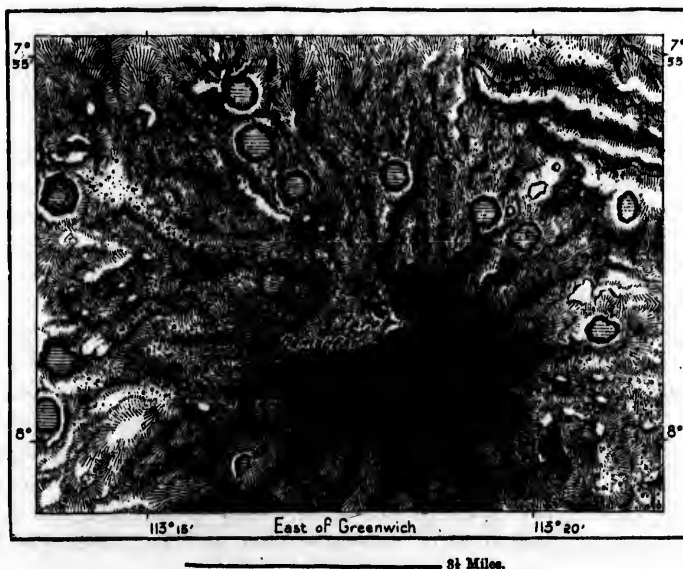
THE BROMO VOLCANO, DASAR DISTRICT, JAVA.



A chain of hills, crossed by a pass 830 feet high, connects Mount Lemongan on the east with another igneous system whose numerous peaks are collectively known by the name of *Ajangan*. Before 1844 this hilly region, which also comprises a broad forest-clad plateau, was completely unknown; but in that year it was discovered by Junghuhn, the indefatigable explorer of Java. Close to the summit of Argopura, the highest peak (10,200 feet), he noticed the ruins of a temple of Siva, and other structures scattered round about explain the name of this summit, which in the Kavi, or old Javanese, language means the "Mountain City." One

Fig. 64.—LEMONGAN.

Scale 1 : 150,000.



of the sanctuaries, corroded by the acid vapours, shows that during the last five hundred years the quiescent volcano has been the theatre of at least one disturbance.

The Gunong Ringgit (4,150 feet), which projects seawards at the north-east extremity of the Ajangan range, is also at present quiescent; but towards the close of the sixteenth century it was rent asunder; enormous quantities of ashes were hurled in the air, and when the sun reappeared after three days of darkness caused by the dense volumes of black clouds, it was found that all the surrounding villages had disappeared with their inhabitants. The traces of the eruption are still visible, although the mountain has now neither crater, solfataras, nor thermal springs.

Like the western extremity of the island, the east coast facing Bali is also dominated by volcanoes. A circular plateau, which was formerly perhaps a vast



crater, is encircled by a diadem of lofty peaks, such as the Raun (11,000 feet) on the south-west, Kendeng on the north-west, Kukusan on the north-east, Merapi and others on the south-east, often collectively known as the Gunong Ijen, or "Isolated Mountain." The waters that collect on this plateau were formerly confined in a lacustrine basin, but now escape northwards through a gorge between Kendeng and Kukusan. The crater of Raun at the time of Junghuhn's visit had a circuit of about three miles and a depth of no less than 2,400 feet, being the deepest of any yet explored in Java. But all these encircling volcanoes are now extinct or quiescent except Merapi, whose crater, like that of Kelut, is flooded by a freshwater lake, which, during eruptions, is changed to steam and precipitated in the same way on the surrounding district. During the outburst of 1817, houses and inhabitants were swept away, and the strait flowing between Java and Bali contracted by the formation of new land. The south-eastern headland of Java, formerly an island, has thus been joined to the mainland by showers of scorice, while the extinct Baluran (4,300 feet), at the north-east extremity, is separated only by a sill 50 feet high from the Gunong Ijen system.

The island of Madura, close to the north coast, has a somewhat irregular surface of limestone rocks, the highest of which, Tambuku, at the east end, has an elevation of little over 1,500 feet. As in Java itself, Verbeek's survey shows that in Madura there is no trace of triassic, jurassic, or chalk formations.

Although the igneous are far less extensive than the sedimentary rocks in Java, this island receives its characteristic aspect from its forty-five conspicuous volcanoes with their lateral cones, lavas, and scorice. As the mariner approaches its shores, his gaze is irresistibly attracted by these lofty symmetrical cones, towering above the wooded plains, now purpled in the solar rays, now of a pale blue, standing out against the deeper azure of the sky, at times surmounted by a wreath of white vapours, at sunset flushed with pink like the snowy Alpine peaks. At different epochs, but especially during later tertiary times, all these burning mountains have taken part in the transformation of the island; even during the historic period more than twenty of them have contributed greatly to modify the profile and contours of the land, transforming what was before a chain of separate islands, like the Lesser Sundas, into one continuous insular mass stretching from Bali to Sumatra. This action of the underground agencies appears also to have been aided by a process of slow upheaval, which is still going on; in many places, the beach and coral reefs have thus been raised twenty, thirty, and even fifty feet above the present sea-level.

#### RIVERS OF JAVA.

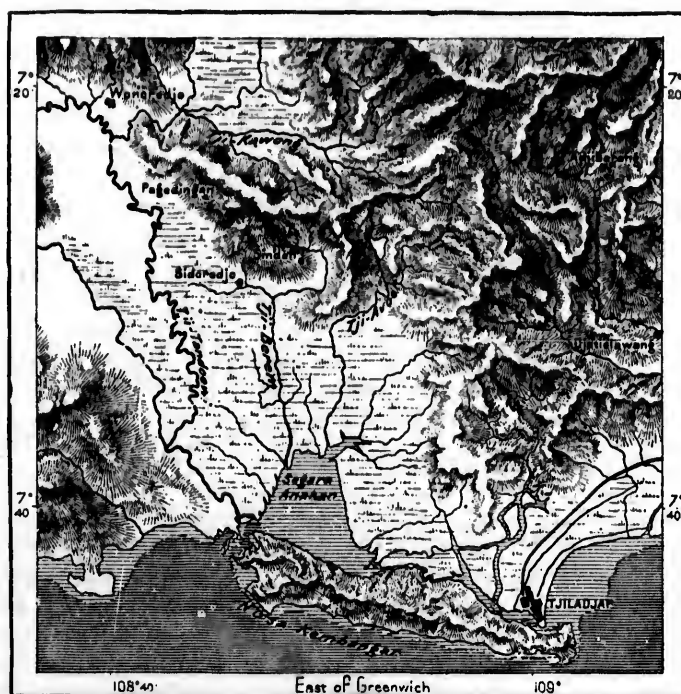
Owing to the position of the volcanic ranges, lying for the most part much nearer to the Indian Ocean than to the inland seas, the northern are far more extensive than the southern fluvial basins, scarcely any of which are navigable. The north-western plains about Batavia are watered by numerous streams, the largest of which is the Tarum, which rises on the slopes of the southern volcanoes,

and, after escaping from the Bandung plateau through a gorge in the northern range, reaches the sea to the east of Batavia Bay after a course of about 140 miles, of which 50 are accessible to small craft. The observations taken on the spot show that its delta is encroaching on the sea at a mean rate of rather more than 22 inches yearly.

But the main fluvial artery of the northern slope is the Solo (Bengawan,

Fig. 65.—NUBA KEMBANGAN.

Scale 1 : 500,000.



Sambaya), whose farthest waters rise in the "Thousand Mountains," within 7 or 8 miles of the Indian Ocean. After the confluence of the two chief branches north-east of Mount Lawu, the main stream pierces a rocky gorge, beyond which it becomes navigable for vessels of a considerable draught. It would even be accessible to large sea-going ships but for the banks at its mouth covered only by 6 or 7 feet of water. In its navigable part, the Solo, which has a total length of 300 miles, flows first to the north-east and then to the east through the

natural depression between the two parallel sections of the island to its delta in Surabaya Strait over against the western extremity of Madura.

At its southern entrance this shallow passage receives another large river, the Brantas or Kediri, which; although ranking next in size to the Solo, is scarcely navigable except during the floods. The Brantas, which also rises very near the Indian Ocean south of the Kawi volcano, is remarkable for the quantity of sediment it washes down, and for the disproportionate size of its constantly increasing delta.

On the southern slope of the island the chief streams are the Progo, whose farthest waters flow from the Sindoro and Sumbing volcanoes on the west, and Merapi and Merbabu on the east; the Seraju, fed by numerous tributaries from the Sumbing, Slamet, and other volcanoes, and navigable in its lower course; lastly, the Tanduwi, whose headstreams descend from the Sawal Mountains, and whose broad estuary is accessible to steamers. In its lower course the Tanduwi winds through a vast marine inlet, which has been transformed to a *rawa*, or marshy plain, by the alluvial matter washed down with the surrounding torrents. Of the original inlet nothing now remains except the shallow Segara Anakan, which is already nearly cut off from the high sea by the long rocky island of Nusa Kambangan. This island itself, which has greatly contributed to the silting up of the inlet by preventing the sedimentary matter from being carried seawards, is now separated from the mainland only by a narrow muddy backwater; it may already be regarded as forming an integral part of Java, from which it was formerly detached by a broad intervening channel.

#### CLIMATE.

The Javanese climate resembles that of the other western Indonesian lands, offering the same alternation of the two trade winds, which here assume the character of monsoons. Both are accompanied by a certain quantity of moisture, the western being as a rule the more humid and attended by the more stormy weather. Being partly sheltered from the west winds by Sumatra, Java receives less moisture than the uplands of that island. The atmospheric currents are also modified by the disposition of the mountain ranges, running in the direction from west to east. The south-east trade frequently veers round to the south, while the west monsoon is shifted to the north. The northern and southern seaboard thus present a great contrast, due to the direction of these winds, and an analogous contrast is offered by the eastern and western extremities of the island owing to the gradual increase of dryness as we approach the Australian Continent.

Other differences arise from local conditions, but most moisture falls everywhere on the western slopes exposed to the "bad" monsoon. Above 2,600 feet the alternation of land and sea breezes is no longer observed, and at 5,000 feet the west monsoon loses its strength. Still higher up a neutral zone prevails, while the highest summits are subject to the south-east trade alone. Several days seldom pass without rain on the uplands, and almost every evening has its local

thunderstorm. The mean annual rainfall, as deduced from the records of a hundred meteorological stations for the last eight or nine years, would appear to vary from a little over 40 to nearly 200 inches.\*

## FLORA.

The Javanese flora, as described by Miguel, comprises altogether over nine thousand phanerogams, of which three thousand have native names, a strong proof of the remarkable power of observation of the inhabitants. Thanks to its numerous volcanoes, following each other like islands in the sea, Java presents an endless variety of vertical vegetable zones, ranging from the perennial summer of the low slopes and plains to the wintry, or at least autumnal upland regions. As a rule, the strictly tropical zone scarcely rises above the 2,000 feet line, beyond which few palms are met. Nevertheless the areng (*Borassus gomutus*), which yields a fermented drink, sugar, cordage, foliage for thatching, and many other useful articles, is everywhere found in the interior as high as 4,600 feet. The finest trees flourish between 2,000 and 6,500 feet, their aspect becoming more European the higher they ascend. Here such western species as the oak, maple, and chestnut, are found associated with the lakka (*Myristica iners*) and the rasamala (*Liquidambar altingiana*), giant of the west Javanese woodlands.

In the higher regions the vigour of the vegetation is gradually diminished, the thickets consisting for the most part of shrubs and small plants, such as the myrtle, acacia, thorn, elder, woodbine, and especially the woody gnaphalium and the agapetes, a species of heath. Several of the volcanic crests, even when emitting no gaseous exhalations, are completely bare; yet some ancient travellers attributed the noxious emanations to the presence of trees, such as the antyiar, to approach which was supposed to be fatal. But this plant (*Antiaris toxicaria*) is in itself in no way dangerous, although it yields a *upas*, or poisonous sap. It is met in all parts of Java, as well as of other Indonesian regions, where it is used for poisoning arrow and spear heads; it kills by paralysing the action of the heart.

Next to the coccoanut, the areng and bamboos, one of the most valuable indigenous plants is the jati or teak (*Tectonia grandis*), which is not found in many other parts of the Eastern Archipelago, and the range of which even in Java has much diminished during the historic period. It is comparatively rare in the western provinces, and its true home lies between the Japara headland and Madura, in the Rembang residency, where it occupies more especially the drier districts on the plains and the slopes of the hills to a height of over 800 feet. But extensive teak forests also occur everywhere in the central and eastern provinces, and this valuable tree has been planted along the highways and in unoccupied spaces.

## FAUNA.

Like Sumatra and Borneo, Java also presents some distinct animal species. Of

\* Mean rainfall of Situbondr, East Java, between 1879-86, 46 inches; of Buitenzorg, West Java, 196 inches.

about a hundred mammals five or six, and of two hundred and seventy kinds of birds, forty are peculiar to this island. But, strange to say, certain animals characteristic of the other large Indonesian islands are not met in Java; here are neither the elephant, the tapir, nor the orang-utan, but instead the elegant dwarf-deer, a perfect miniature of the common European deer. Of the large mammals, the most remarkable are the rhinoceros and wild ox, but the former have become very rare and are already restricted to the western provinces. The tiger still infests the jungle in various parts of the island, and hundreds of human beings yearly fall victims to its ravages. As in India, when their teeth are worn they often become man-eaters, and in the province of Bantam whole villages have had to be displaced in consequence of their depredations. The crocodiles are also very dangerous in certain rivers, although causing fewer deaths than the tigers. The *tokei*, a lizard of gigantic size, is so named from its cry, which a stranger might fancy uttered by a human being.

The insular dependencies of Java present some peculiarities in their faunas. Bawean especially almost constitutes a little zoological world apart, and even Nusa Kambangan, which is scarcely more than a peninsula of the mainland, has a woodlark (*pteropus aterrimus*) not found in Java.

#### INHABITANTS.

The natives of Java do not all belong to a common national group. The Malays, properly so-called, are represented only by immigrants, and are in the ascendant only in a section of the province of Batavia, whither they have been attracted by trade and political influences. The rest of the island is occupied by the Sundanese, the far more numerous Javanese, and the Madurese, three groups distinguished chiefly by their languages.

Excluding the Malay enclave of Batavia and the north coast, where the Javanese language has prevailed, the western part of Java is inhabited by the Sundanese as far as a transverse line drawn from Cheribon Bay to the mouth of the Tanduwi. The term Sunda given to this region is of very ancient date, and the Sundanese, or "Men of the Soil," that is, aborigines, thanks to the hilly nature of their territory, have better preserved their primitive usages than the other inhabitants of the island. They are as a rule taller, more robust, and healthier; but they are regarded as relatively barbarous, and in the company of Malays or Javanese, they are themselves ashamed of their dialect, which is looked on as a sort of rude patois. Less developed than the Javanese, it differs little from it in the primitive stock of words and structure, but it contains far fewer Sanskrit terms, Hindu influences having been relatively weak in the Sundanese highlands. Yet the people at one time accepted Buddhism, and afterwards Islam. They have also suffered much from invasions, and the word *preang*, which gives its name to the Preanger Regencies, is said to have the meaning of "Land of Extermination."

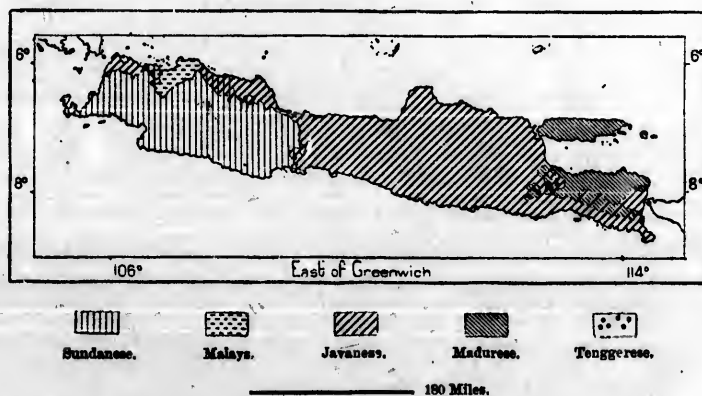
In the upper Ujung Valley, near the western extremity of the island, about a thousand Sundanese, known by the name of Badui, still practise pagan rites inter-

mingled with traces of Buddhism. These highlanders are distinguished from their Mohammedan neighbours by their honesty and more correct morals. Amongst them murder, theft, and adultery are unknown, and visitors guilty of any misdemeanour are banished from the commune. The heads of the villages take the names of "father" and "source of joy."

The Javanese proper, representing over two-thirds of the population, occupy all the central provinces east of Cheribon Bay, as well as the northern seaboard between Cheribon and the Sunda Strait, and the whole of the south-east coast. Their ancient liturgical language, the Kavi, that is, "cultivated," contains a large number of Sanskrit words. It has been preserved from oblivion by old documents and inscriptions, and numerous traces survive, especially in Javanese poetry. The great scenes of Hindu mythology are still commemorated in the national legends, poems, theatrical representations, and those *wajangs*, or marionettes, in which the natives take such delight.

Fig. 66.—INHABITANTS OF JAVA.

Scale 1 : 11,000,000.



Amid the Javanese populations, there still exists a community of about three thousand fugitive Sivaites, who have preserved both their Hindu practices and their ancient dialect largely affected by elements derived from the sacred language. These are the Tengger people, who have taken refuge on the plateau of that name. Here they occupy large houses where several families reside under one roof, and where they keep alive the sacred flame, which has never been extinguished since it was brought ages ago from the shores of India.

Modern Javanese is divided into several provincial dialects, each of which, like the Sundanese, comprises two forms, the "high" and the "low" (*Kromo* and *Ngoko*), the first used in addressing superiors or equals when treated ceremoniously, the second employed amongst friends or in addressing inferiors. The differences between the two forms are profound, affecting the vocabulary, the phraseology,

and to some extent even the grammar. Intermediate between the two is the *Madyo*, current amongst intimate friends.

The dialect of the island of Madura differs sufficiently from Javanese to be regarded as a distinct idiom. It is spoken not only in Madura, but also in the eastern parts of Java, where it is even encroaching on the Javanese, just as the latter is upon the Sundanese. All three are written with characters derived from the Indian Devanagari.

Physically the Javanese are noted for their graceful forms and delicate features. They are rather below the average height, but always of slim and supple figure, and even better proportioned than other Malays. The complexion varies from a pale yellow to a deep olive, according to occupation, diet, and locality. The nose, without being flat, is but slightly prominent, the mouth firm, the eyes broad and well opened, the face round, with a kindly courteous expression, often sad, plaintive, or resigned. Princes wear a moustache in the Hindu style.

Altogether the Javanese are an extremely mild race, although by some accused of being fanatical, faithless, spiteful, and revengeful. Inhabiting a land well suited for tillage, they early became agriculturists, and long raised sufficient to supply the local demand. However rapidly the population increased, the produce was always superabundant in a region where a few hours' labour sufficed to procure three daily meals of rice with fish and a little buffalo meat, and where the climate enabled the natives to dispense with clothes, fuel, and even houses. Hence the Javanese naturally acquired the peaceful habits of the peasant, and a communal life became highly developed in the rice-growing districts where collective labour was required.

On the other hand, a certain timidity of character was fostered by the tremendous energy of the natural forces by which they were surrounded—terrific thunderstorms, yearly fatal to hundreds and destructive to houses and villages; volcanoes belching forth torrents of scoriæ, molten lavas, and dense volumes of smoke and ashes turning day into night; igneous outbursts, by which whole populations with their dwellings and crops were at times swept away in a few hours; inundations spreading havoc far and wide, and all these horrors increased by the wild beasts prowling about the habitations of man.

But from man himself came still worse perils and plagues. The early history of the country following the stone age is wrapped in obscurity, but we know that for the last twenty centuries, the inhabitants of the island have always had foreign rulers or oppressors. The highland tribes may here and there have maintained their independence, protected by their rocky fastnesses, dense forests, rugged heights, or even the crater mouths themselves. But the agricultural lowlanders, scattered over a region with scarcely any natural bulwarks, were at all times exposed to foreign invasion, and had everywhere to bend the neck to the yoke of servitude. The very form of the island, a long parallelogram disposed in transverse avenues by volcanic ranges, prevented the development of a compact nation with a certain political cohesion and capable of presenting a firm front to invading hosts.

At the dawn of Indonesian history, Hindu propagandists, arriving probably

Fig. 67.—EMPEROR AND EMPRESS OF SURAKARTA.



through Burmah, Siam, and Camboja, were already at work converting the



Javanese aborigines to Brahmanism. At the time of the visit of the Buddhist pilgrim, Fa-hian, early in the fifth century, the Brahman form of Hinduism prevailed throughout the island. Later, it was almost everywhere replaced by Buddhist tenets, although the rites still practised round about a few inaccessible volcanoes recall the traditions of Sivaism. Numerous Hindu states, whose names are preserved in history or legend, and whose splendour is reflected in the mighty ruins of their cities and temples, were successively constituted, especially in the central and eastern parts of the island.

During the period of Indian ascendancy, nearly the whole of Indonesia was twice, in the thirteenth and fifteenth century, reduced under the power of a single master. But the Arab Mohammedans were already contending with the Hindu dynasties for the supremacy in Java. In 1478, they destroyed the capital of Mojopahit's empire, which stood near the present city of Surabaya, and during the two or three ensuing generations, they successively overthrew the petty Hindu principalities that had hitherto held their ground.

But these conquerors were in their turn soon replaced by others. The Portuguese, too weak to reduce the island, did little more than found a few factories on the seaboard, and take part as adventurers in the local civil wars. But the Dutch, who appeared on the scene in 1596, in a few years felt themselves strong enough to assume a dominant position in the country. In 1619 they erected the fort of Batavia, centre of the sovereignty which gradually spread over the rest of Java and the Eastern Archipelago. Notwithstanding some local insurrections and a war of succession, which shook their power to its foundations, between the years 1825 and 1830, they have, on the whole, found in the Javanese perhaps the most submissive and resigned nation known to history. Cases are mentioned of unhappy wretches who quietly submitted to take the place of their chiefs condemned by the suzerain authority to imprisonment with hard labour. It is surprising that such a docile people, yielding so readily to bondage, should have nevertheless preserved their gentleness, sense of justice, probity, and other good qualities.

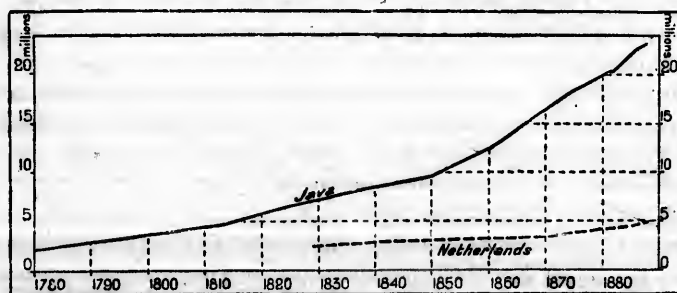
The rapid increase of the Javanese population is commonly appealed to in proof of their material and moral progress, and consequently of the beneficent results of the present administration. Assuredly, if the numerical growth of a people were an indication of prosperity, the Javanese would have to be regarded as amongst the happiest of nations. Within a century, apart from the Chinese and other immigrants, their numbers have augmented tenfold by the excess of births over deaths alone. In 1780, a series of exterminating wars had reduced them to little over two millions; in 1888, they were at least twenty-three millions, and the annual increase now ranges from three hundred thousand or four hundred thousand to half a million. The density of the population is already far greater than that of Holland and nearly equals that of Belgium; and as two-thirds of the soil is still untilled, there appears to be no reason why this density should not be tripled, when the whole island is reclaimed.

Nevertheless there has been an occasional ebb in this steady flow of human vitality. In 1880, a famine, followed by a series of epidemics, reduced the popula-

tion of the province of Bantam by one hundred and sixty-eight thousand ; in 1848 several districts of Semarang also suffered much from the same cause, while in the seven central provinces the population diminished by three hundred and fifty-four thousand in four years. But after periods of drought, the families again increase, and the gaps are soon filled to overflowing.

A certain number of Javanese emigrate to Borneo, Sumatra, and other islands, but this outflow is greatly exceeded by the immigration, especially from China. The Chinese already number over two hundred and twenty thousand, the majority being Peranakans, that is, born in the island of Javanese mothers. But the paternal type is little modified by the crossing, and even after several generations the descendant of the Chinese may still be recognised under the Javanese national garb. The children receive a Chinese education from teachers either introduced from China, or who have passed their examinations there. In general, this element is much dreaded by the other inhabitants of the island. As brokers, contractors, farmers of monopolies, pawnbrokers, smugglers, and opium dealers,

Fig. 68.—COMPARATIVE INCREASE OF POPULATION IN JAVA AND HOLLAND.



they appropriate the better part of the profits on all transactions. By loans and credit they forestall the very crops and legacies ; on their arrival they are your humble servant, but presently your master ; " they expand like the lotus," and in 1885 their estates in Java had a collective value of considerably over £11,000,000. The Europeans look on them as rivals in the wholesale trade, yet are fain to avail themselves of their services in acquiring a knowledge of men and things. Even the Dutch Government, while on its guard against their independence of character, their common national sentiment and secret brotherhoods, is compelled to employ them in numerous offices needing order and careful attention. Hence the decree of 1837, absolutely interdicting Chinese immigration, had soon to be revoked, although access to the island was still rendered difficult to the " Children of Han " by landing and resident charges, poll-taxes, passports, special imposts on the several industries, and other harrassing burdens. They have still to pay a special income-tax, and the result of this policy is that they increase at a less rapid rate than the Javanese.

Although less numerous than the Chinese, the Arabs, being Mohammedans of the "chosen race," have a relatively greater influence, and those especially who have made the pilgrimage to Mecca are venerated as saints. Yet they follow the same pursuits as the Chinese, and as business agents and dealers live at the expense of the native peasantry. Till lately the Javanese Arabs were more or less mixed descendants of the former masters of the land; but during the present century their numbers have been increased by direct immigrants from Hadramaut. The men, being engaged chiefly in the sale of European wares, all speak Malay, but in other respects they keep aloof from the natives, and in the family circle carefully preserve their mother tongue. All learn to read and write, and some are regarded as well versed in questions of Mussulman theology, jurisprudence, and grammar.

The European population, even comprising the Eurasians, are a mere handful, lost, so to say, in this great sea of Oriental elements. But they are the ruling class, and consequently command an influence out of all proportion with their numbers. Officials who marry native women bring up their children with great care, and in the second generation the "nannas" or half-caste women are regarded as belonging to the white race. Their education is often provided for by the Government, as is also that of the *signos* or *liplaps*, as the half-bred men are here called, not without a slight touch of contempt. They receive appointments as notaries, clerks, surveyors, and are reputed to be intelligent, but indolent, effeminate, and excessively vain. Their families are said not to be very numerous, and appear to die out in a few generations, the fact being that they simply become absorbed in the surrounding populations. With them have already been merged the few Portuguese who arrived in the sixteenth century.

European immigration was formerly discouraged by the Administration, which regarded the Dutch East Indies as a domain to be worked for the benefit of the State, and not as a colony opened to private enterprise. According to the decree of 1818, which long remained in vigour, no European in any capacity had the right to settle in Batavia, or elsewhere in Java, without the special authorisation of the governor-general, and even then could not remove more than five or ten miles from his residence, according to the locality. But although access to the island is now no longer interdicted, few Europeans settle permanently in the country.

The excessive mortality, which formerly earned for Java the title of "Cemetery of the Whites," is probably ten times less than in the last century. The maladies by which they were decimated are now better understood, while they have learnt to live more like the natives, and in accordance with sanitary principles. Their dwellings are built in salubrious places, and the health resorts are situated at various altitudes, so that the climate may be graduated for invalids and convalescents. Nevertheless, the mortality is still high, and at times the colonial forces suffer terribly, especially from the so-called beri-beri, apparently a kind of low fever or anæmia. The immigrants also tend to lose their moral tone, becoming less vigorous and energetic after a protracted residence in the country.

The first law for all Europeans is to uphold the prestige of their race, and to maintain their ascendancy by a sort of religious terror. Till lately the natives would fall prostrate by the roadside at the approach of a white in his carriage; those carrying an umbrella hastened to close it, at the risk of a sunstroke, and in the presence of an official the masses still preserve a solemn silence. For the same reason, no European could accept servile work, and when condemned for a breach of discipline the military were sent to Holland to undergo their sentence. Before 1864, no Javanese was allowed to learn Dutch, or send his children to a white school. An exception, however, was always made in favour of the Malays proper, whose language has long been the lingua franca of the Eastern Archipelago, as well as the official idiom for the transaction of public business and the administration of justice. Till lately it was always written in Arabic characters, which are now being gradually superseded by the European orthographic system.

The Dutch government also discourages the Christian missionaries, so that the Javanese, nominal Mohammedans, are still pagans at heart, worshippers of their ancestry and of the forces of nature, and attributing to the spirit world all the events of their daily existence. But they have also preserved numerous Hindu practices, while still celebrating the Mussulman feasts with ever-increasing fervour. Amongst them have sprung up some fanatical sects, notably that of the Naksyibendi, and since they are now permitted to make the pilgrimage to Mecca, some thousands return yearly from the Prophet's shrine dressed as, and calling themselves, Arabs. The Mohammedan schools are continually more and more frequented, and most of the peasantry observe at least the evening devotions.

Some Christian legends have also been introduced into the national mythology. Like their remote kindred, the Madagascar Hovas and the natives of the Moluccas, the Javanese would have embraced Christianity had their rulers commanded them to do so; but the very opposite policy has been pursued, and missionaries, unless of Dutch nationality, have often been refused permission to settle in the country. Scarcely 11,000 Javanese are classed in the census papers as members of any Christian church.

In order to avoid all needless contact with the natives, the Dutch officials carry on the administration largely through the agency of local chiefs. Certain Javanese "Regents," descendants of princely families, have preserved a semblance of authority, upholding their rank and dignity by means of rich emoluments and a share of the public revenues. But in return they have to accept the advice of the Dutch "Residents" stationed at their courts. The action of the real rulers is thus masked from the natives, who have themselves no share in the choice of their officials. They are, however, allowed to elect the village chiefs entrusted with the distribution of lands, public works, statute labour, and salaries; but these chiefs or communal mayors are liable to be removed at any moment, should they fail to satisfy the central authority.

## ECONOMIC CONDITION OF JAVA.

The slave trade was abolished in the Dutch East Indies at the end of the seventeenth century, and slavery properly so-called has ceased to exist in Java since 1860, when nearly five thousand slaves were emancipated. But can the rest of the people be regarded as freemen so long as they are subjected by Government to forced labour? While the authorities were satisfied with collecting the taxes on the crops fixed by Sir Stamford Raffles during the British occupation, the results were financially bad, and the public deficit went on increasing from year to year. But in 1832, the Governor-General Van de Bosch received full power to modify existing arrangements, and the very next year the people had to adapt themselves to the famous "system" of culture and taxation, which was largely modelled on that of the tobacco monopoly in the Philippines. Nevertheless, the change was effected without causing a crisis, the Government edicts being largely conformable to the *adat*, or old customs observed by the native rulers.

In virtue of this "system of culture," which was to replace the land-tax by a sort of Government monopoly of the crops themselves, each agricultural circuit of the vast Javanese "farm," was placed under a controller, who reserved a fifth of the land for the public service. Here the Administration, or its grantees, introduced at its option the cultivation of economic plants, exacted throughout the commune every fifth working-day (later every seventh), and *de facto* regulated all the works, encouraged and coerced the workers. At the end of the year, it took over from the producers the various exports, coffee, sugar, indigo, tea, tobacco, cinnamon, pepper, "at the market price," after deducting two-fifths for the taxes, and a fixed sum for transit charges.

But this "market price" has always been fixed by the Government far below the real value, and, according to official statistics, the Javanese peasantry have been defrauded, since the introduction of the "system," to the extent of some £80,000,000. On coffee alone, the "staple of the Dutch Colonial régime," the plunder of the natives to the benefit of the home budget amounted, between 1831 and 1877, to the enormous total of £68,000,000. The real market price, after deducting the impost, has occasionally been three times in excess of the price officially announced to the natives.

Hence it is not surprising that by the Minister Van de Putte and many other Dutch statesmen this wholesale plunder of the Javanese has been denounced as a "wretched system." On the other hand, an administration which yielded a considerable "colonial bonus" to the mother country, often over £2,000,000 yearly, could not fail to find many admirers, although the bulk of the native population meantime remained poor and half famished. Certain political economists have even ventured to hold up the procedure of the Dutch Government in Java as a model of political wisdom.

However, the era of direct agricultural monopolies seems to have run its course. The Achinese war, followed by the ravages of insects on the coffee plantations and the necessary increase of the public expenditure, have brought about a

deficit, showing once more that monopolies end in the ruin of states as well as of the plundered. Of late years, the system has been gradually modified.

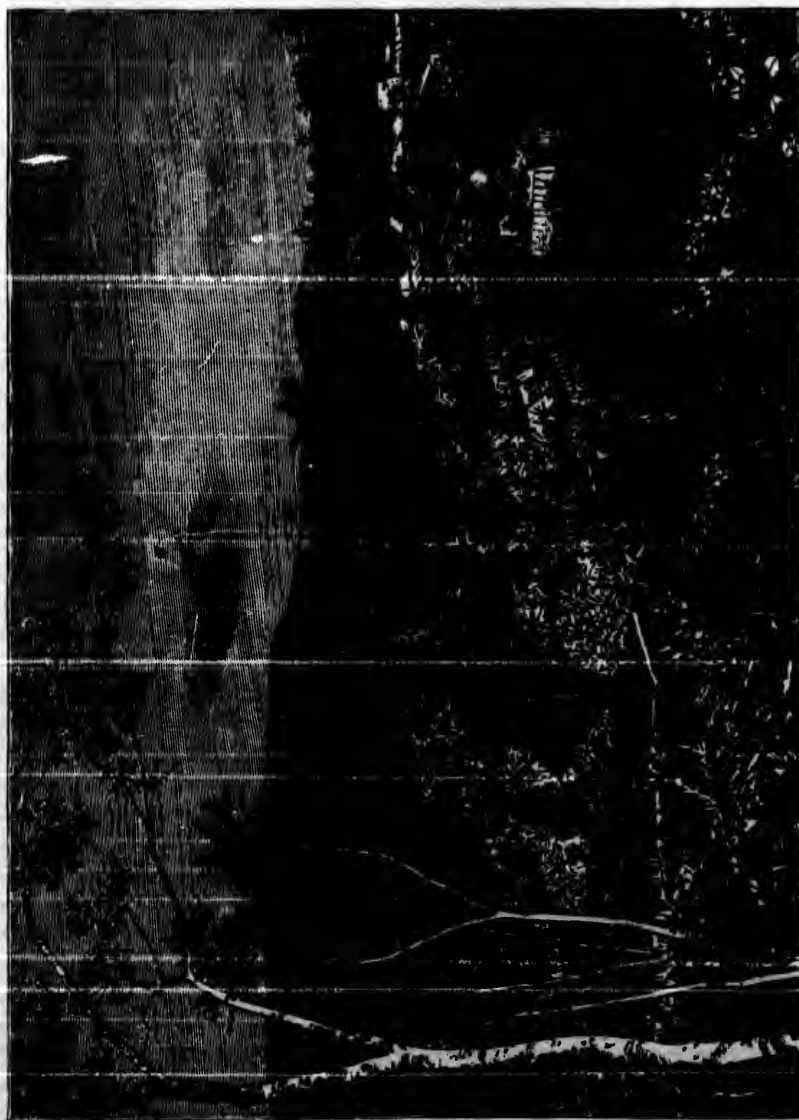


FIG. 69.—COFFEE PLANTATION, PERANG REGENCIES, JAVA.

Statute labour has been abolished, at least on paper, except for works of public utility, such as roads, harbours, canals and administrative buildings. Lands held by the communes in virtue of hereditary right have been ceded to

them absolutely; the cultivation of tea, tobacco, indigo, cochineal and cinnamon has been left to private enterprise, the Government retaining the monopoly only of sugar till the year 1890, and of coffee until the question is settled by legislation.

The system of forced labour, that is, of slavery in disguise, has had the natural consequence, of retarding the intellectual and moral progress of the people. The structures in different parts of the island dating from the Hindu epoch show that the knowledge of industrial, scientific and artistic processes has greatly deteriorated since those times. Doubtless the initiative came from the Hindus, but the works executed under their control attest the advancement made by their disciples. But decadence was inevitable under an Administration which for nearly three centuries closed the schoolroom to the natives, lest they should learn to think and thus attempt some day to bridge over the gap separating them from their masters. Even now, for a population of some twenty-three millions, Java possesses only two hundred native schools, attended by some forty thousand scholars.

In the Javanese communes the land has remained unallotted, the sovereign being still regarded as the supreme proprietor, while the collective usufruct of the cultivated parts belongs to the peasantry. The cultivators thus form with the communal land an organic whole, the so-called *desa*, and they can scarcely understand any other system of tenure. Efforts have in vain been made in some places to introduce that of private holdings amongst the poor cultivators of the plains. Doubtless there exist a certain number of plots inherited in the family; but the communal organisation everywhere prevails. Even where the jungle is cleared by private enterprise, it lapses after a certain time to the commune, which, according to the *adat*, or "custom," is the true owner and collectively responsible for the taxes and the statute labourers. As in the Slav *mir*, each member of the *desa* keeps his cottage and garden, while all have equal right to the woods and waste lands. But the tracts under tillage are distributed to the families either every year, or every two or three years according to the districts.

Unfortunately the enormous increase of population during the present century has had the consequence of reducing to a mere fraction the portion assigned to each individual, in some places five acres or even less, while the government abstains from helping the communes by the grant of public waste or fallow lands. On an average, the Javanese cottage is worth about sixteen shillings, and the revenue of each family plot five pounds at the utmost. The peasant finds it difficult to earn an equal sum on the Government plantations, so that the whole population sees its substance constantly diminishing, and itself threatened with still deeper poverty, although it at least contrives to live despite the imposts and forced labour.

Would they fare better were the principle of private property established in the 40,000 communes, and were most of the holdings rapidly reduced to proportions too small for any practical purpose, or even bought up altogether, leaving the bulk of the peasantry without any property? Would not the condition of Java then

become analogous to that of Ireland, and depopulation become inevitable? In the province of Bantam under the British administration the greatest impulse was given to the development of large estates, and here also the land, belonging mostly to absentee owners, is the worst cultivated, here the indigent classes are most numerous, famines most frequent and often attended by bread riots. The famous novel of *Max Havelaar*, which deeply moved the public conscience of Holland, described in eloquent language the deplorable condition of the Bantam peasantry, and since then there has been no change for the better.

The staple crop is rice, which in many districts constitutes the exclusive food of the people. Hence, despite the enormous annual production, the export of this grain is slight compared with that of Burmah and Cochin China. The rice-fields exceed a total area of 5,000,000 acres, covering not only the marshy low-lying tracts and regularly irrigated sloping valleys, but also the so-called *Legals* or dry grounds, yielding the most nutritive varieties, as well as the flanks of the mountains to a height of over 4,000 feet, below the zone of coffee plantations. After the harvest, the ditches and reservoirs are emptied, and a second harvest made of the myriads of fish that swarm in these waters during the year. Fevers are endemic in the *Sawah*, or wet rice districts, but are less fatal than in other regions lying even farther from the equator. This is due to the fact that the Javanese do not allow the waters to stagnate, but always keep up the current, and also plant a curtain of large trees round their villages.

In Madura, where the surface is nearly everywhere gently undulating, scarcely any rice is grown; here the chief alimentary grain is maize.

Although the Javanese peasantry never drink coffee, those residing in the prescribed coffee districts have to cultivate a strip of 600 feet, and to supply fresh plants in case of failure. It is from this source that Holland derives, or has hitherto derived, her "colonial bonus," and consequently to it the natives are indebted for the oppressive system of forced labour. The coffee plant was not introduced till towards the close of the seventeenth century; yet Java produces from a sixth to an eighth of the yield of the whole world, or an average of about 150 million pounds, valued at £2,000,000. Since the end of the Napoleonic wars, when this island was restored to Holland, the yield had gone on increasing from decade to decade till recently. Now, however, although several private capitalists have entered into competition with the Government, it seems to be at a standstill, or rather to have entered a period of decline. In 1876, the destructive *hemileia vastatrix*, which had already wasted the plantations of Ceylon, made its appearance in Sumatra, and three years later attacked those of Java. Precautions have also to be taken against other parasites, such as the *xylotricus quadrupes*, the combined attacks of which have reduced the Government crop from nearly 80,000 tons in 1879 to less than 18,000 in 1887.

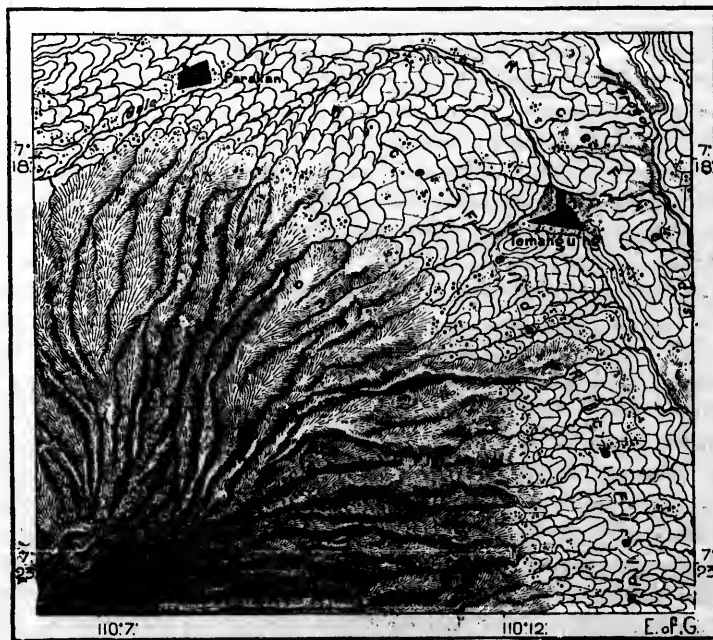
The Javanese coffee-planters have now great hopes of the Liberian variety, which resists both the *hemileia* fungus and the *xylotricus* borer. But merely to replace over 200 million plants would alone be tantamount to an economic revolution.



Java ranks next to Brazil in the production of coffee, and also holds the second place in the markets of the world for that of sugar, in this product being exceeded by Cuba alone. The crop, which, however, varies greatly from year to year according to the rainfall and other climatic conditions, averages one-tenth of that produced by the rest of the world. There are several local varieties of the cane, whose cultivation is one of the old industries of the island. In 1808, the yield rose to 5,800 tons, but it did not acquire its present gigantic proportions till the second half of the century. The share of the Government in this industry declines each year in virtue

Fig. 70.—ZONES OF WET AND DRY RICE FIELDS AND COFFEE PLANTATIONS ON MOUNT SUMBING.

Scale 1 : 150,000.



3 Miles.

of the law obliging it to gradually abolish statute labour, and to grant concessions to private enterprise. Some of the plantations, especially in the Jokjokarta and Surakarta districts, are supplied with machinery in no respects inferior to that of the finest sugar mills in Europe.

The tea industry, introduced from Japan in 1826, has never acquired a development sufficient to enter into serious competition with the Chinese and Indian growers. The plantations laid out by Government in all parts of the island did not prove very profitable, and since 1865 the industry has been completely

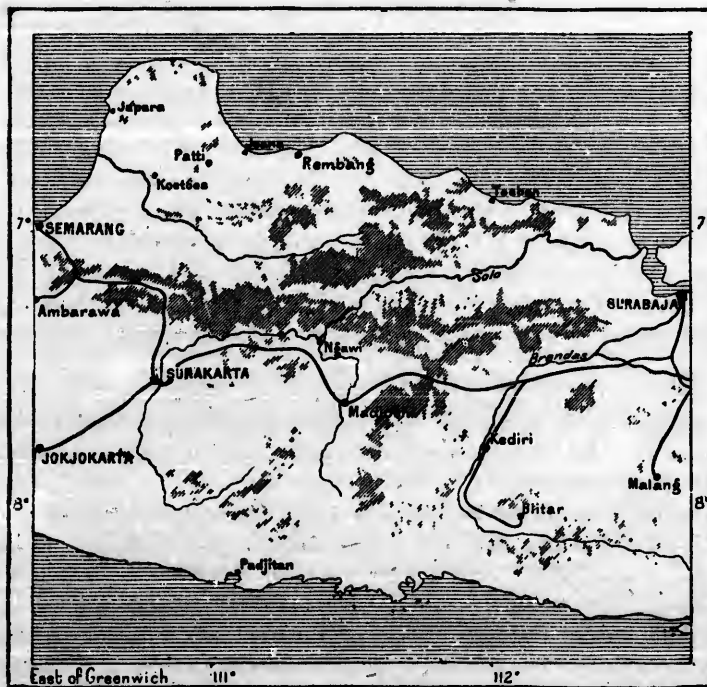
abandoned to private speculators. The yield averages about 6,000,000 pounds; but the leaf is of indifferent quality.

Other economic plants, such as cacao, the clove, and cinnamon, are not extensively grown, and even pepper, formerly the chief resource of the province of Bantam, has ceased to be a profitable industry. Of the 25,000,000 coconut trees, about 10,000,000 are fruit-bearing.

Despite great commercial vicissitudes, tobacco has become one of the important

Fig. 71.—TRAK FORESTS BETWEEN SEMARANG AND SURABAYA.

Scale 1 : 2,500,000.



exports, besides supplying a considerable local consumption. This industry has also ceased to be a Government monopoly, and is now largely in the hands of Chinese speculators. But they are not allowed to cultivate opium, and have to purchase this drug from the Government, which imports it from India, Persia, and Asia Minor. Indigo, formerly one of the most jealously preserved monopolies, is now also surrendered to free labour, and still continues to be an important article of the export trade despite the competition of the coal-tar dyes. Neither jute, cotton, nor any of the other textile plants are extensively cultivated. Amongst

these is the kapok or randu (*eriendron anfractuosum*), the fruit of which yields a down utilised by the native weavers.

The same plant is used for building purposes, but in this respect a vastly more valuable tree is the teak—the *jati* of the Javanese, which still covers an extent of about 2,500 square miles. Recently, also, some of the cleared spaces have been replanted with the no less valuable cinchona, first introduced from Réunion in 1852, and again directly from South America in 1854. Within nine years of that date, there were already 1,140,000 cinchona plants either in the nursery-grounds or the forests of Java; but the variety selected was one of the least valuable, and it had even to be replaced by others of more medicinal value, notably the *calisaya*, which had been successfully introduced into the uplands of British India. In 1888, the Government enclosures contained over 3,700,000 of the best varieties, growing at different altitudes between 4,000 and 6,500 feet. By careful selection and grafting, plants have been obtained whose bark yields from 11 to 13 per cent. of quinine.

Java lacks a sufficient number of domestic animals for agricultural operations. In the western province of Bantam, the proportion of horses, oxen, and buffaloes is only 94 per thousand of the population, but this proportion increases somewhat steadily eastwards until, in the extreme east, it rises to 830 per thousand. But everywhere the live stock has diminished during the second half of the present century, while the population has rapidly increased. The Javanese horses of Arab stock have diminished in size, but not in mettle and staying power. The Cheribon trotters and the Kedoc cart-horses are highly spoken of, although none can compare with the Sumatran ponies in form or vigour.

The produce of the fisheries, which employ about fifty thousand hands, is all required for the local consumption, except the sea-slugs and sharks' fins exported to China. Java also yields the very finest quality of edible birds' nests, also destined for the Chinese market.

To the traditional industries, such as weaving, dyeing, krissees, and other arms for which the Javanese have always been famous, the manufacture of heavy machinery has recently been added for the sugar refineries, the harbour works and railways. An ancient monopoly of the Jokjokarta regency are the gongs and musical instruments for the *Gamelangs*, or native bands, bells, cymbals, drums, and bars of copper or bamboo which the players strike with a hammer to accompany the theatrical representations and native ballets. The most skilled craftsmen are the Chinese, who are usually employed, especially by Europeans, wherever taste and execution are objects of consideration.

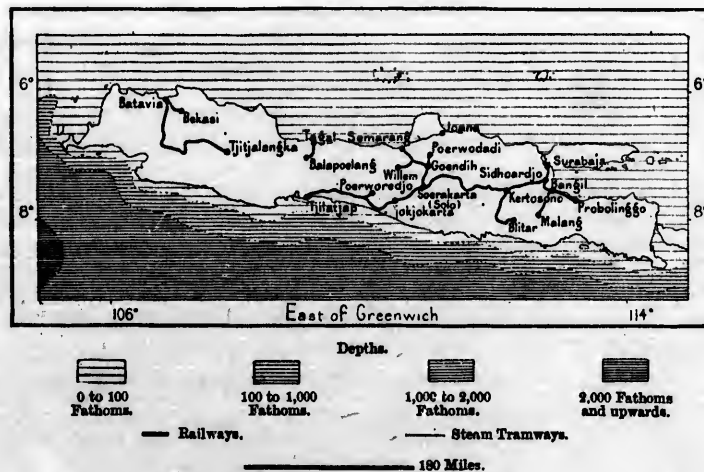
The carriage roads are well planned and kept in excellent repair, and are often supplied with footpaths and supplementary avenues for heavy traffic, especially between the chief towns. The main artery is the great military route, 780 miles long, running from Anjer, in the extreme west, to Banjuwangi, in the extreme east, and constructed by the terrible Daendels, still remembered by the natives as the "Master of the Great Thunder." The torrents and even rivers are crossed by ingeniously planned bamboo bridges, which, despite their frail appearance, are extremely solid works. The first railway, connecting Batavia

with Buitenzorg, was opened in 1872, and since then the network of lines, as originally planned and suggested by the configuration of the island, has been slowly developed. When completed, the system must obviously comprise two coast lines running from one end to the other, and connected at intervals by transverse lines through the valleys separating the volcanic ranges. But this system is far from complete, although the three great ports of Batavia, Semarang, and Surabaya are already connected with the rich inland districts. More than half of the railways, as well as all the telegraph lines, belong to the State. The latter are connected with the Indo-European system through Singapore, and with that of Australasia through Timor.

The steam navigation companies, whose craft ply regularly between Europe and Batavia, as well as from port to port round the coast of Java and through-

Fig. 72.—RAILWAYS IN JAVA.

Scale 1 : 11,000,000.



out Indonesia, already own over sixty steamers, with a collective capacity of nearly 100,000 tons. The largest share of the Javanese trade is still carried on with Holland, although the law of 1874 abolished all differential dues on foreign vessels touching at the insular ports. The entry and clearing charges were also, at the same time, greatly reduced on a large number of commodities. All the Government exports are shipped for Holland by the privileged *Handel-Maatschappij* ("Dutch Trading Company"), founded in 1824, and in the imagination of the people confounded with the State itself. The original Dutch East India Company, after realising millions by its long monopoly of the trade with Indonesia, became bankrupt at the end of the last century with a debt of £10,000,000.

Since the declaration of free trade in 1874, the movement of the exchanges with Great Britain has acquired considerable importance. England takes especially

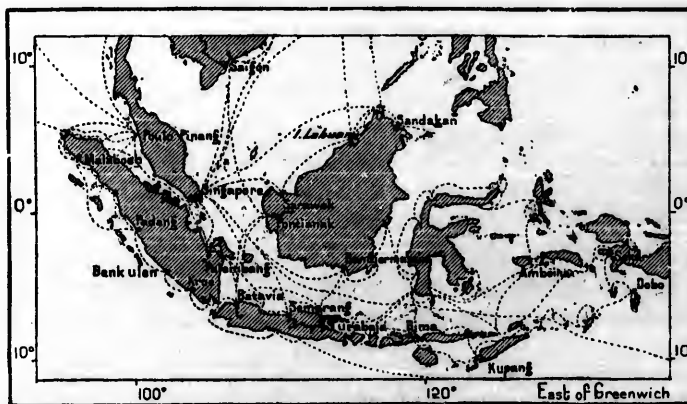
raw sugars in exchange for cotton goods and hardware. China, the United States, and France also share to some extent in the general export trade. The Javanese sailors are surprisingly daring and agile, swarming up the ship's shrouds almost with the nimbleness of the monkey.

#### TOPOGRAPHY.

At the beginning of the seventeenth century, the chief outpost was *Bantam*, situated near the north-west extremity of the island on a well-sheltered semi-circular bay, but obstructed by mudbanks. Here the Dutch founded their first factory in 1596; but it is now a mere village almost hidden by the surrounding foliage. Although Bantam has given its name to the province, the capital of the

Fig. 73.—LINES OF STEAM NAVIGATION IN INDONESIA.

Scale 1 : 48,000,000.



residency has been removed to the small town of *Serang*, some six or seven miles farther south, while the local trade has been diverted to Anjer, which was nearly destroyed by the Krakatau eruption of 1883.

*Batavia*, the *Jakarta* of the natives, present capital of Java, and of all the Dutch East Indian possessions, occupies an area out of all proportion with its population, stretching from the harbour in a straight line for over twelve miles inland. The vast space, however, is not continuously built over, but rather occupied by several distinct quarters, connected together by canals, routes, and avenues. The old town had been founded in 1619 on the coast along the right bank of the *Liwong*, while the citadel with its four sharp bastions stood on an artificial islet at the entrance of the estuary. Batavia gradually acquired the aspect of a Dutch city with its canals and dykes, its many storied and gabled brick houses; but a shower of ashes ejected from Mount *Salak* choked the canals, con-

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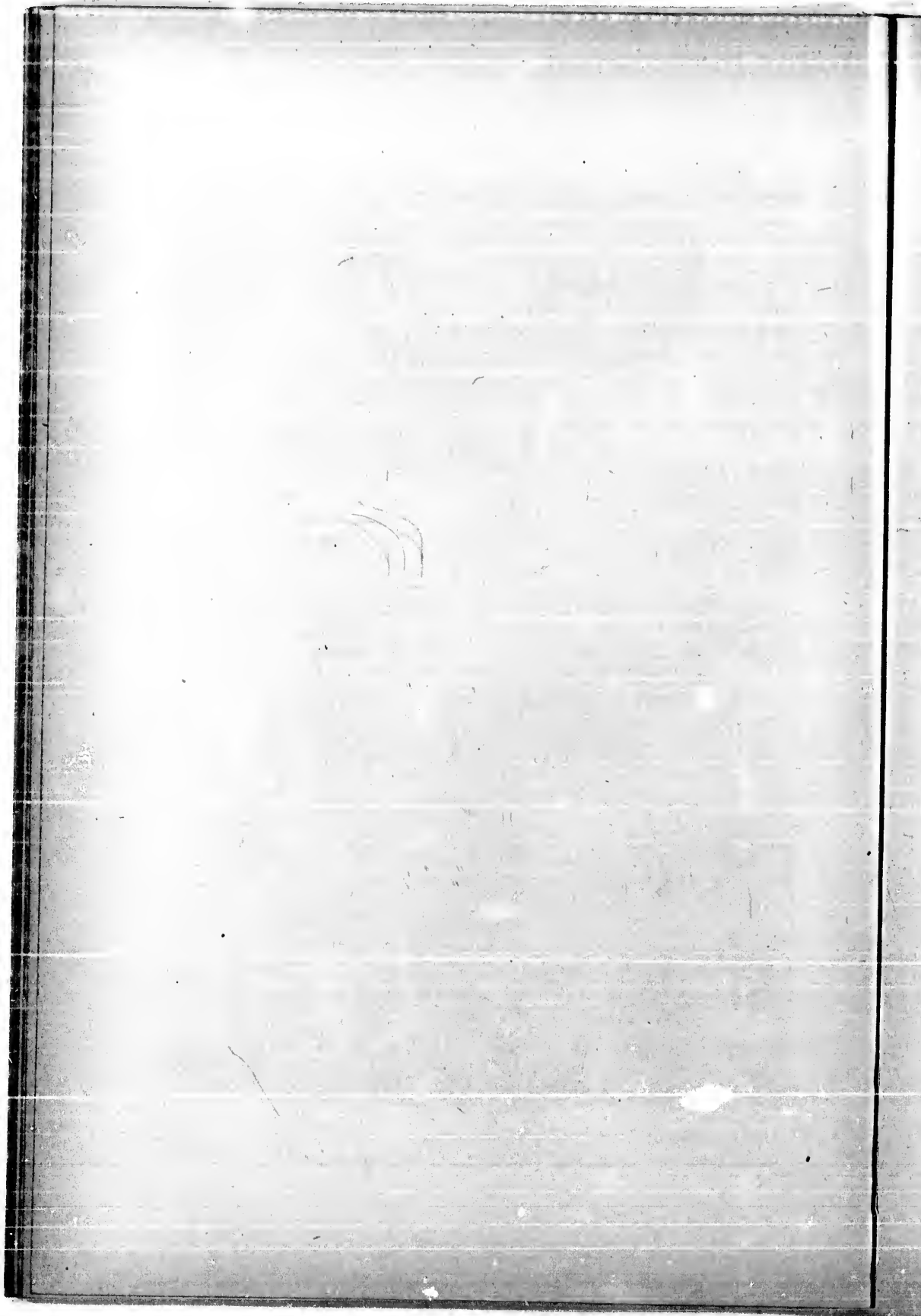
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STREET VIEW IN BATAVIA.



verting the lower quarters into swamps and causing the land to advance seawards. Batavia thus became still more unhealthy than before, and at the same time lost the advantage of its marine position. At present it lies considerably over a mile from the coast and the canalized river has had to be extended the same distance to reach deep water.

Leaving the old town to the Malay custom-house officers and the teeming Chinese population, the Europeans have established their new quarter some miles farther south on more elevated ground, everywhere planting broad avenues and laying out gardens and shrubberies. The central quarter of *Wetteveden*, comprising the chief public buildings and large hotels, combines the aspects of a fine city and magnificent park, where flourish most of the tropical plants distinguished by the splendour of their flowers and foliage. Round about this district and beyond the extensive grassy tract of *Koning's Plein* ("The King's Plain") other quarters have sprung up on the western slopes, and these also are everywhere interspersed with gardens and shady groves, the favourite evening promenade of the Europeans. Northwards, a district

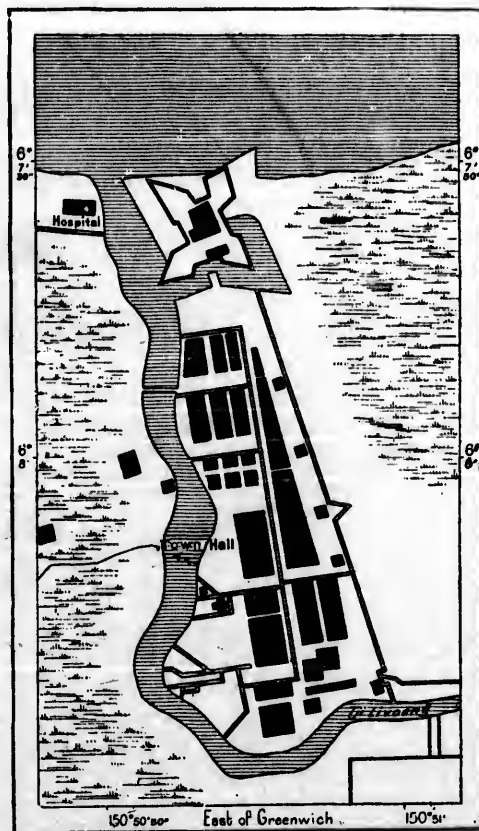
of suburban residences, skirting the canal, stretches away to Old Batavia, and is continued southwards as far as *Meeater Cornelis*, another group of scattered quarters separated administratively from Batavia proper, but all belonging to the same system. The whole is encircled by the palm-groves of the native kampongs.

Batavia is the seat of the oldest and most flourishing learned societies in the Eastern Archipelago. It also possesses a medical school, libraries, a museum, and some periodicals of high scientific value.

The maritime quarter of *Tanjong Priok*, also forming part of Batavia, is of

Fig. 74.—BATAVIA IN 1628.

Scale 1 : 20,000.

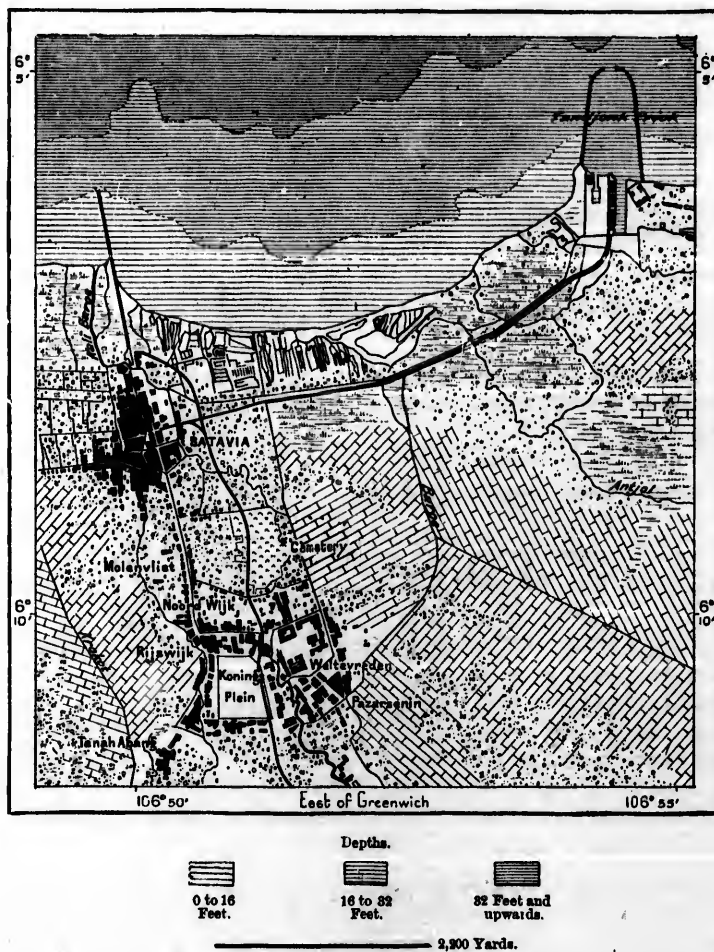




quite recent foundation. Till lately Batavia had no harbour, and large vessels were obliged to ride at anchor in the roadstead, which, however, is perfectly sheltered by quite an archipelago of small islets. The canal was accessible only to small steamers and river craft, while the approaches were being yearly invaded by the

Fig. 75.—BATAVIA AND PORT OF TANJONG PRIOK.

Scale 1 : 60,000.



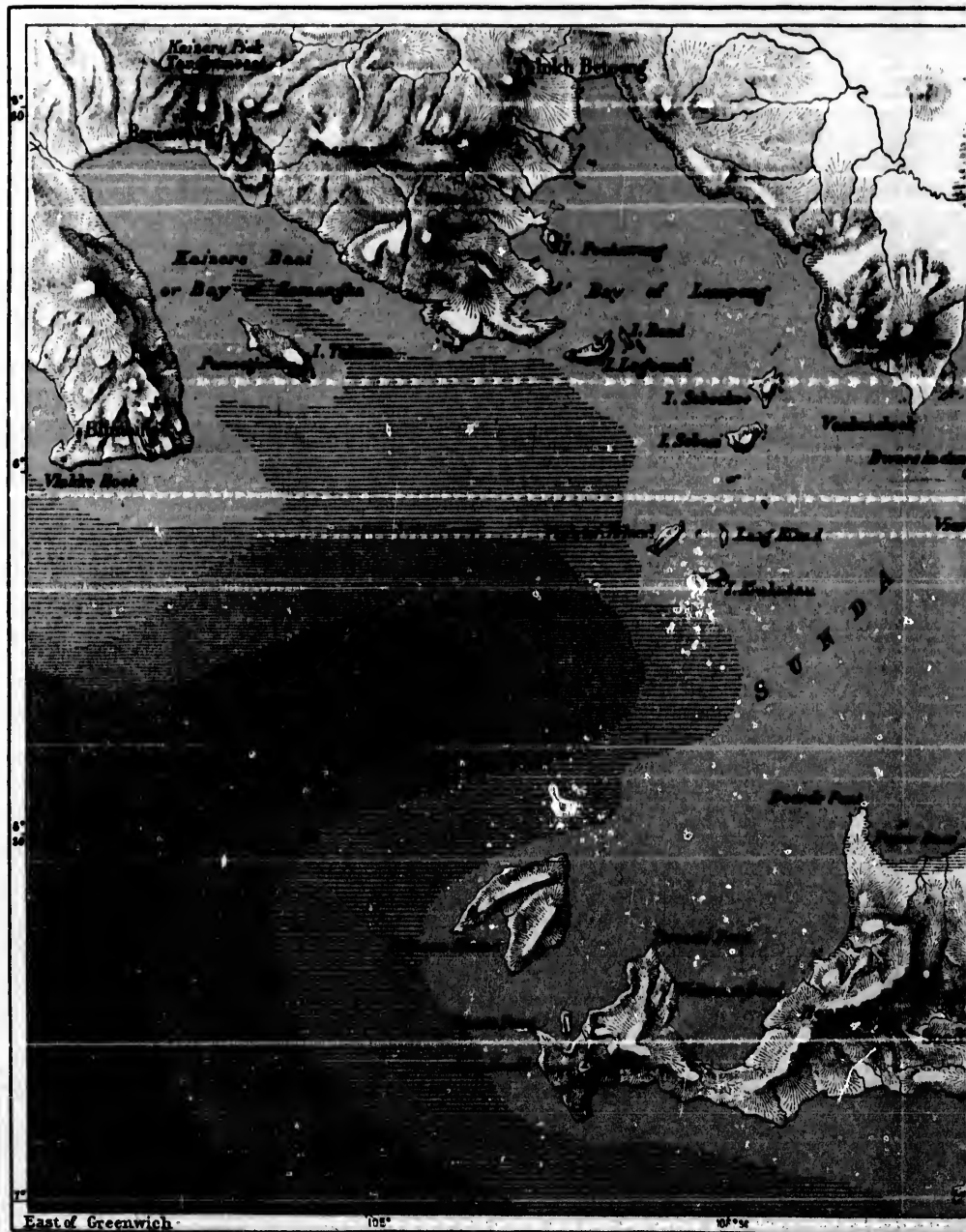
sedimentary matter brought down by the Liwong and Angkee rivers. Between 1817 and 1874, the shore-line advanced at the rate of 35 yards a year, so that it became necessary to remedy the evil by constructing piers in deep water.

At first it was proposed to establish the port near the island of Onrust, north-

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SUNDA STRAIT



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NEW YORK, D. APPLETON & CO.

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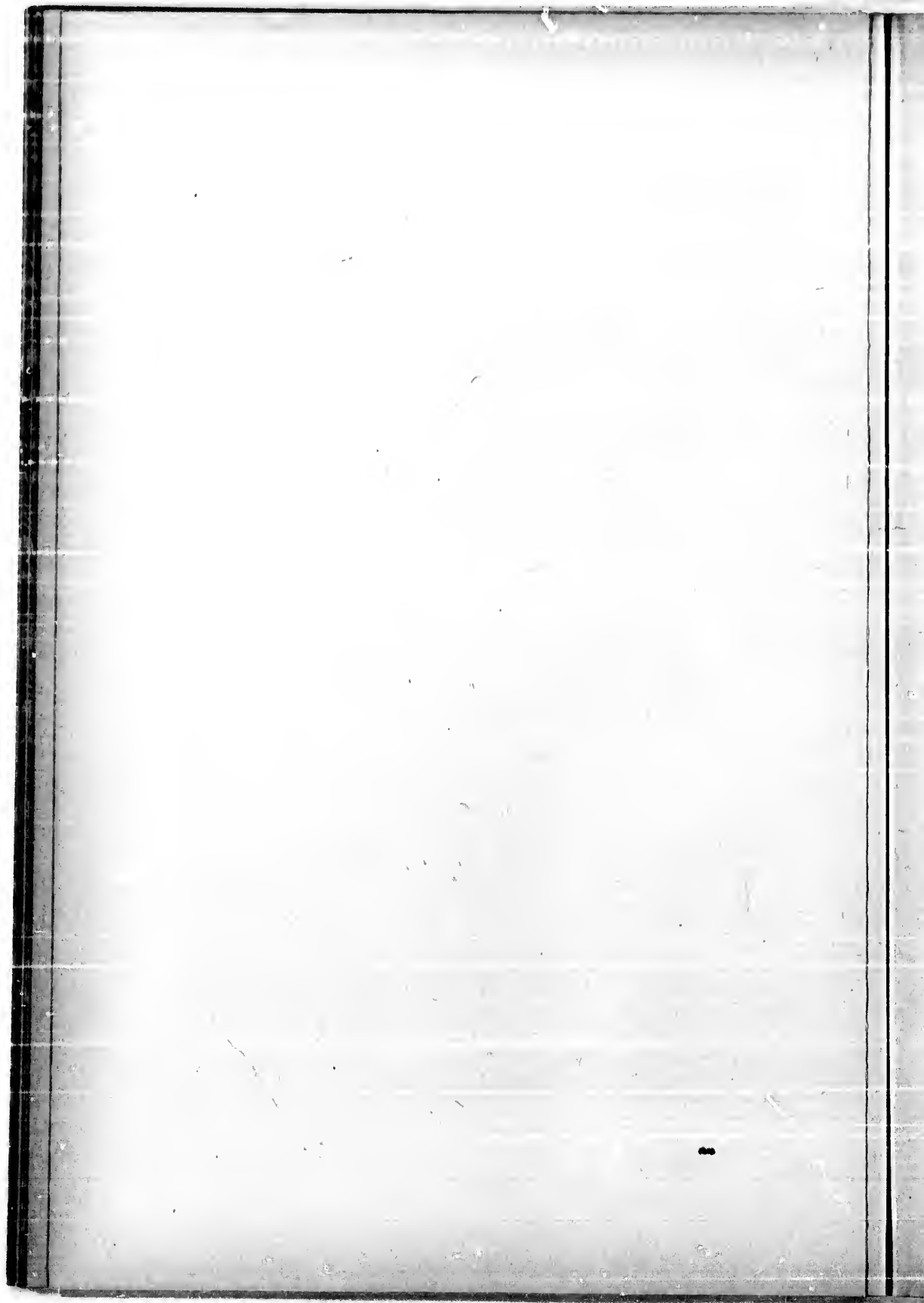


*Depths.*

*fms. 50 100 250 500 upwards.*

*except by the wave during the eruption of Krakatau in 1883.  
The lighthouses are indicated by red dots.*

NEW YORK, D. APPLETON & CO



west of the roadstead, which already possessed a naval arsenal; but after much discussion, the engineers at last decided in favour of the Tanjong Priok Point, which is distant only 6 miles to the north-east of the old town. Here the land, somewhat more elevated than the neighbouring coast, projects seawards towards a line of upheaved beds, which are continued in the direction of the east. Two immense stone jetties, 2,140 and 1,960 yards long respectively, now project from this point, curving round at their northern extremity so as to leave for shipping an entrance of about 500 feet. The space thus enclosed comprises nearly 500 acres, and affords good anchorage for the largest vessels. Repairing basins, graving and dry docks, and building yards complete the harbour works, which are connected with the rest of the city by a road, a railway, and a canal crossing the intervening marshy plain.

The two large towns of *Tangerang* and *Bekasi* to the east, both inhabited by Chinese, may be regarded as direct dependencies of Batavia. Bekasi is even connected by rail with the capital, of which it forms a suburban retreat; but not a single descendant is now to be found of the Dutch Boers, who settled in the district about the middle of the eighteenth century. In *Tangerang* and neighbourhood some 40,000 or 50,000 peasants are occupied during the "dead season" in plaiting hats, mats and boxes of bamboo fibre, which are bought up by Chinese traders for the market of Paris. In 1887, the district of Tjilongok alone exported about 1,200,000 hats, valued at nearly £80,000.

Farther south the advanced spurs of the Gedé volcano are resorted to by most of the Europeans, who can here breathe a pure and invigorating atmosphere. In 1774, *Buitenzorg*, that is "Sans Souci," was chosen as the site of an official health-resort, and this place has by successive enlargements become a vast residence, now usually occupied by the Governor-Generals of the Dutch East Indies. Lying 880 feet above the sea, on a wooded slope between the Liwong and Dani river valleys, *Buitenzorg* commands a superb prospect of the surrounding forest-clad gloomy gorges and undulating heights rising in one direction towards Mount Salak, in another towards Gedé. Nowhere else in Java is the indigenous vegetation more exuberant or more varied than here, and no botanic garden in the world is richer or better organised than that of *Buitenzorg*, whose magnificent avenues wind round about the government palace. Here are cultivated no less than 9,300 different species of plants.

But *Buitenzorg* is not sufficiently elevated to be regarded as a sanitarium. Hence invalids and convalescents usually prefer the station of *Sindang-Laya*, which stands at an altitude of 3,560 feet on the northern slope of Gedé, near the vast nursery grounds of *Tjibodas*. This is said to be the most salubrious spot in the whole of west Java, and hundreds of soldiers stricken down during the Atjeh campaigns have here recovered their health.

South of *Buitenzorg* the railway, after crossing the main insular water-parting, and leaving to the south thinly peopled districts sloping down to *Wijnkoops Bay*, and the port of *Plabuan-Ratu*, passes eastwards by the important stations of *Sukabumi Tjanjur*, into the vast basin of the Tarum. Here is the port of *Tjikao*,

which before the opening of the railway was the only outlet for the produce of the whole district.

Farther east, at an elevation of 2,470 feet, stands *Bandong*, the picturesque capital of the "Preang regencies," almost completely concealed by the surrounding forest vegetation, and commanded northwards by the long crest of the *Tungkuban Prah* ridge.

At present (1889) the railway terminates beyond *Bandong* at *Tjitjalenka*, but is to be continued across the plateau down to the *Manuk Valley*, where it will throw off a branch south-westwards to the town of *Garut*. Then climbing the eastern hills it will fall by long inclines down to *Tjitjatap*, the most sheltered port on the south coast, and already connected by rail with the northern slope of the island. Even at low water there is a depth of 17 or 18 feet on the bar, and from 30 to 35 in the harbour, which is protected by the island of *Kembangan*, and defended by fortified lines.

East of *Batavia* the marshy coast, fringed by mangroves and mud-banks, has no harbours west of *Cheribon Bay*. *Indramaju*, in the *Manuk delta*, which grows the best rice in the island, is a small riverain port accessible only to vessels of light draught. The populous and productive province of *Cheribon* has a large number of small towns and large communes, but no cities of great size. *Cheribon*, the capital, which takes its name from the *Tji-Ribn* torrent on which it is situated, occupies only a secondary position amongst the commercial centres of *Java*. *Tegal*, capital of the province of like name, has a roudstead exposed, like that of *Cheribon*, to the north and east winds, so that vessels run some risk in shipping the produce of the interior brought down by the railways, connecting this place with *Balapulang* and *Pangka*. The largest town on the north coast between *Batavia* and *Semarang* is *Pekalongan*, which occupies both banks of the river of like name. *Pekalongan* formerly enjoyed a monopoly of the indigo trade, and the native women wove highly esteemed coloured fabrics.

*Semarang* or *Samarang*, lying near the centre of the curve formed with the rest of the coast by the peninsula of *Japara*, is one of the three great *Javanese* marts. At the close of the last century it stood first, and still rivals *Batavia* and *Surabaya*, exporting large quantities especially of sugar, coffee, tobacco, and indigo. Yet it has no harbour, and large vessels calling here are obliged to anchor considerably over a mile from the shore in waters exposed to the fury of the west monsoon. Boats and steam launches alone can penetrate into the city through the *Banjir* canal to the west, and the canalised river to the east, on which have been erected the chief public buildings. If a harbour is constructed it will probably have to lie further west, near *Krowelang Point*, for at *Semarang* deep water of 25 or 30 feet occurs only some five miles from the coast. In the marshy plain between the canal and the river rises a star-shaped fort strengthened by bastions and a moat, and close by is one of the two artesian wells which supply the place with pure water.

As in *Batavia* the inhabitants are grouped according to their nationalities, the Europeans, here numbering several thousands, being chiefly centred in the *Bojong*

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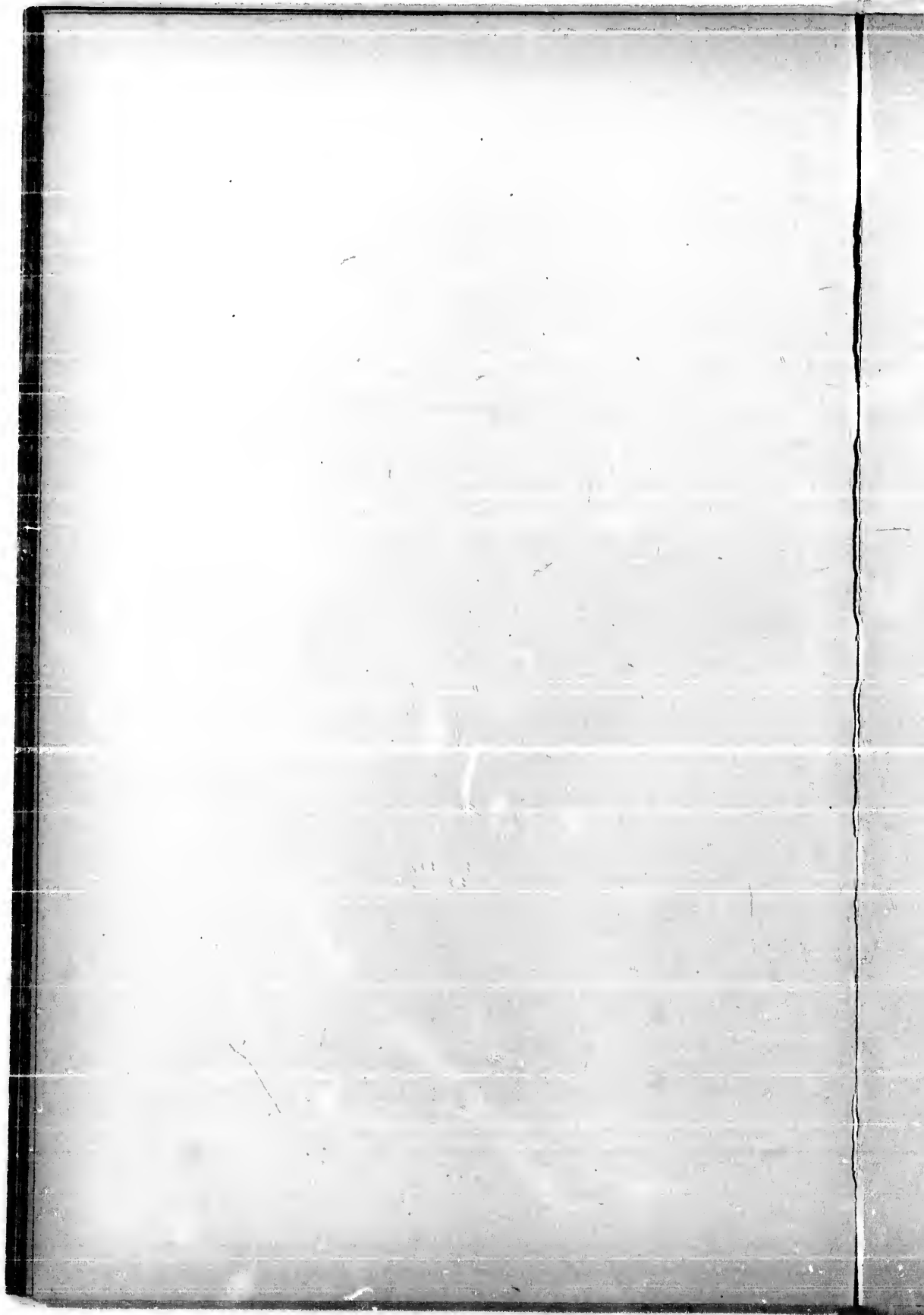
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VILLAGE OF TJIMATAN, NEAR TJANTUNG, JAVA.

M. Taylor



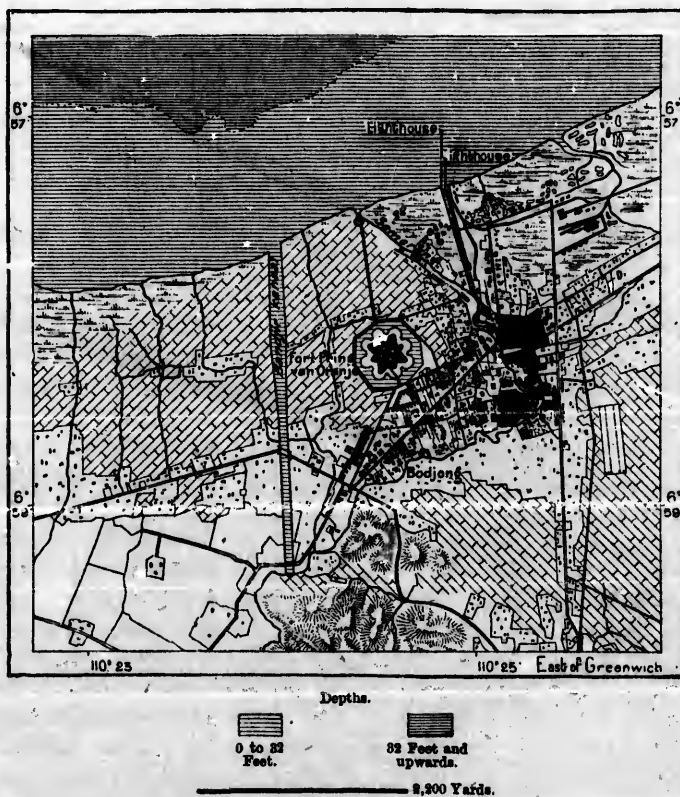


quarter, which lies above the low-lying tracts near the spurs of the hills to the south. Pleasure resorts are also scattered to the south-west at the foot and on the flanks of the Ungaran volcano, whose terraced slopes are crowned by the ruins of Hindu temples.

Semarang is abundantly supplied with means of communication, roads, railways, steam trams, canals, and steamers, one line of navigation connecting it with the

Fig. 76.—SEMARANG.

Scale 1 : 60,000.



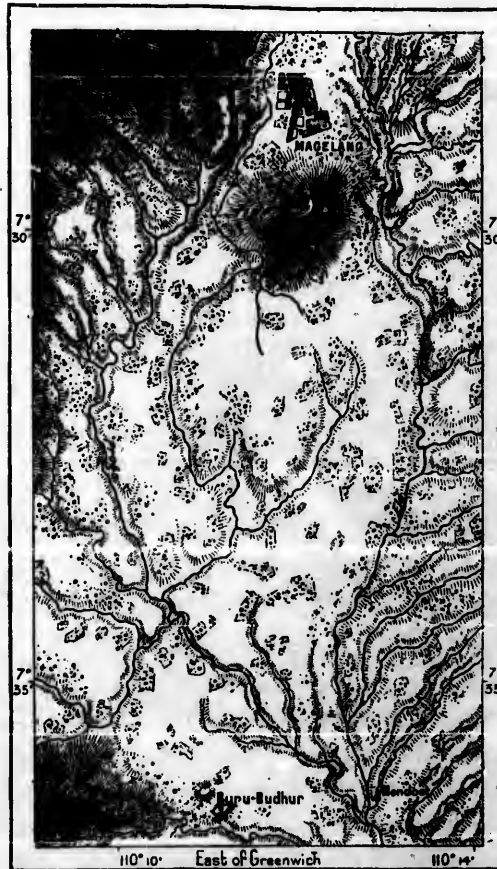
ancient city of *Japara*. During the Hindu epoch, *Japara*, which gives its name to a province, was a great emporium, and down to the close of the last century it was still frequented by shipping. But its port has been gradually closed by the coral reefs, and its trade having been transferred elsewhere, *Japara* is now nothing more than a dull administrative centre. In the rich valley stretching southwards one of the chief places is *Demak*, whose mosque is famous in the Mohammedan world as being the first erected in Java.

Farther east follow the large markets of *Kudus* and *Patti*, and on a broad

estuary accessible to ships of average size, the ancient city of *Jawana* or *Joana*. South of Semarang the railway gradually rises in the direction of *Ambarawa*, which the Dutch have selected as their chief strategic station in the interior. Here the vast fortress of *Willem I*, 1,680 feet above sea-level, commands several natural routes radiating in all directions.

Fig. 77.—MAGELANG AND BURU-BUDHUR.

Scale 1 : 130,000.



Towards the south-east, on the first slopes of Mount Merbabu, stands the town of *Salatiga*, where in 1811 was signed the capitulation surrendering the Dutch East Indies to Great Britain. At present Salatiga is one of the chief health-resorts of Java.

*Magelang*, capital of the province of Kadu, occupies the centre of a magnificent plain watered by the river Progo and fertilized by the ashes of the surrounding volcanoes. Some nine or ten miles to the south of this enchanting spot a small eminence near the Progo is crowned by the pyramidal temple of *Buru-Budhur*, the finest Hindu ruin in Java. Standing on a square platform, 540 feet on all sides, the edifice rises in seven retreating storeys to the central *dagoba*, or dome, a solid mass of masonry towering above thousands of sculptured stones and bas-reliefs, representing battles, hunts, shipwrecks, domestic scenes, triumphal processions, in which is figured

the elephant, an animal unknown in Java. At the angles of the terraces are monstrous carved idols, while at intervals are throned effigies of Buddha of the traditional solemn and conventional type. Thus are intermingled in these sculptures the cults of Siva and Sakya-Muni. This superb monument, which has been compared, for vastness of proportions and finish of details, to the Cambodian

temple of Ankor-Vat, has lost a large number of precious carvings, carried off by native princes and officials to embellish their palaces and gardens. But enough still remain to give an idea of the prodigious architectural work executed in the eighth or ninth century by Javanese artists, under the guidance of their Hindu instructors. The discovery has recently been made that the base of the building is surrounded by a revetment, or stone facing, which masks inner walls richly carved and covered with inscriptions. Here archæologists hope to find valuable data on the history of the edifice and of the country.

Lying on the southern slope of the island, both Magelang and the equally

Fig. 78.—MERAPI AND JOKJOKARTA.

Scale 1 : 500,000.



picturesque *Purwoorejo*, capital of the province of Bagalen, have their natural outlet in the port of *Tjilatjap*. Here the fertile and thickly-peopled coastlands are traversed by a railway running parallel with the seaboard. North of this line lies *Banjumas*, capital of the province of like name.

But the central station of the insular railway system is the city of *Solo*, or *Surakarta*, the ancient *Kartasura*, capital of one of the few remaining native "regencies." In population Surakarta holds the second rank, and would even be the first were Batavia and Meester Cornelis regarded as forming two really distinct cities. Its numerous quarters, lining the banks of the *Pepé*, a western

affluent of the Solo, occupy a vast space, in the centre of which stands the kráton, or royal palace. This structure, with its inner courts, harem, barracks, kiosks, and gardens, forms a town of itself, with a population of ten thousand within its

Fig. 79.—PATJITAN.

Scale 1 : 100,000.



enclosure. But close by is the Dutch citadel, whose guns command the Imperial court and all its surroundings.

*Jokjokarta*, or *Jokjo*, capital of the sultanate of like name, takes at present

only the fifth place amongst the Javanese cities; but it has preserved its national character far better than Surakarta, or any other town subject to European or Chinese influences. Jokjokarta, which in the last century bore the famous name of *Mataram*, lies at the southern foot of Merapi, fifteen miles in a straight line from the south coast. Like Surakarta, it groups its various quarters round about a central kraton, covering nearly a square mile in extent, and occupied by the Sultan and his numerous household. A few ruins of Hindu temples are scattered over the surrounding district, and on a hill to the south-east stands the highly-venerated necropolis of the Mataram princes.

Although lying so near the coast, Jokjokarta has no port, and the projected harbour on the nearest creek (*Manjiengan*) has not yet been constructed. Meanwhile the least remote port is that of *Patjitan*, which is formed by an indentation of the rock-bound coast, to the east of the "Thousand Hills." But this place communicates with the inland towns only by means of rugged paths traversing a thinly peopled territory. The district, however, contains rich deposits of fine marbles.

The elegant Sivaite temple of Brambanan, situated to the north-east of Jokjokarta, was the first discovered by the Dutch explorers. It was brought to light in 1797 by some engineers who found it buried beneath a mass of dense vegetation.

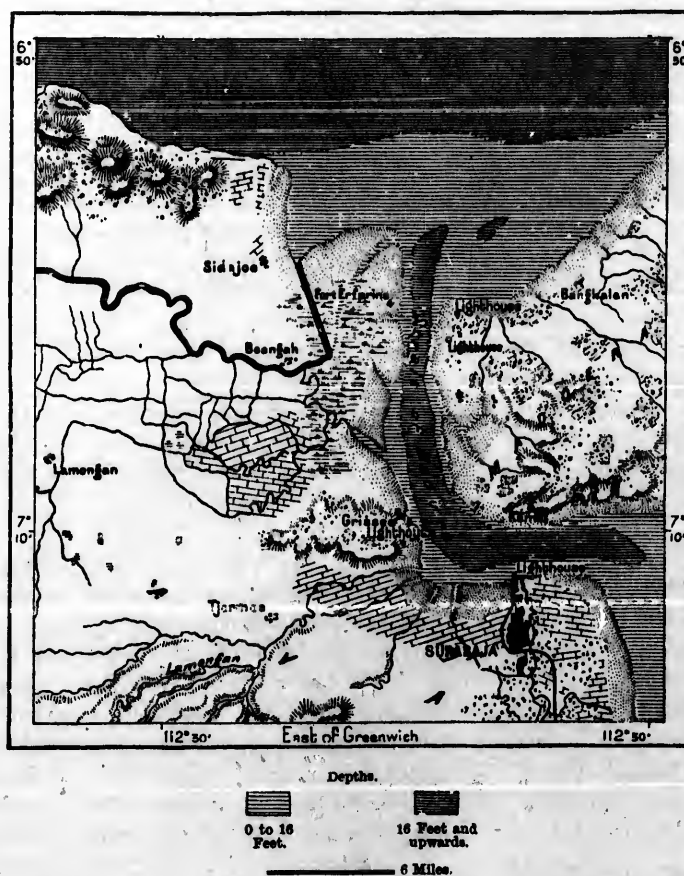
*Madiun*, capital of the province of like name, lies like Surakarta in the Solo basin on the banks of the Madiun, a navigable affluent of that great water-course. *Ngawi*, standing near the confluence, was formerly a vitally important strategical station on the frontier of the regencies, and is still a busy market. *Bojonegoro*, on the Solo, about the head of its delta, is also a considerable trading place, forwarding most of the supplies for the maritime cit., of *Tuban*; one of the most frequented ports on this coast. Although merely the chief town of a district, Tuban is a larger place than *Rembang*, capital of the province, which lies farther west on a bay bounded by the two volcanic headlands of Murio and Lasem.

*Surabaya*, metropolis of east Java, and for a time capital of the whole of Indonesia, is one of the great marts and the chief naval arsenal in the island. As a seaport it has taken the place of its northern neighbour, *Gresik* or *Grinee*, an old Arab settlement, whence Islam was propagated throughout the interior, and which became the residence of a powerful theocratic dynasty. The city of Surabaya proper stands on the left bank of the Brantas, its site having been gradually created by the deposits of this stream, which compelled the sea to retire some miles to the north. Here the strait of Trechter, separating Java from Madura, has preserved sufficient depth and width to give large vessels access to this perfectly sheltered and commodious roadstead. Certain quarters of Surabaya, intersected by canals in all directions, present the aspect of a Dutch town. But the commercial parts are encircled by the palm-groves of the native kampongs, while the European suburban villas of *Simpang* are embowered in dense tropical foliage. The ancient tombs still standing in a neighbouring suburb recall the arrival of the "Legendary People," that is, the Hindus. To them the local tradition refers the foundation of the great Mojo-Pahit empire, a Brahman State, which the Mohammedans at last overthrew in the second half of the fifteenth century.

The ruins of the Hindu capital are still seen strewn over the plains watered by the Brantas some 30 miles south-west of Surabaya, near the town of *Majo-Kerto*. The decline of Javanese civilisation since the arrival of the Europeans is here

Fig. 80.—SURABAYA AND MADURA STRAIT.

Scale 1 : 440,000.



illustrated in the perfect specimens of masonry seen in the remains of several brick edifices.

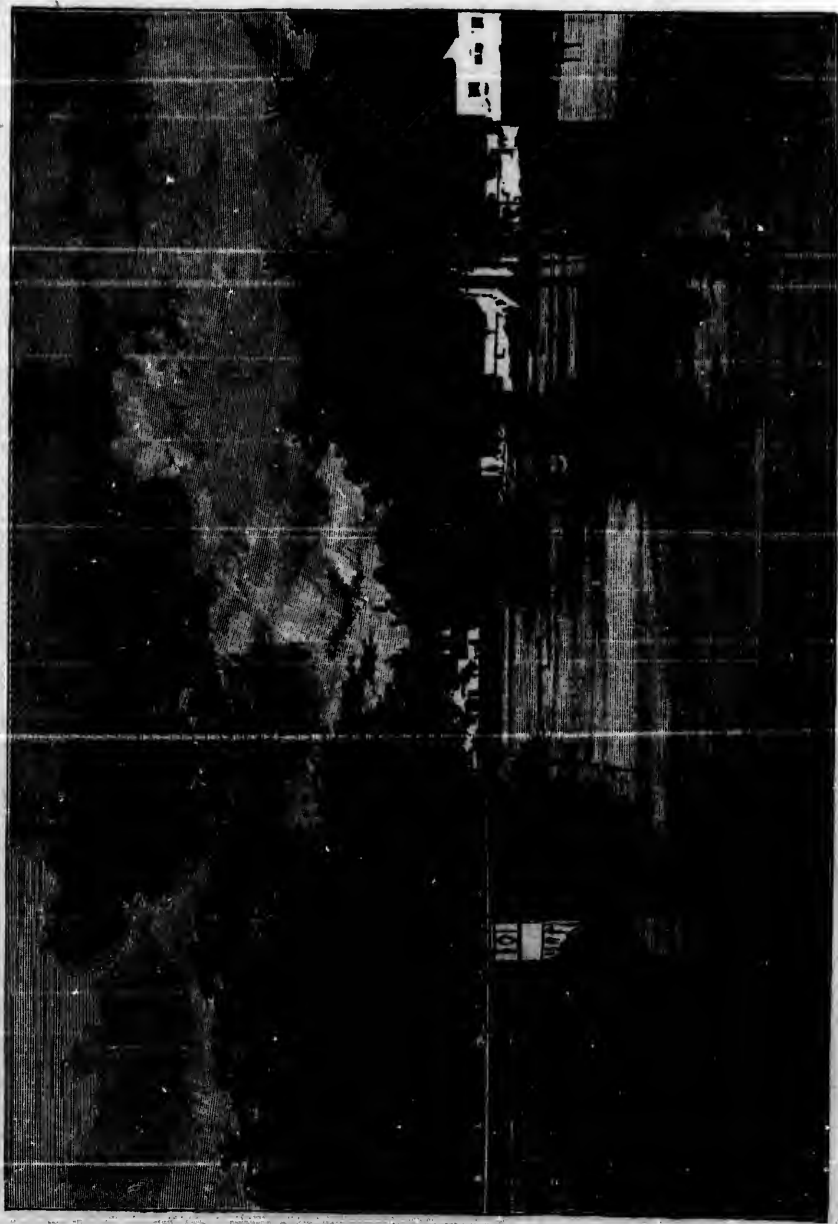
Higher up the Brantas river traverses the magnificent province of Kadiri, one of the earthly Edens of Java, but also one of those regions where the wretched inhabitants, brutalised by servitude, are moreover physically degraded by the use of opium. The upper bend of the stream, sweeping round the Kelut and Kawi mountains, comprises the *Malang* district, in which are situated the richest coffee and tobacco plantations in the island. At *Singosari*, near *Malang*, occur numerous

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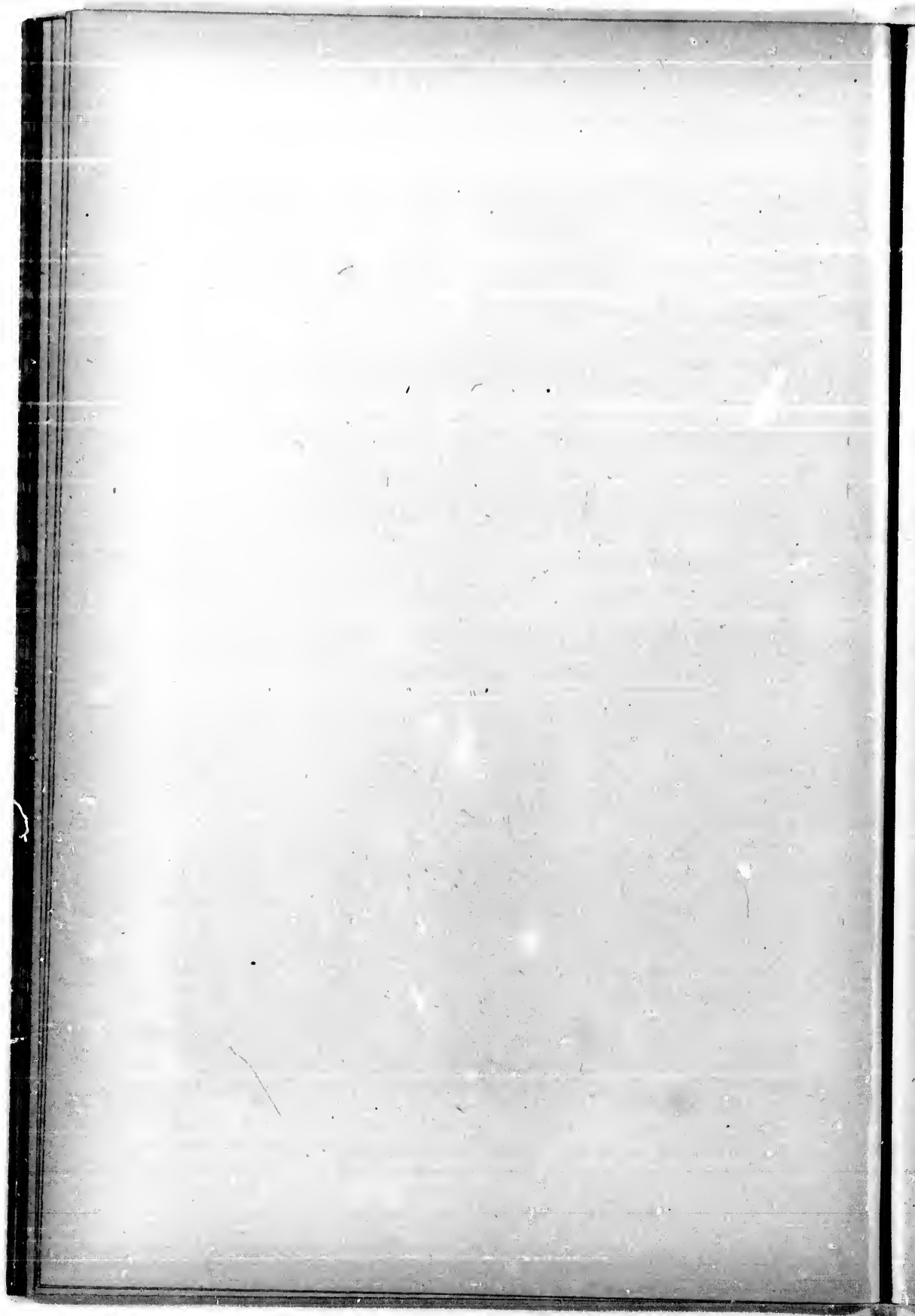
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VIEW TAKEN FROM THE GENTING BRIDGE, SURABAYA.





remains of Hindu structures, while the spurs and terraces of these highlands are also crowned with the ruins of ancient temples, now, for the most part, enclosed within the grounds of the residences belonging to the large landowners.

The village facing Surabaya on the opposite side of Madura Strait is the terminus of the steam ferry plying between Madura and the mainland. *Bangkalan*, the chief trading place in the smaller island, lies farther north on an open bay facing the high sea. This seaport is a much larger and richer town than *Pamekasan*, the official capital of Madura, which lies on a plain a few miles from Madura Bay. The chief industry along this coast is the preparation of salt for the Indonesian government. The Madurese cattle belong to an excellent breed highly valued throughout the Eastern Archipelago.

The island of Bawean, lying farther north and depending administratively on Surabaya, appears from the local dialect to be inhabited by people of Madurese stock. It has a brisk coasting trade, and yearly sends thousands of peasants and artisans to find employment in Java.

South of Madura Bay, *Pasuruan* is the first large Javanese town traversed by the railway beyond the old Mojo-Pahit gulf, which is now choked with alluvia. In this ancient Hindu settlement the customs of Indian origin are better preserved than in any other part of the island. The natives of the surrounding district still bring their offerings of foliage and flowers to the sources of the running waters, and worship the remains of sculptures in the ancient temples of Siva. *Tosari*, the chief health resort in east Java, stands 5,850 feet above sea-level on a spur of Mount Tengger, whence a superb view is commanded of the surrounding waters, plains and highlands.

East of Pasuruan, along Madura Bay, follow two other provincial capitals, *Probolingo* (*Banger*) and *Besuki*, both of whose roadsteads are very unsafe during the prevalence of the *ghendeng*, or stormy south wind, in the months of January and February. Still farther east, on the shore of a small inlet, lies *Panarukan*, which was formerly a great city and a chief centre of trade in the Eastern Archipelago. Here the Portuguese, under Affonso d'Albuquerque, established their first factory in Java. Beyond Panarukan the main highway, sweeping round Mount Ruan, reaches the town of *Banjuwangi*, or "Perfumed Waters," which stands on the strait separating Java from Bali. As a commercial mart this place has replaced *Blambangan*, which lies farther south on an estuary now choked with sands. Banjuwangi is the western terminus of the submarine cable connecting Indonesia with Port Darwin on the Australian mainland. The surrounding district, cut off from the rest of the island by trackless mountains, is the least densely peopled part of Java.

#### ADMINISTRATION.

The central authority enjoys almost absolute power in Java and the other islands, or "outer" possessions of Holland in Indonesia. The governor-general, representing the crown, is himself a sovereign, who has at his free disposal the

land and sea forces, who applies the laws passed by the Netherlands Parliament, and who even enjoys the privilege of issuing decrees in general conformity with the administrative provisions of 1854. His civil list, although recently diminished, still exceeds £13,000, besides travelling expenses. In his legislative work he is aided by a council of five members, who are proposed by him and nominated by the king, but who take no part in the executive.

Public opinion both in Java and Holland has hitherto in vain demanded for Indonesia the appropriation of its own budget, as well as some share in the administration. The natives retain nothing beyond a few tolerated rights in the management of the *desa*, or communal groups. A large section of the inha-

Fig. 81.—ADMINISTRATIVE DIVISIONS OF JAVA.



I. Bantam.	VI. Tegal.	XII. Jokjokarta.	XVIII. Surabaya.
II. Batavia.	VII. Banjumas.	XIII. Surakarta.	XIX. Pasuruan.
III. Preanger Regent- schappen.	VIII. Pekalongan.	XIV. Japara.	XX. Probolinggo.
IV. Krawang.	IX. Bagelen.	XV. Rembang.	XXI. Paski and Ban- juwangi.
V. Cheribon.	X. Semarang.	XVI. Medun.	XXII. Madura.
	XI. Kedu.	XVII. Kediri.	

bitants still consists of the so-called *manumpang*, that is, "houseless and homeless," with whom might till lately be compared the class of the *heimathlosen* in Switzerland.

Surprise is often expressed that so many millions should obey the orders of a person who has at his disposal so few material forces. The army scarcely exceeds thirty thousand men, of whom only one half are Europeans, and even these include Belgian, German and other mercenaries or adventurers. Whites and natives of diverse races, half-castes, Negroes, Arabs and Hindus, serve together in the same battalions, but grouped according to colour in distinct companies, and commanded by a relatively small number of European officers. In accordance with Eastern usage the troops may reside in the barracks with their permanent or temporary families, which at times even accompany them on short military expeditions. It is an exclusively colonial service, and even for the Atjeh war no Dutch troops have ever been despatched to the East Indies. But the better part of the fleet belongs to the national navy.

The European element is directly administered by the governor-general, while

for the natives the fiction is still maintained of a certain local rule by the descendants of their ancient princes. The various provinces are divided into regencies, whose "regents" or titular chiefs are members of the former dynasties. Although nominated by the crown, these *adhipatti* and *tumenggung*, that is, regents of the first and second class, have always the prestige commanded by wealth, for they enjoy stipends ranging from £800 to over £7,000, besides a share in the produce of the land. But at their side are the Dutch residents and assistants—prefects and sub-prefects—who, although keeping more in the background, represent the real authority. Even in the secondary divisions the *vedono*, or native officials, are held in check by European controllers, these Dutch functionaries numbering altogether about three hundred. They are even gradually replacing the Javanese officials, who will doubtless sooner or later disappear altogether.

In the two *Vorstlanden* ("principalities") of Surakarta and Jokjokarta, the old régime is still kept up with its primitive outward formalities. Surakarta officially obeys a *Susuhunan* ("emperor"), while Jokjokarta is ruled by a sultan; but both alike are controlled by a Dutch resident, without whose sanction they cannot even leave their palaces for a stroll in the neighbourhood. The monopolies formerly enjoyed by them have for the most part been bought up by the Dutch Government.

A supreme court of justice for the whole of the Dutch possessions has its seat in Batavia. Java itself is divided into three legal circuits, corresponding to the natural divisions of the land, and under these courts, located in Batavia, Semarang and Surabaya, secondary tribunals are established in the provinces, regencies and districts. Each resident, assistant, and controller is at the same time a magistrate who pronounces sentences in conformity with precedent and after formal consultation with the Mohammedan assessors learned in the Moslem law and the local usages. The communal mayors also enjoy a certain discretionary power for repressing crime and awarding penalties, and the same privilege, though to a less extent, is possessed by the heads of the Chinese communities, the mayors, captains, and lieutenants, as they are called, being charged with the maintenance of order amongst their fellow countrymen.

Capital punishment, though not yet removed from the colonial penal code, is rarely enforced. The native convicts are for the most part employed on public works, in the arsenals and dockyards, on the road and canals. Except in the large towns, there are no local police, the communes being directly responsible for the preservation of peace in their several jurisdictions.

The "colonial" revenue, two-thirds of which is applied to local purposes, is partly derived from the sale of the coffee raised by forced labour, the other chief sources of income being the sale of land and the opium and salt monopolies. About a third of the budget is applied to defensive purposes, and another third to the administration properly so called. The actual revenue is much larger than would appear from the official returns. Including the statute labour and estimating this burden at the lowest rate, it amounts, according to Brooshooft, to not less than £10,000,000.

Java and Madura constitute twenty-two administrative provinces, which with their capitals, areas and populations will be found tabulated in the Appendix.

#### BALI.

Bali, or "Little Java," as it is often called, is in fact geologically a fragment of the great island from which it is separated by a channel little over two miles wide, and in one place only 53 feet deep. Yet this narrow strait has sufficed to impart a certain local character to the flora and fauna, as well as to the native population. From the historic point of view Bali is, so to say, a fossil Java; while the latter has become Mohammedan, the former has remained Hindu in religion, customs, institutions, and, to a certain extent, even in speech. Hence the historical and linguistic relations of Bali, owing to their unusual interest, have been carefully studied, somewhat to the neglect of its present material and social condition. No systematic census has yet been taken; but according to official documents this island, like Java, is one of the most densely peopled lands in the world, about 1,340,000 human beings being here crowded together in a space not exceeding 4,300 square miles.

Bali presents the general outlines of an elongated triangle, with apex pointing towards Java and base turned towards Lombok. Hills of eruptive formation run west and east, disposed in ridges or isolated masses without any apparent regularity. Bakungan, the first of the volcanic peaks, rises to a height of 4,800 feet over against the Javanese town of Banjuwangi. The much more elevated Batu Kau (9,700 feet), occupies very nearly the geometrical centre of the island. Its central cone is enriched by a number of lakelets, and north-east of this point stands the still active Batur (6,420 feet), whose twin craters emit columns of vapour accompanied by a rumbling noise. Streams of molten lava flowing down its eastern flank have reached and nearly evaporated a lovely blue lake at its foot. According to the local legend Batur is the abode of a god, whose wife dwells in the waters of the lake.

South-eastwards follow other volcanoes apparently extinct, such as the Gunong Abang (7,650 feet), and the Gunong Agung, that is, the "Great Mountain," called also the Bali Peak, whose bare yellowish cone rises 10,520 feet above the sea. At the eastern extremity of the island stands the Seraya volcano (4,125 feet), now a vast ruin, whose crater and upper parts were blown away during a prehistoric eruption. South of these igneous masses the plains are strewn with volcanic scoriæ, beyond which occur a few hills of tertiary formation, such as Badung connected by an isthmus with the mainland, and the insular Nusa Penida or Pandita, that is, "Isle of Priests."

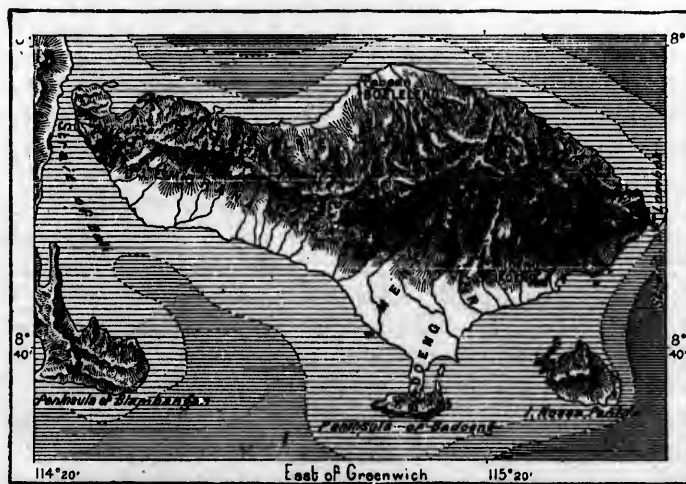
Despite an abundant rainfall Bali is too small to develop any important running waters, and most of the rivulets even run dry during the south-east monsoon. The surface water is almost entirely absorbed in irrigating the rice-fields, which are carefully cultivated by the native peasantry, and which cover nearly all the productive land. The primeval forests have entirely disappeared, and with them

all rapacious beasts, except a few tigers which still prowl about the brushwood on the mountain slopes.

The Balinese, akin to the Javanese, are somewhat taller and more robust; being also less inured to serfdom and freer from the direct control of their Dutch masters, they have a more resolute attitude and prouder glance. On the uplands goitre is very common, in some districts more than half of the population being afflicted by this affection, which, however, according to Jacobs, is here never accompanied by cretinism, as in the Alps and Pyrenees.

Two quite distinct dialects are current, the "low" or primitive Balinese, differing greatly from Javanese and showing more affinity with the idioms of the

Fig. 82.—BALL.  
Scale 1 : 1,500,000.



eastern islands, and the "high" Balinese, which differs from the "high" Javanese mainly in the large number of words it has borrowed from the Kavi, or sacred language, still spoken by the priests and men of letters. As in Java, the servile classes are obliged to use the high language in addressing their superiors, who reply in the low language.

Hindu culture appears to have penetrated far more deeply amongst the Balinese than amongst the Javanese. The persistence of the Hindu religion in the smaller island may be due partly to the immigration of refugees from the Mojo-Pahit empire in the fifteenth century, and partly to the arrival of settlers direct from the Coromandel coast. Officially, the whole population is still divided,

as in India, into the four castes of the Brahmans, Kshatryas, Vāīyas, and Sudras. But these primordial groups are again subdivided into numerous sub-castes, while the ancient Balinese nobility constitutes a special class between the Vāīyas and Sudras. All these distinctions are maintained by inveterate custom with pitiless ferocity. The daughter of a Brahman marrying a man of lower position is thrown to the flames, and her lover sewed up in a sack and drowned. Even in the provinces under direct Dutch control, public opinion compels the magistrates to banish any young persons violating the laws of caste. Brahmans have often been known to slay their own daughters guilty of this offence. Nevertheless, inter-crossings are frequent, both Brahmans and nobles having the right to take from the lower ranks as many wives as they like, the offspring of such unions inheriting the paternal caste.

The Balinese are still worshippers of the Hindu trinity, and everywhere is to be seen the tricolour flag, red, white, and blue, symbolising the Creator, Preserver, and Destroyer. But the effigies of Brahma and Vishnu have for the most part been replaced by those of Durga and Ganesa. Buddhist influences also persist under the outward forms of Brahmanism, and Siva, by far the most popular deity, is invoked as a beneficent god. In other respects the Balinese have little religious zeal, and display no intolerance towards those of other religions. Some thousands of the lower caste have even become Mohammedans, in order thus to improve their social position. But since the murder of a missionary in 1881, all further attempts to propagate Christianity have been discontinued. The thousands of Hindu temples scattered over the island are obviously too numerous for the faithful, for many are in ruins and no one thinks of repairing them. The religious ceremonies observed with the greatest fervour are those connected with husbandry. These agricultural islanders delight in processions round their fields, in worshipping at the little bamboo shrines of the goddess of the crops, and crowning themselves with chaplets of flowers after abundant harvests.

The religious jurisprudence is excessively harsh, and severe public penances are frequently imposed in order to avert any fancied forebodings of evil. Till recently certain ill omens required the shedding of human blood, at times accompanied even with the most atrocious tortures. One of the hideous devices of the priests was to stretch their victims on the sharp points of young bamboos and leave them to linger for days until released by death from their unspeakable agony. The wives of Brahmans and of princes were morally bound to perish in the flames kindled to consume the bodies of their husbands, and twenty years after the last case of suttee in India, Bali still had its holocausts of widows.

The Balinese live almost exclusively on rice, other cereals, and fruits, pork being the only flesh permitted by the priests, who, however, never touch it themselves. The extensive cocoanut groves yield large quantities of oil, and domestic industries as well as agriculture are even more developed than in Java. The jewellers, metal-chasers, and armourers are very skilful, while the women weave and dye beautiful cotton and silk textiles.

Public instruction stands at a high level, and, although there are no schools,



Fig. 83.—PALACE OF THE SULTAN OF BULELENG, BALI.

most of the men and women of the upper castes can read and write Balinese and



even Kavi. Thousands of books circulate amongst them on history, theology, jurisprudence, ethics, poetry, and the drama. According to Van der Tuuk, who formed a rich library of this extensive literature, the Balinese poem of *Tantrya* is at least partly the original source of the *Arabian Nights*. The people often gather of an evening to assist at theatrical performances, the subjects of which are mostly Hindu and local mythologies. The actors, all of the Brahmanic caste, use the sacred language, as was formerly the case in Java, and in these "mysteries" the ancestors of the Balinese are figured as *rakshasas*, or giants.

But the native civilisation has, for the last two centuries, entered on a period of decline. The early travellers speak of flourishing seaports, and well-kept highways connecting the large towns; now trade has fallen off, and the country is mainly traversed by rough tracks. This decadence must be attributed to the use of opium, now prevalent amongst all classes, to the constant civil wars, to the slave-hunting expeditions which have wasted the coastlands, and lastly to the degradation of woman, now reduced to a mere object of barter.

The two western provinces of Jembrana and Buleleng, lying nearest to Java, are subject to the direct administration of the Dutch. The town of *Buleleng*, near the coast, is the chief residence of the officials, and ranks as the capital although destitute of any harbour.

The seven remaining provinces have been left under the control of protected princes, who still enjoy certain sovereign rights, but whose military power was broken during the sanguinary wars of 1840 and 1849. Although deprived of all real power, they maintain the outward show of mighty potentates. They are approached with much prostration, and at their death all their subjects have to shave their heads in sign of mourning. They inherit some of the effects, of the women, and slaves of those dying without direct heirs, and of all criminals sentenced to banishment. But in these matters the princes themselves are the judges, and whenever it suits them, they have merely to mount their stately tribunal, and award to themselves any coveted estates.

The principality of *Bangli*, which lies to the east of Buleleng, is the "Holy Land" of Bali, for here is situated the Batur volcano. But the province of *Kalung-Kung*, on the south-east coast, ranks first in national importance. The chief, although now one of the least powerful in the island, is, nevertheless, the "Great Man," to whom all the other princes pay homage.

*Gyanyar*, lying west of Kalung-Kung, is the most densely peopled territory in Bali; its great fertility, generally flourishing condition, and relatively mild administration attract a constant stream of immigrants to this favoured principality. The conterminous state of Badung, on the south coast, was formerly the chief centre of trade, but is now almost destitute of inhabitants, the slave trade having converted it into a wilderness. The western principalities of *Tabanan* and *Mengwi* are both said to be thickly inhabited. The eastern province of *Karang-Assem* is included within the jurisdiction of the Rajah of Lombok. Since 1882, both Bali and Lombok belong to the same administrative division of the Dutch possessions.

A table of all the provinces with their respective areas and populations will be found in the Appendix.

LOMBOK.

This island, so called by the Europeans from a village on the north-east coast,

Fig. 84.—LOMBOK STRAIT.  
Scale 1 : 500,000.



is known to the natives by the name of Selaparang or Selaparan, and to the Malays as the Tanah Sasak, or Land of the Sasak people. It presents about the same superficial extent as Bali, but is less known owing to the more rugged character of the land, and the lower state of culture of its inhabitants. Since the middle of the eighteenth century it has been a political dependency of Bali, although the Balinese themselves form but a fraction of the population.

The Strait of Lombok separating the two islands, although little more than twenty miles broad at its narrowest point, has a depth of no less than five hundred fathoms. This apparently unimportant channel may thus be said to form the natural limit of the shallow Java Sea, which has an average depth of considerably less than one hundred fathoms. The current in the Strait sets with a mean velocity of four miles an hour in the direction from south to north, and Wallace has shown that for the distribution of animal and vegetable species this passage forms in many respects the chief parting-line between the Indian and Australian Domains. The Areng palm (*arenga saccharifera*) is not found in Lombok, which also lacks the teak, orchids, heaths, and mosses peculiar to the Javanese flora.

In the animal kingdom the differences are still greater, Lombok possessing neither the tiger nor any other members of the feline family. Most of the Javanese and Balinese birds are also unknown in the neighbouring island, which on the other hand possesses several Australian species, amongst others the remarkable *megapodius gouldii*, a species of turkey, which buries its eggs under a heap of earth and foliage 6 or 7 feet high and 40 in circumference. Here also are found the Australian cockatoos, which, however, reach as far west as the islet of Pandita (Penida), separated only by shallow water from Bali. But the transition of species may be followed from island to island, and according to Martin, the true parting-line between the Asiatic and Australian forms should be placed rather to the north-west of Timor.

Like Java and Bali, Lombok is intersected by two parallel ridges, sedimentary in the south and volcanic in the north. The former, which scarcely exceeds 1,000 feet in height, is continued both east and west beyond the coast-line, and is intersected at certain points by a few prominent masses of scoriæ. It is also connected with the northern volcanoes by some still older eruptive tufas, which form in the centre of the island a water-parting for the streams flowing in one direction towards Lombok Strait, in another to that of Allas.

The volcanic chain begins over against Bali with Mount Wangsit (4,000 feet), which is followed eastwards by several other extinct cones. The system merges towards the middle of the range in the massive Renjani group, from the centre of which rises the peak of Api, or "Fire," whence are still emitted wreaths of sulphurous vapour. The highest summit of this group, usually known as the Lombok peak, is one of the loftiest, if not the culminating point of Indonesia; but this majestic cone has not yet been ascended, and its altitude is variously estimated at from 11,000 to 13,800 feet.

The Sasaks, who form the great bulk of the population, differ physically but little from the Balinese and speak a language of the same stock, but approaching nearer to the Sumbawa dialect, although written with the Balinese alphabet. The natives are all Mohammedans, but display little religious fervour, as is shown by the general absence of mosques. Politically they are subject to the Balinese intruders, who are represented by a colony of about twenty thousand scattered over the western parts of the island.

*Mataram*, the capital of the kingdom, lies on a plain about four miles from the east coast. The neighbouring port of *Ampanan* is a flourishing place composed of four Kampongs, which are inhabited by as many distinct nations: Malays, Balinese, Bugis of Celebes, and Sasaks. Mataram, where the Balinese alone enjoy the privilege of riding on horseback, is a well-kept place with broad streets lined by shady banyans. A little to the south lies the Sasak village of *Karang-Assem*, which was the capital of Lombok before the Balinese conquest; but since the year 1849 it has been subject to the foreign rajah.

The rolling plains stretching east of Mataram towards the Sasan hills are described by Wallace as perhaps the most highly cultivated in the whole of Indonesia. For a space of some hundred square miles all the streams are distributed with admirable art in a network of irrigating canals, which encircle the flanks of the hills, and rise from terrace to terrace like the seats of an amphitheatre. "Each terraced plot consists in some places of many acres, in others of a few square yards. We saw them in every state of cultivation: some in stubble, some being ploughed, some with rice-crops in various stages of growth. Here were luxuriant patches of tobacco; there cucumbers, sweet potatoes, yams, beans, or Indian corn varied with the scene."\*

The chief crops are rice and coffee, which are shipped at Ampanan. The Sasaks also export a small but fiery breed of horses and a peculiar species of duck, which walk nearly erect like penguins, and which are locally known as "Balinese soldiers."

In Lombok the penal code is very severe, theft and adultery being capital offences. In certain cases torture is even inflicted before death, and gamblers and opium smokers are punished with the bastinado. The rajah, who is represented in the Balinese province of Karang-Assem by a viceroy, maintains a force of about 20,000 men, well drilled and supplied with the best fire-arms.

#### SUMBAWA.

Sumbawa, the correct form of which is Sambava, is larger than Bali and Lombok taken together. It really consists of several distinct lands, which a slight subsidence would decompose into a small archipelago, and which a corresponding upheaval would connect with the neighbouring islets, such as Moyo in the north, Sido and Tengani in the south-east. Towards the centre Sumbawa contracts to a narrow isthmus scarcely twelve miles across, and here a broad inlet penetrates from the Sunda Sea far inland, ramifying here and there into lateral creeks completely sheltered from all winds. Farther east the coast is again indented by similar fjords, such as Tjempi Bay on the south and Bima on the north side.

The surface is for the most part mountainous, developing distinct masses of eruptive origin, and comprising altogether as many as twenty-two active or extinct

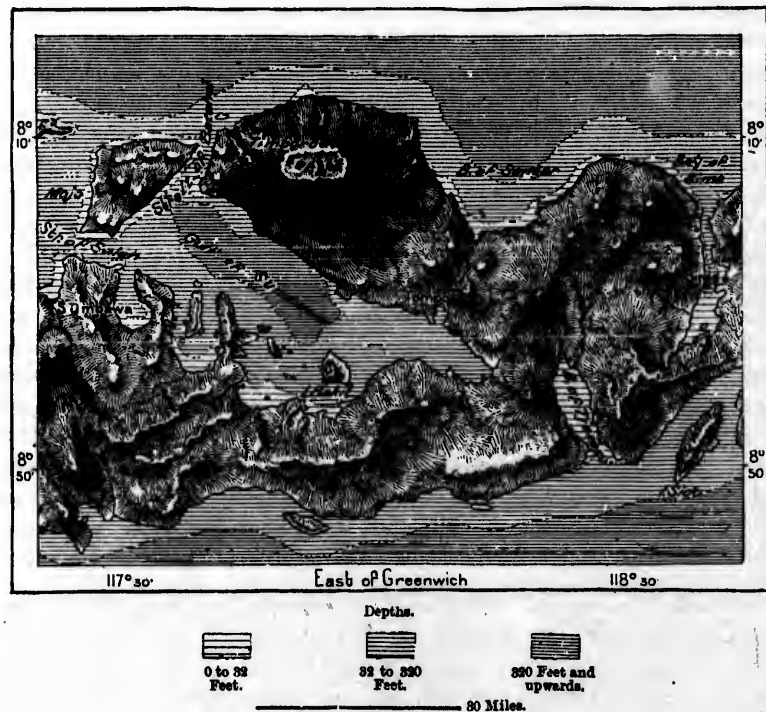
\* *The Malay Archipelago*, fifth edition, p. 164.

craters. In the south, however, occur some sedimentary formations, which form an eastern continuation of the Javanese, Balinese and Lombok limestone system. The south-western extremity of the island also consists of a non-volcanic promontory terminating in a regular plateau, which, like so many similar formations elsewhere, takes the name of Tafelberg or Table Mountain.

The Ngenges (5,370 feet) and Lanteh (5,260 feet) volcanoes in the west are succeeded farther east by the far more imposing Timboro (Tomboro, Tambora), which projects on the north side beyond the normal coast-line, its broad slopes

Fig. 85.—CENTRAL PART OF SUMBAWA.

Scale 1 : 1,500,000.



here completely filling an extensive peninsula. At present its loftiest peak rises to a height of 9,900 feet; but it is said to have had an elevation of over 13,000 before the year 1815, when it still formed the culminating point of the Eastern Archipelago. But on the evening of April 5th in that year, a tremendous explosion took place, which was heard as far as Celebes, Borneo, and Sumatra, and which was accompanied by a prodigious shower of ashes burying all the surrounding lands and waters in darkness for ten consecutive days. In the neighbouring seas the floating masses of pumice exceeded a yard in thickness, and

these débris represented at least 150, and according to some authorities over 500, cubic miles of matter ejected or blown from the mountain on this occasion. The 12,000 inhabitants of the surrounding district were all buried under the rain of scorie; but probably as many as one hundred thousand perished during the famine and epidemics caused by the destruction of the forests, the loss of cattle, the ruin of the irrigation works and the general havoc spread over the adjoining islands by this terrific outburst. Over 40,000 Sasaks died of hunger in Lombok, and the population of Sumbawa, which in 1815 was about 170,000, was still only 75,500 in 1847. Even at present the Timboro peninsula remains almost a complete desert.

Throughout a great part of Indonesia the "night of ashes" was long considered the chief event in history, and served as the starting point of a new chronological era.

The eastern part of Sumbawa is often agitated by violent earthquakes, and here also are numerous volcanoes, such as Dindi (5,160 feet), Soro Mandi (4,570 feet) and Aru Hassa (5,520 feet) near the north coast, and towards the south-east angle Sambon (4,730 feet), and Lambu (4,650 feet). Lastly the islet of Sangean, called also Gunung Api (6,900 feet), is still in a constant state of agitation, emitting at short intervals jets of vapour and ashes.

The Malayan inhabitants of Sumbawa have been much influenced by the cultured peoples of Celebes, with whom they carry on a large part of their trade, and by whom they have long been governed. The Bugi language of South Celebes is current, with other Malay dialects, in some districts of the north coast, while that of Macassar is the only literary standard in the island. Nearly all the natives profess Islam, but some groups of Orang Dongo, or "Highlanders," occupying the forests south of Mount Aru Hassa, are still pagans, though preserving a few practices dating from the early visits of the Hindu missionaries to their mountains. They call the spirits by the Sanskrit name, *deva*, and offer them fruits and flowers. At night torches alone are used, the light of lamps being regarded as ill-omened. The property of the departed is shared equally amongst all the kindred, a share being also reserved for the deceased. The cattle are sacrificed on their graves, and the other articles burnt or buried for their use in the other world. These highlanders keep aloof from all direct contact with Europeans, and their barter with the outer world is confined to certain clearings in the forests on the verge of their territory.

*Sumbawa*, capital of the western state which bears the same name, lies on a bay on the north coast exposed to the north-west winds. At the time of the Timboro explosion, only twenty-six of the inhabitants escaped alive, but at present it has a mixed population of natives and Celebes immigrants numbering altogether about six thousand. This place exports cotton, sandalwood, sapanwood (*cæsalpinia*, or "red wood"), and an excellent breed of ponies.

*Bima*, on the east side of the bay of like name, is almost the only market in the section of the island lying east of Timboro. It is the capital of a native state which also comprises the old breached crater of Gili Banta, east of Sapi strait, the

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Komodo group, a few other islets, and the Mangkarai district in the west part of Flores. Formerly the large island of Sumba also formed part of this state. The port of Bima is one of the best in Indonesia. The inlet, which here penetrates over fifteen miles inland, is no less than sixty-five fathoms deep at its entrance, and opposite the capital, where it expands to a land-locked lake, it affords large vessels perfect shelter in depths of from twelve to eighteen fathoms. The European merchants and the Dutch officials who keep the sultan under control, reside in a separate quarter known as the *Kampong Wolanda*, or "Dutch Village." In the neighbourhood are some Hindu tombs, dating probably from the epoch when this part of Sumbawa was tributary to the Javanese Empire of Mojo-Pahit. Here also have been discovered some undecipherable inscriptions, whose origin is unknown.

#### FLORES, SOLOR AND ALLOR ARCHIPELAGOES.

These members of the "Little Sundas" constitute so many links in the long chain of volcanic islands which stretches eastwards to Timor, and then curves gently round north-eastwards to Nila. Flores and its eastern neighbours are entirely of igneous origin, lacking even the sedimentary limestones that are continued from Java through Bali and Lombok as far as Sumbawa. The southern headlands of Flores are all volcanic mountains with extinct or still active craters.

Although abounding in natural products of all sorts, these lands have hitherto been somewhat neglected by their European masters. The vast Indonesian Empire is too extensive to have yet been systematically surveyed and opened up throughout its whole extent. Till 1859 the Dutch and Portuguese were still contending for the eastern part of Flores and the adjacent archipelagoes, and although all were then assigned by treaty to Holland, their exploration has since remained nearly at a standstill. No accurate returns have yet been made of the population, which is roughly estimated at about four hundred thousand for Flores and the Solor and Allor groups, which have a collective area of 9,000 square miles.

Conspicuous amongst the chain of volcanoes stretching along the north side of Flores are Rokka, or Ombuu Soro (6,900 feet), and farther east, in the Endehe district, a name sometimes applied to the whole island, Gunong Keo, or Roma, believed to be the culminating point (9,200 feet). South of the village of Endehe (Ambogaga) rises the Gunong Api, and the natives report to the north of the same place the Gunong Kingo, which is said to have been the scene of several eruptions during the historic period. At the south-east corner of Flores stands the double-crested Lobetobi volcano, one of whose cones, the Laki-Laki, or the "Man" (7,160 feet), is always smoking, while the other, Perampuan, or the "Woman" (7,460 feet), is covered on the inner walls of its crater with incrustations of sulphur.

The extinct Kabalelo (7,500 feet) commands one of the passages of Larantuka Strait, facing the island of Solor; the strait itself takes its name from another volcano, called also Ilimandiri (5,180 feet), at the north-east extremity of Flores. This moun-

tain is at present quiescent, but at its foot are numerous thermal springs, through which the subterranean heats still manifest themselves. Near the village of Geliting on the north coast, mention is made of another crater, which, however, has not yet been identified.

South of the Tanjong Bunga, or "Promontory of Flowers," whence the Portu-

Fig. 86.—LARANTUKA STRAIT.

Scale 1 : 1,000,000.



guese term, Flores, a channel about 1,300 yards broad at its narrowest part separates this island from the islet of Adonaré, and farther south from Solor, which, although the smallest member of the group, gives its name to the archipelago stretching east from Flores. Adonaré is much more populous as well as larger, and farther east follows the still more extensive Lomblém. The two islands of the



Allor group, Pantar and Ombai, visited by Pigafetta, companion of Magellan, and described by him under the name of Maluva, are also larger than Solor, while round about the chief lands are scattered a large number of reefs and islets. All are hilly and from many lava streams have been discharged. The highest cones are Lamahalé (3,000 feet), in Adonaré, and Lobotollé (4,900 feet), which forms the northern headland of Lomblem.

The inhabitants of Flores and of the neighbouring islands are of a mixed character. Those of the coastlands, who for the most part speak the Malay dialect of Bima, belong to the same group as the natives of Sumbawa, and, like them, construct their dwellings in the Malay fashion on the solid ground, and not raised on piles after the manner of the Papuans. Nevertheless the natives of the interior both in Flores and Solor appear to have a darker complexion than those of the seaboard, and are said to betray both in their features and usages a marked affinity to the Papuan inhabitants of New Guinea. Like the peoples of Sumbawa and Lombok, nearly all claim to be followers of the Prophet. But the Portuguese, who, down to the middle of this century, occupied the eastern part of Flores with the adjacent archipelagoes, displayed far greater zeal than their Dutch successors for the conversion of their pagan subjects. Hence some of the Malays in these islands still call themselves both "Portuguese" and "Christians." They may even have some Portuguese blood in their veins, and priests from Timor pay occasional visits to their communities in order to baptise the children, solemnise marriages, and bless the graves of the departed.

*Larantuka*, an old Portuguese stronghold at the foot of the volcano of like name and on the west side of Flores Strait, has become the capital of the Dutch possessions in these waters. The place is yearly visited during the north-west monsoon by a fleet of native craft from Celebes, returning with the south-eastern trade-winds, and exchanging textiles, pottery, and hardware for mother-of-pearl, sea-cucumbers, edible birds'-nests and other local produce.

The Celebes traders also visit a few other seaports, such as *Adonaré*, in the island of the same name, *Lawayang*, capital of Solor, and *Allor Katjil*, at the north-west extremity of Ombai. These places with their archipelagoes all depend administratively on the province of Flores, while the district of Mangeraai in Flores itself is attached to Sumbawa.

#### SUMBA.

This island, called also "Sunda," although lying in the deep waters of the Indian Ocean outside the line of the Sunda Islands proper, forms a little world apart from the surrounding lands. Separated from Komodo and Flores by an arm of the sea some 60 miles broad and over 100 fathoms deep, its quadrilateral mass is disposed, not east and west, parallel with the Little Sundas, but in the direction from north-west to south-east. It possesses no active volcanoes, and igneous rocks appear to occupy but a small portion of its surface. Nearly the whole of the island, in fact, is believed to be of sedimentary formation. The south coast consists

entirely of limestone cliffs pierced by caverns, which are frequented by myriads of edible-nest builders. Towards the centre the somewhat level surface presents the aspect of a plateau rising to a height of 2,000 feet above the sea, and developing ranges of hills and mountains only on the north side.

Amongst the numerous names, such as Sumba, Chandana or Chindana, given to this island, there is one, that of Sandalwood, which it scarcely deserves any longer, for this valuable tree, which formerly covered the coast-lands, almost entirely disappeared during a terrific explosion and is now found only in the heart of the island. There are two varieties, the red and the grey, the latter being the more valued and much used in the powdered state as a cosmetic and medicinally. Sumba also possesses some gold deposits, and was regarded as one of the legendary "Golden Isles."

Notwithstanding the generally peaceful disposition of the natives, who are divided into numerous small communities, the interior is still little known. The estimate of the population, till recently ranging from 200,000 to 1,000,000, is at present about 400,000, a relatively large number for an area not exceeding 4,300 square miles. The people are all of Malay stock, but speak a peculiar dialect unintelligible to the surrounding populations. Like their eastern neighbours of the Savu group, they have preserved the worship of ancestry mingled with rites and tenets which attest Hindu influence. Thus they speak of a trinity of mysterious deities, the Good, the Protector, and Evil One: but the offerings of the "elders" are made, not to these superior beings, but to the ocean waves, to the forest trees, to the rocky headlands and the graves of their forefathers. There are neither temples nor priests, unless the heads of families and the old men of the tribe can be regarded as such. In the Savu islands, however, the title of priest is borne by the executioner, who beheads the criminals condemned by the rajahs.

*Nangamesi*, on the north coast, where there is a small Arab trading settlement, is the chief market in Sumba, and from this port are forwarded hardy little ponies to all parts of Indonesia and even to Mauritius and Australia. This island jointly with the Savu group (Great Savu, Ranjuna, and Dana) constitutes an administrative district dependent on Timor. The population of Savu exceeded 30,000 in 1869, when half of the inhabitants of the archipelago were swept away by an outbreak of small-pox. At present the population is estimated at 16,000 in a total area of less than 200 square miles. According to Wallace the natives resemble the Hindus or Arabs in physical appearance much more than they do the Malays.

#### TIMOR AND ROTTI.

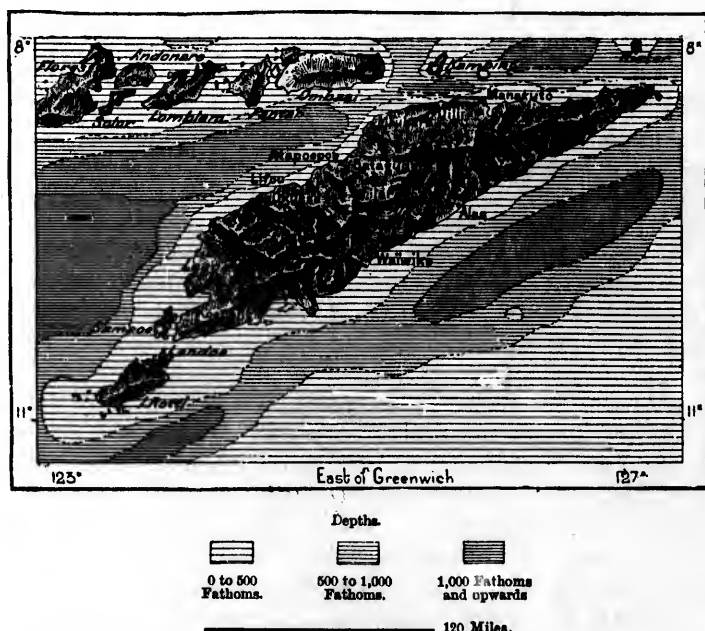
Like Sumba, Timor, largest of the Little Sundas, lies beyond the line of volcanic islands. Disposed in the direction from south-west to north-east, it forms an acute angle with that chain, which, in crossing, it appears to have deflected from west and east to the same south-west and north-east direction parallel with itself. Hence the links of the Sunda volcanic chain lying farther

east bend round to the north-east in such a way as to continue the axis of Timor as far as Nila. It seems, therefore, probable that in the general modelling of the terrestrial crust, Timor and these islands have been subjected to a common process of folding in some remote geological epoch.

Like Sumatra and Madagascar, Timor presents towards the Indian Ocean a far more regular coast-line than towards the inland northern waters. Notwithstanding its geographical importance at the south-east corner of Indonesia over against Australia, it has been so little studied that the population can only be approximately estimated. Politically it is divided in nearly equal proportions between Portugal and Holland; but the Portuguese half, which depends administratively on Macao, and which comprises fifty-four "kingdoms," some still com-

Fig. 87.—TIMOR AND NEIGHBOURING ISLANDS.

Scale 1 : 5,500,000.



pletely independent, is said to have a population of half a million, while the Dutch section appears to contain scarcely half that number.

The Malay term Timor, that is, the "East," shows that this island long formed the eastern limit of navigation in Indonesia. According to tradition the natives were savages, ignorant of agriculture, and living only on the chase and fishing, when the first Malay immigrants landed on the south coast, where is now the petty state of Waiwiko-Waihali. These settlers, who introduced rice and maize and iron implements, are said to have come from Ternate towards the close of the

fourteenth century, and soon made themselves masters, everywhere imposing dynasties supposed to owe a certain vague allegiance to the Sultan of Ternate.

The first European arrivals were the Portuguese, who appear to have secured a footing at Lifau, towards the middle of the north coast, about the year 1520. Soon after they raised a fort at Kupang, now the chief station of the Dutch, who first made their appearance in 1613. The desolating wars of the two rival powers and their native allies were continued almost uninterruptedly down to the present century, when they were replaced by diplomatic negotiations, the treaty of 1859 finally settling the question of the frontier line between the respective states.

According to the partial explorations round the coast and in the interior, Timor seems to present a backbone of mountains and plateaux, consisting mainly of schists, sandstones and limestones; but on both slopes these older formations underlie chalks and argillaceous deposits of great thickness. The coral reefs fringing the south-west coast have gradually been upheaved several hundred yards above the present sea-level. In some places the rocks of the primitive system tower up above the surrounding formations in the form of obelisks and citadels, one of which, Mount Leeu, in the south-west, attains an elevation of 4,000 feet. Farther east follow still more lofty peaks, although within the Dutch or western province none of the summits reach an altitude of over 6,500 feet.

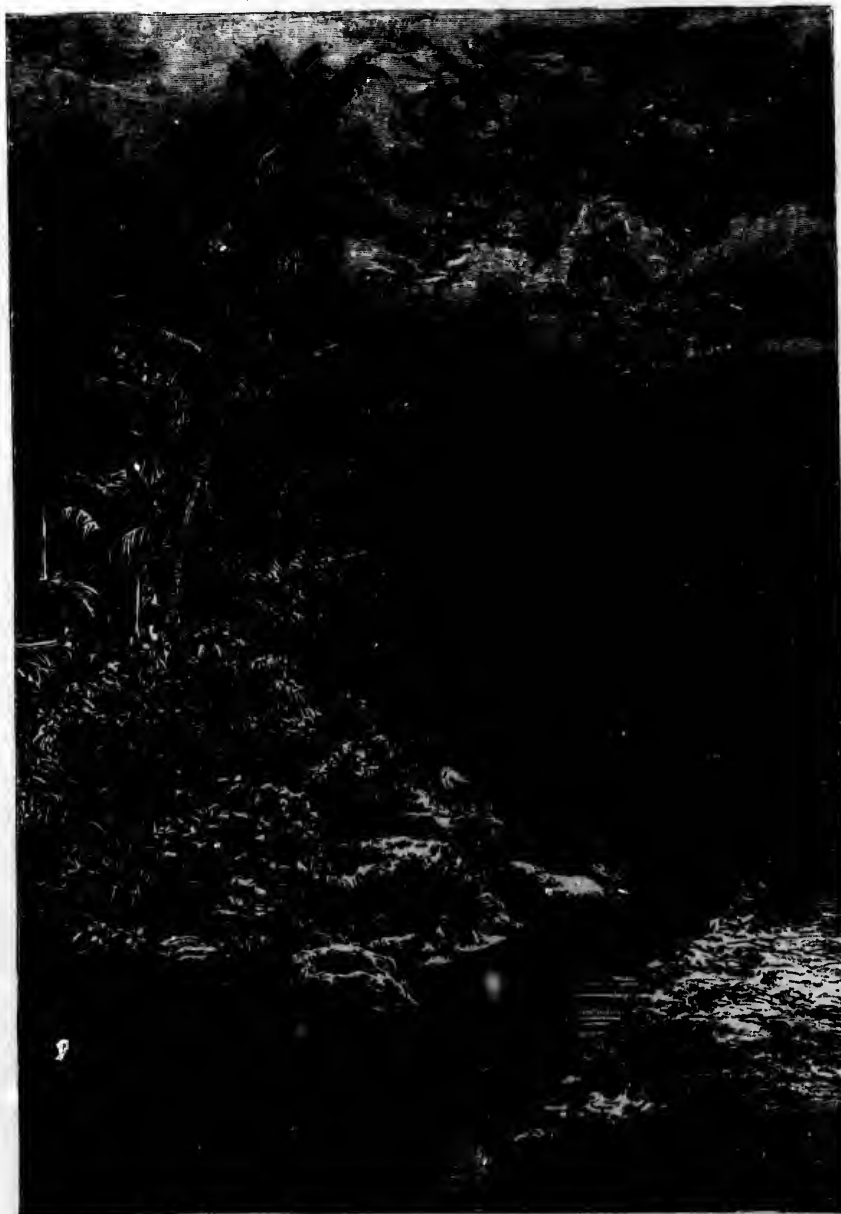
In the Portuguese division the surface is of a more rugged aspect, and here the Kabalaki peak, visited by H. O. Forbes, exceeds 10,000 feet, while Mount Allas, close to the frontier and near the south coast, is said to rise 11,500 feet above the Indian Ocean. The existence of true volcanoes has not yet been placed beyond doubt, although mention is made of a Mount Ilun-bano in the west, which was the scene of an eruption in 1856, while Bibiluto in the Portuguese territory is said to have ejected ashes the following year. In several districts porphyries and serpentines have cropped out above the sedimentary rocks, and the islet of Kambing, between Samau and the south-west extremity, terminates in a sort of crater, within which are several mud volcanoes, 10 to 30 feet high, resembling the Sicilian *macalube*. Mud volcanoes also occur in Landu, between Samau and Roti.

In Timor the seasons are much more sharply defined than in the large islands of Western Indonesia. During the south-east monsoon, prevailing from May to October, the winds blowing from the neighbouring Australian continent bring no moisture, the vegetation withers, and wherever the slopes are covered with grasses or scrub, they assume red, yellow, or greyish tints. The brooks and even the rivers run dry, and are not again flushed till the return of the western monsoon, when vegetation revives and the land resumes its verdant aspect. The northern slope of the island enjoys the most copious rainfall, and consequently here the streams are most voluminous, the forests most extensive, and the population most numerous and prosperous. But the southern slope is far from being so arid or unproductive as it has been described by travellers who have visited it only during the dry season.

The same contrast between the two slopes is also presented by the respective

floras and faunas. The side facing Australia abounds most in forms characteristic

Fig. 88.—VIEW TAKEN IN A FOREST NEAR KUPANG, TIMOR.



of that continent, while the opposite side belongs more to the animal and

vegetable zones of the Sundas and Moluccas. But Timor is on the whole comparatively poor in biological species, and in this respect forms part rather of the Australian than of the Asiatic world. Here occurs the eucalyptus, a peculiarly Australian plant, while the vegetation of the interior often recalls the African flora.

The only feline animal is a long-eared wild cat, and the largest quadruped is a species of deer resembling one found both in Java and the Moluccas. The only member of the simian family is the *Cercopithecus cynomolgus*, and two-thirds of all the mammalian species belong to the widespread bat family. The most dreaded animals are the green trigonocephalus and the crocodile, from whom the rulers of Kupang claim descent. At the accession of a new rajah, his subjects thronged to the waterside to render homage to his saurian relatives: the first that came to the surface was regarded as his Majesty's cousin; a beautiful maiden, gaily decked and perfumed, was presented to him as his consort and devoured amidst the applause of the multitude.

The natives of Timor are not classed with the Malays properly so-called, and appear to be more akin to the Bornean Dayaks. Despite the statements of several writers, there are no dark or Papuan tribes in the island, all the inhabitants of which have the light, yellowish complexion of the Malay, and differ from each other rather in their dress and arms than in stature or features. They are divided into a large number of distinct clans or communities, speaking according to Crawford as many as forty different idioms. The largest ethnical group is that of the Ema-Velus (the Belunays of the Dutch), who occupy all the eastern section and a great part of the centre. They claim to have come from the Moluccas, and attribute the same origin to their western neighbours, the Timorese properly so-called; whom, however, they also call Ema-Davan, or "Javanese."

Some Bugis, Chinese and European traders are settled in all the seaports, and a half-caste people, the so-called "Black Portuguese," have become established especially in the northern principalities of Ambenu, Okussé and Noimuti, forming a Portuguese enclave within the Dutch-frontier.

The natives who have not yet been brought under the influence of the Protestant and Catholic missionaries have a somewhat developed animistic form of religion. They worship Usi-Neno, "Lord of Light," who dwells in the Sun, and whose wife is the moon. The stars are the abode of an inferior order of deities; but while paying reverence to these remote divinities, the Timorese address their supplications chiefly to the natural objects round about them, the mountains and rocks, trees, running waters, and the like; they also make offerings to the souls of the departed, who are regarded as the indispensable intermediate agents for all communications between man and the higher divinities.

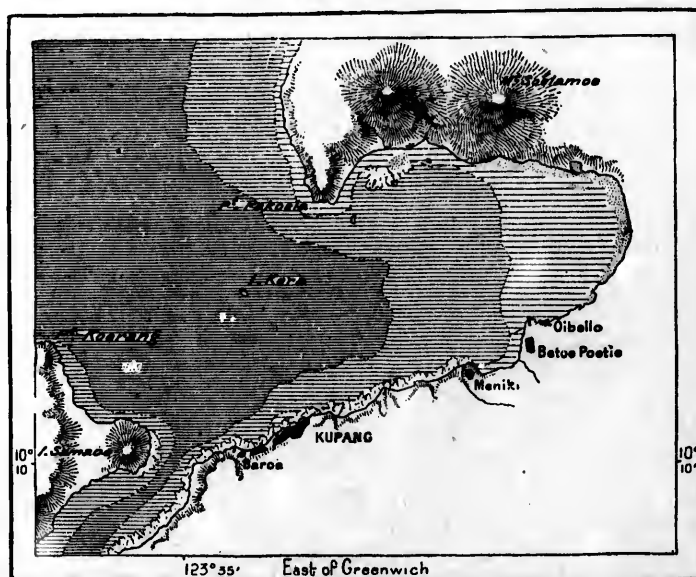
The laws of *pomali* or *taboo* are as intricate and as carefully observed as amongst the Polynesians and some Malagasy tribes. In fact the religious ideas pervading the oceanic regions are so uniform that they can scarcely have been independently evolved, and point rather at a common civilisation at one time diffused throughout the whole area from Madagascar to the remote South-Sea Islands.

In Timor every village has its temple hid away in some sacred grove and surrounded by a stout enclosure. Each petty state has its special sanctuary, a hallowed spot which the profane dare not approach, for in it dwells the *lulik*, or tutelar genius, seated in the centre of the edifice on a stone cast down from heaven by the Lord of Light. There are also evil spirits, to which are sacrificed black victims, the animals with red coats being reserved for the protecting deities.

The Timorese tattoo various parts of the body with thorns, file the teeth to a point, and often dye them red "in order not to look like apes." The usages

Fig. 89.—KUPANG.

Scale 1 : 800,000.



connected with marriage and inheritance differ greatly in the different districts. In some places exogamous, in others endogamous rites prevail. In one tribe the succession is from father to son: in another through the female line. The young men in some communities can neither marry nor enter the public assemblies until they have carried off one or more heads, as in Borneo, but only in open warfare or else at funeral ceremonies. The penal code is very severe, death being the penalty for most crimes; but as ransom is allowed, the poor are the chief victims.

As in many other places, the rulers, "children of the sun," never die, but only

fall asleep, and are not buried till long after the beginning of the "trance." In some districts they are exposed in open coffins on the branches of the trees; in others the wives have to keep them night and day for months together, until reduced to the state of dried mummies, and then buried with all their treasures beneath cairns corresponding in height to the rank of the deceased. They were formerly accompanied by an escort of slaves, as they still are by a dog to lead the way in the region beyond the grave. To prevent their return, the route followed by the funeral procession is carefully blocked by a strong bamboo palisade.

*Kupang*, capital of the Dutch territory and of the neighbouring islands, is one of the unhealthiest places in Indonesia. It lies at the south-western extremity of Timor, on the south side of a deep inlet too confined for the air to circulate freely. Yet its official position and safe harbour have made it the chief trading place in the island, with a motley population of about seven thousand Timorese, Malays, Chinese and Europeans. Its principal exports are sandalwood, horses, excellent oranges and beeswax. The neighbouring fishing grounds and oyster beds yield great varieties of fish, besides pearls, tortoise-shell, sea-cucumbers and shark's fins for the Chinese market. The people of Rotti prepare large quantities of a much-esteemed palm wine, and rear an excellent breed of little ponies, "about the size of Newfoundland dogs."

*Atapupu*, another seaport on the north coast near the Portuguese frontier, lies in the province of Filarang, which is said to be one of the richest in copper ores, though mining operations have scarcely yet been seriously begun.

*Dilli*, administrative centre of the Portuguese territory, is a less important place than Kupang, and appears even to have entered on a state of decline, the population having fallen from over five thousand about the middle of the century to little more than three thousand in 1879. It is even a more unhealthy town than its Dutch rival, but has the advantage of a good roadstead, from which it presents a pleasant appearance. Its exports are chiefly coffee of superior quality, wax, and sandalwood; rice being the staple import. The wheat grown on the plateaux and slopes to a height of about three thousand feet is much esteemed. North of Dilli rises the steep rock of Kambing, the only islet beyond Timor which the treaties have left to the Portuguese; it has a population of about two thousand.

#### THE ZUID-WESTER (SERWATTY) ISLANDS.

These "South-western" groups, so-called because mostly lying to the south-west of Amboyna, their administrative and commercial centre, are better known by their English name Serwatty, which, in fact, is a corruption of the Dutch "Zuid-Wester." The southern and more numerous islands form an eastern extension of Timor, of which they are, so to say, merely scattered fragments. But the central chain, of which Wetter forms by far the largest link, belongs to the volcanic Sundanese system, while Gunong Api (the "Burning Mountain"), with a few scattered rocks farther north, are supposed by Junghuhn to constitute the eastern



extremity of another igneous range indicated at intervals by a few islets rising above the surface.

But however they may differ in their sedimentary, volcanic, or coralline origin, the Serwatty groups resemble each other in their political and commercial history. The most striking in form and relief are naturally the igneous islands, conspicuous amongst which is the superb but now smokeless cone of Gunong Api. Wetter (Wetta), facing the north coast of Timor, is traversed by a line of craters, amid which the timid natives have taken refuge. Kisser (Kissa), lying farther east and nearest to Timor, is also mountainous, and in the last century was chosen as the administrative centre of the whole group; but it suffers from a deficient rainfall, and its inhabitants have often been driven by famine to emigrate to the surrounding lands. Roma, which follows to the north-east, is on the contrary productive enough to export some of its superabundant produce. The chain is continued north-eastwards through Damma, with its smoking crater and thermal springs, to Nila, with a still active cone, and Sarua, the last eastern links in the Sundanese igneous system.

The southern chain, stretching between Timor and Timor Laut, begins with Letti, most densely peopled of all the Serwatty Islands; it is followed eastward by Moa, also very populous and noted for its peak, the "Buffalo," which looks like a reduced copy of Teneriffe. The neighbouring Lakor is a mere coral bank rising little more than twenty feet above the surface. Luang is also fringed with reefs, where are taken the most highly prized sea-cucumbers in the whole archipelago. Sermatta, forming a long chain of steep hills with no accessible creek, is little visited by skippers, whereas Babber (Baba), with its numerous islets, including the lovely little Wetang, is much frequented by native craft.

During the last century, when the Company kept a factory and a fort in almost every island, the natives of Serwatty had mostly become Christians, adopting a dark costume and European names as an outward sign of their conversion. In 1825 and 1826 the chaplain accompanying Kolf's expedition had scarcely landed in a village, when he was surrounded by these "Christians," entreating him to solemnise their marriages and baptize their children. Some could still read and write, and, as they were nearly everywhere looked on as a superior race, they had succeeded in imposing a kind of slavery on those natives who had remained pagans. Their authority is now all the greater that they claim the title of Anak Company, or "Children of the Company," on the ground of descent from European fathers and native women. But of late years Islam has made considerable progress in the Archipelago. The natives of several islands, especially Wetter and Kisser, are designated by the name of Alfuru; a term, however, which has no ethnical value, and which is indifferently applied in many places to the indigenous inhabitants, whatever their origin, that have hitherto resisted Mohammedan and Christian influences.

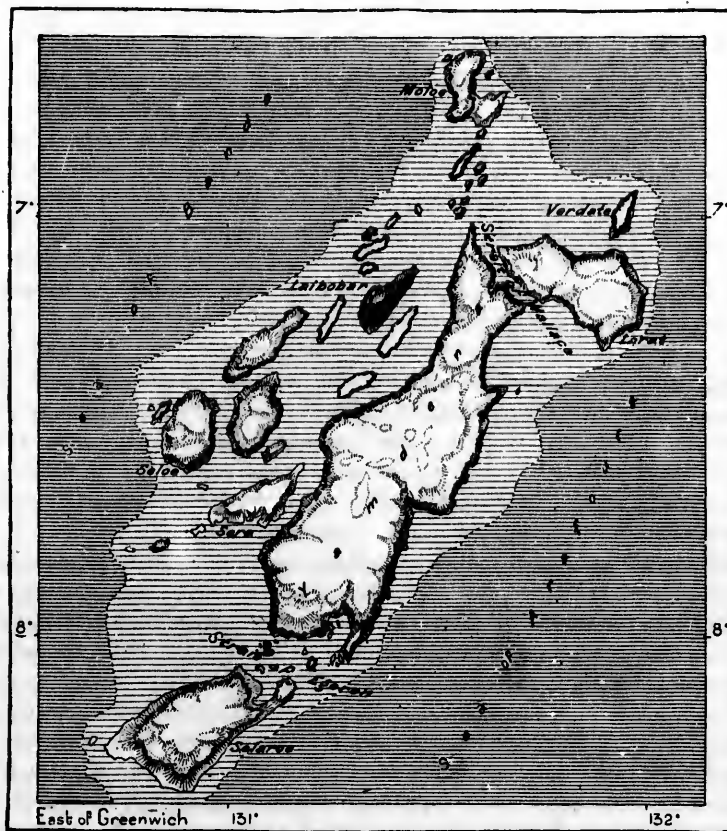
#### THE SOUTH-EASTERN GROUPS: TENIMBER AND KEL.

These groups were named the "South-Eastern Islands" by the Dutch in reference to Amboyna, their chief political and trading station in those distant waters.

On the other hand the Macassar navigators gave to the largest of the Tenimber Archipelago the name of Timor-Laut, or "Seaward Eastland," to indicate its position in reference to Celebes. From the geographical standpoint they may be regarded as collectively forming the eastern limit of the Indonesian world; beyond

Fig. 90.—TENIMBER.

Scale 1 : 1,700,000.



them flows the Arafura Sea, whose shores are inhabited by Papuan and Australian populations.

These thinly-peopled islands have not yet been thoroughly explored, and even the coasts are here and there still traced with uncertain lines. Till recently

Tenimber (Tanah Imber) was supposed to stretch uninterruptedly to the southern extremity of the Archipelago, and this error still figures on most maps. Yet the natives are quite aware that their territory is divided into two distinct islands, to each of which they give a special name. Owen Stanley had already stated in 1839 that Tenimber comprised several separate islands, and in 1878 the *Egeron*, a ship from Banda, traversed the channel between Yamdena and Selaru, varying from eight to forty fathoms in depth, and presenting several excellent havens on both sides. But the hydrographic survey of the group is still far from complete, and so recently as 1888 a hitherto unknown island two miles long was discovered at the south-west extremity of the Archipelago.

The two chief islands, consisting of limestone rock, are almost everywhere low, and the highest point of the whole group is the volcanic islet of Laibobar, off the west side of Yamdena, rising, according to Forbes, to a height of about two thousand feet. The islet of Larat, separated by the navigable Wallace Strait from Yamdena, is also low, but beyond it rises the precipitous islet of Verdate, at the northern extremity of the Tenimber group. The archipelago is skirted on the west side by a parallel line of islets and reefs, which, lying mostly in shallow water, are little accessible to shipping.

Owing to the porous nature of the calcareous soil the rain-water almost everywhere disappears without forming fertilising streams; hence, vast tracts have remained barren and uninhabited. Some of the slopes are, nevertheless, clothed with dense brushwood, where the cattle, let loose by the early navigators, find a refuge from the native hunters. Large herds of wild boars infest the neighbourhood of the villages; but Tenimber, like most of the Moluccas, has no monkeys, and its fauna generally presents a New Guinea aspect.

The natives recognise no rulers, although certain individuals claim the empty title of chief. In appearance they resemble the Malays much more than the Papuans, although they are evidently a mixed race. Both sexes slightly tattoo the forehead, cheeks, breast, and hands, and the women deck themselves with bracelets and necklets of red glass beads. The wealthy natives convert into heavy rings and ear ornaments the gold coins they take in exchange for their holothuræ and tortoise-shell; in the decoration of their praus and dwellings they also display far greater artistic taste than their Malay neighbours. They have hitherto resisted the proselytising attempts of the Arabs and other Mohammedans. Nevertheless they worship a supreme deity, Dwadilah, symbolised by a sacred post and other rude images set up in front of their dwellings. They also believe in a future state for themselves and all living beings, and the fisherman never fails to return to the sea a portion of his capture, so that the soul of the fish may swim away to the spirit world.

The Kei (Ké) Islands were probably so named by the Portuguese, for the term appears to be identical with that of the *Keys*, that is, the *Cayos*, of Florida. Lying nearer to Banda and Amboyna than Tenimber, this group, to which the surrounding populations give the name of Evar, or Hog Islands, has been brought more under Mohammedan influences. They manufacture earthenware, and build excellent

praus, which are exported to all the neighbouring archipelagoes. Two-thirds of the inhabitants are centred in Great Kei, the largest member of the group; but *Dula*, the most frequented station, lies in Little Kei, on a deep inlet well sheltered by a chain of insular hills. Recently some planters have settled in the islands, the chief products of which are holothuræ and tortoise-shell, both of excellent quality.

#### CELEBES AND ADJACENT ISLANDS.

Celebes, which in extent takes the third, in population and commercial importance the fourth place in Indonesia, vies with Java itself for romantic beauty and the variety of its natural phenomena. It consists, so to say, of a framework of peninsular ranges, radiating from a central nucleus, and enclosing extensive marine inlets, which, unlike those of Borneo, have not yet been transformed to alluvial plains. Northwards the peninsula of Gorontalo and Minahassa sweeps round in a double curve to the north and east. In the centre two other peninsular masses project north-east to the Molucca waters and south-east to the Banda Sea; lastly, in the south is developed the Macassar peninsula, stretching due south to the Flores Sea. Thanks to this extraordinary conformation Celebes, with an area of about 75,000 square miles, has a coastline of no less than 3,500 miles, excluding the secondary indentations. In other words, although little over one-third the size of France, it has a seaboard equal in extent to that of France and the Iberian Peninsula taken together.

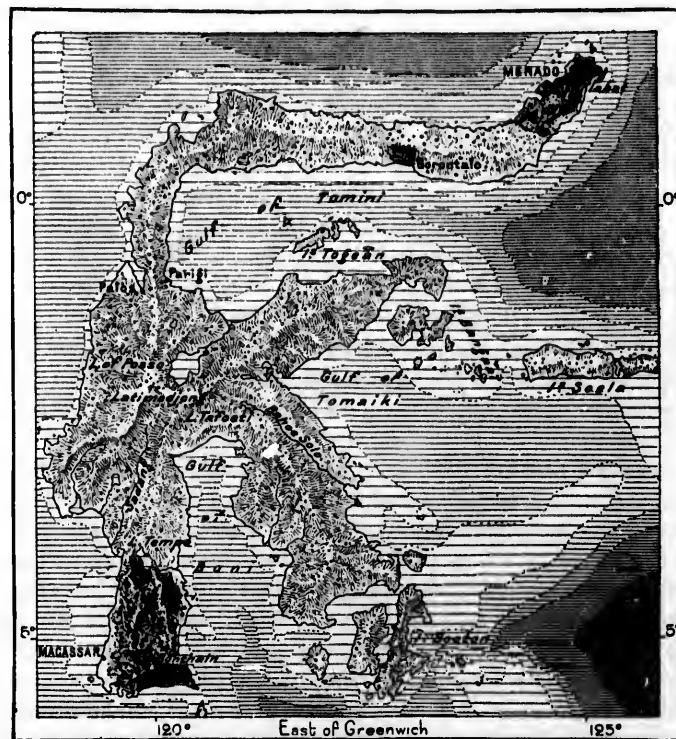
This eccentric island, everywhere so easily accessible from the sea, and, moreover, enjoying an extremely fertile soil and a superabundance of natural resources, is nevertheless almost destitute of inhabitants. Were it as densely peopled as Java, it would have a population of some thirty millions, whereas, according to the approximate estimates the actual population is little over three-quarter of a million. But although nominally under the Dutch rule, most of the interior is still occupied by Alfurus, that is, wild tribes for the most part living in isolated and hostile groups. In many places head-hunters still prowl about the villages, and till recently the neighbouring waters were infested by corsairs, continually sweeping down on the natives and carrying them off into slavery. Nor was the Dutch occupation effected without many sanguinary struggles, not always to the advantage of the invaders. The Europeans appeared first as guests, and the early conflicts were connected with questions of trade rights. Then the Dutch presented themselves as rivals of the Portuguese in 1660, when they seized the fort of Macassar, long their only possession on the coast. Later they concluded a treaty of alliance and a protectorate with several petty states in the south-western peninsula, and since that time they have omitted no occasion of strengthening their position in the island. Yet in most of the inland states they are still unrepresented by any officials, and even the coast districts are visited only at long intervals.

Celebes has not yet been completely explored, and some parts are known only

in a general way. The Latimojong highlands, which form the central nucleus, and from which flow the largest rivers, are one of the least known regions, and travellers have hitherto failed to form an estimate of the elevations. According to Schneider the main range, beginning at Cape Palos (Donggala) on the west coast, runs south-east towards the Latimojong mountains, beyond which it traverses

Fig. 91.—EXPLORED REGIONS OF CELEBES.

Scale 1 : 8,000,000.



The finished parts of the map represent the regions completely surveyed by the Dutch.

the south-eastern peninsula. The framework of these highlands consists of gneiss and granites, which in some places crop out above the secondary and tertiary rocks of both slopes. A lateral ridge of gneiss, radiating from the central nucleus, forms the backbone of the Balante peninsula, while that of Macassar, traversed in 1888 by Weber and Wichmann, is also dominated by crystalline or paleozoic ranges,

which, however, are not disposed parallel with the coasts, but run in a transverse direction towards the south-west, one of them terminating in the granite headland of Cape Mandhar. Farther south rises the isolated mass of Dikbuik, better known by the name of Bonthain, or Bantaeng, from the town at its foot. Bonthain, which was found by Weber and Wichmann to be of volcanic origin, as already suspected by Beccari, is the culminating point of Celebes (10,270 feet).

The south-east corner of the Macassar peninsula is continued seawards by a few islets and the long, hilly island of Salayer (Saleyer), or Limbangang, with heights exceeding 3,000 feet, and at one point attaining an altitude of 5,840 feet. A curious and hitherto unexplained phenomenon is the glow of light observed in the evening at both extremities of Salayer during the prevalence of high winds. Salayer is itself continued southwards by other islets, such as Tambolongang, Pulasi, Rusa, Tanah Jampea, and Bonerate, which belong administratively to Celebes, and which like Buton, at the extremity of the south-eastern peninsula, may also be regarded as forming part of the same geological system.

Although no volcanoes have been discovered in the central parts, there can be no doubt that in remote times Celebes was the scene of considerable eruptions. In several districts, and especially near Maros, in the province of Macassar, the limestone formations rest on basalt rocks, which here and there even crop out above the sedimentary deposits.

The northern peninsula, attached to the rest of the island by a low, narrow isthmus, forms geographically and geologically a distinct region. East of Tomini, where the isthmus is contracted to a width of about 18 miles, and commanded by the lofty Mount Donda (9,500 feet), the peninsula is traversed by chains of gneiss and auriferous quartz hills, and at the point where it trends towards the north-east more recent lavas and scorix have burst through the other formations. Here rises the Saputan volcano (6,170 feet), the theatre of

Fig. 92.—SALAYER.

Scale 1 : 900,000.

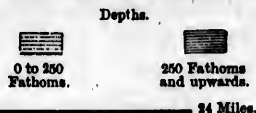
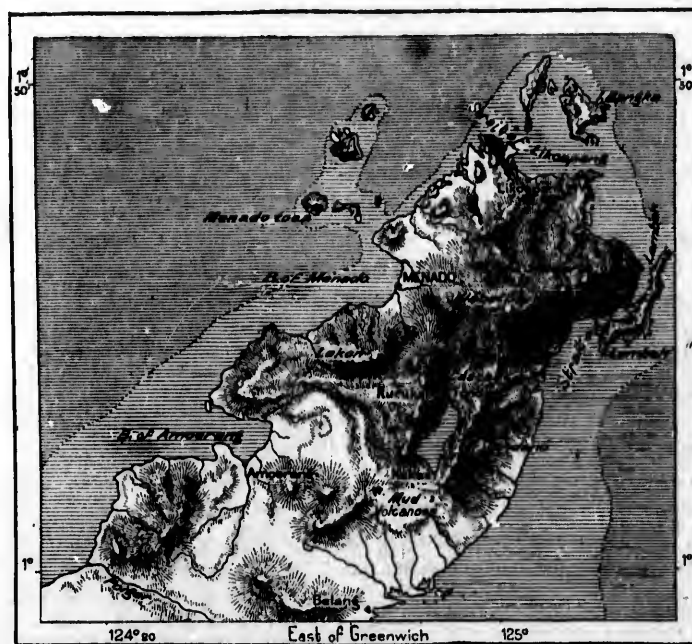


several disturbances during the present century. In the neighbourhood are the thermal waters and still active mud volcanoes of Panghu.

Towards the northern extremity of Minahassa follow other volcanoes, such as the twin-crested Klabal (6,800 feet), the Duwa Sadera, or "Two Sisters" (4,550 feet), and Lakon (5,570 feet), all visible as far as Ternate. This igneous system is continued in a northerly direction seawards, thus connecting Indonesia with the Philippines at the southern headland of Mindanao. Several of the intervening

Fig. 93.—MINAHASSA.

Scale 1 : 1,800,000.



islets are still active volcanoes, and Duang (Ruang), west of Tagulanda, forms a cone 1,720 feet high, which emitted flames in 1856. Siao, lying farther north, is often wrapped in smoke, and in the larger island of Sanguir (Sangi) rises the superb volcano of Abu, which has been the scene of several disastrous eruptions during the last two centuries.

The peculiar conformation of Celebes prevents the development of any large rivers. Nevertheless certain ranges are so disposed as to form longitudinal plains where the streams run for a considerable distance parallel with the coast before

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Fig. 94.—THE TONDANO CASCADE, MINAHASSA.



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between two oblique mountain ranges in the Macassar peninsula, has a length of no less than 240 miles. On the eastern slope of the same peninsula the copious river Tjeurana, fed by several northern and southern tributaries and by the shallow Tempe (Tamparang) lagoons, is navigable for boats for some 60 miles from its mouth. Of the other lacustrine basins one of the most romantic is Lake Tondano, which lies at an altitude of 2,000 feet near the northern extremity of Minahassa. After piercing a winding gorge the emissary of this basin suddenly plunges from a height of 490 feet into a rocky cirque, whence it escapes through a broad valley northwards to Menado.

#### CLIMATE, FLORA, AND FAUNA OF CELEBES.

Like Borneo, Celebes is crossed by the equator, which leaves the three southern peninsulas in the Austral, that of Minahassa in the northern hemisphere; hence the mean temperature is high, ranging from about 90° F. in the day to 70° F. at night. But these extremes are usually tempered by the alternating land and sea breezes, which prevail round the whole periphery of the island. The rain-bearing clouds brought by the south-eastern and north-western monsoons being intercepted by the inland ranges discharge an abundance of moisture on both slopes, but especially in the Macassar peninsula, which is exposed to the "bad monsoon." Thus with a yearly rainfall varying from 40 to 160 inches, Celebes seldom suffers from drought, and in other respects enjoys one of the most salubrious climates in Indonesia.

Its flora almost rivals in splendour and variety that of the Sunda Islands; its forests even appear more beautiful, having to a large extent preserved their primeval aspect, especially in the wonderful Minahassa peninsula. But while the indigenous flora is closely allied to that of the western islands, the fauna presents considerable differences. Separated by deep waters from the surrounding lands, Celebes appears to have enjoyed its insular independence long enough to impart an original character to its fauna. Lying midway between Asia and Australasia, it possesses some species belonging to both of these zoological areas; but it also presents numerous forms quite distinct from either, and often more allied with African than with Indian or Australian types. Amongst these are the *Cynopithecus nigrescens*, a baboon occurring nowhere else in Indonesia except the small island of Batian; the *Anoa depressicornis*, with the horns of the antelope, but by many naturalists classed with the bovine family, and greatly resembling certain African species; the famous *Babirussa*, half pig, half deer, with four spiral tusks. There are no felines, but five varieties of the squirrel, and two marsupials, Celebes being the extreme eastern and western limit of the former and latter respectively.

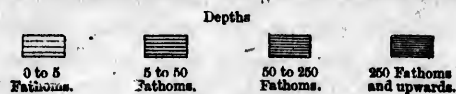
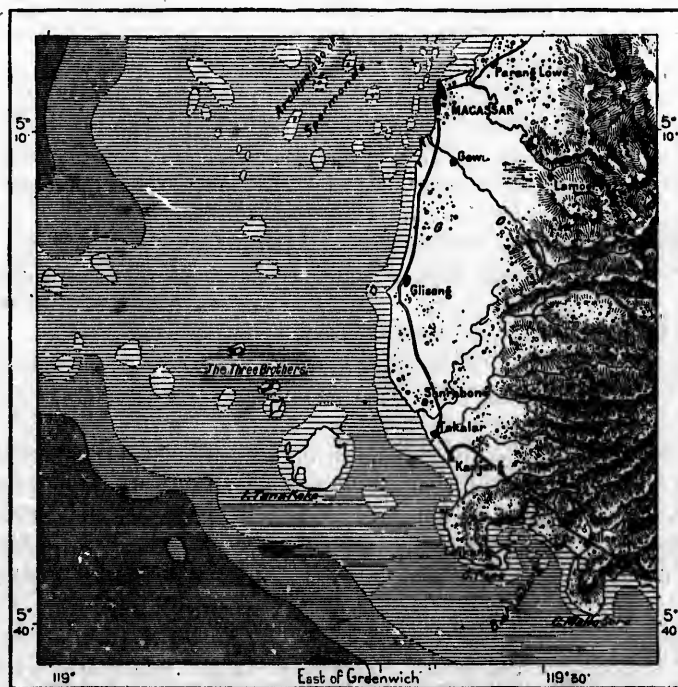
#### INHABITANTS OF CELEBES.

The native populations are usually classed as Malays and Alfurus; a division, however, which is much more of a social than an ethnical character. The

cultured coastlanders, who speak or understand Malay or allied idioms, are regarded as members of the dominant Indonesian race, while the inland wild tribes, whatever their physical types and speech, are indiscriminately grouped as Alfurus. Hence this name is dropped when any of those tribes exchange their savage ways for a settled life on the coffee plantations. Many of these indigenous

Fig. 95.—MACASSAR AND THE SOUTH-WEST REGION OF CELEBES.

Scale 1 : 845,000.



18 Miles.

peoples betray undoubted traces of mixed descent, and individuals are often met with the characteristic features and hair of the Papuans

One of the dominant nations are the Bugis, whose original home is the kingdom of Boni, in the south-western peninsula. From this region they have spread to the neighbouring provinces, and have even founded settlements in many remote parts of the Eastern Archipelago. Like their Mangkassar (Macassar) and Wajo neighbours, the Bugis are of middle size, but robust, vigorous, and active,

with a complexion somewhat lighter than that of other Malays. They are a brave, haughty people, but very revengeful, and more addicted to "running amuck" than any other Indonesian communities.

The Bugis have long enjoyed the reputation of being daring and enterprising mariners, and they have completely monopolised the local trade in many of the surrounding lands. Although they purchase no slaves, creditors reduce their defaulting debtors to a state of absolute servitude, regarding this law as the essential condition of their widespread commercial enterprise. Their women enjoy a certain liberty, practising the industrial arts, such as weaving and embroidery, and often even learning to read and write either Malay or Bugi, this idiom possessing, like the Mangkassar, a peculiar alphabet of Indian origin. Towards the middle of the seventeenth century the Bugis, yielding to the Mohammedan missionaries, abandoned their old animistic religion, which had been profoundly affected by Hindu influences. They even still observe many rites connected with the worship of Siva, and the doctrine of metempsychosis explains the respect even now paid to the crocodiles swarming in the moats of their citadels.

The Alfurus of the central districts are divided into many tribal groups, such as the Torajas, a term often applied collectively to all the pagan savages of the interior. The Topantunusas, or "Dog-eaters," of the Lake Posso district, eat the brain and drink the blood of their enemies. Even some of the islands off the coast are still occupied by wild beasts in human form. Those of Peling Island, near the Balante peninsula, roam naked in the forests and take refuge at night amid the branches of the trees.

But in the extreme north the civilised and confederate peoples of Minahassa, that is, "Brotherhood," vie with the Bugis and Mangkassars of the extreme south in the arts of peace and industry. The Minahassans and their western neighbours are distinguished above most Indonesians for their remarkably light complexion, many being quite as fair as Europeans and distinguishable from them only by their more prominent cheek-bones. Dumont d'Urville was struck by their surprising resemblance to the Tongans and Maoris of Eastern Polynesia. At the beginning of the present century most of the Minahassans were still head-hunters, and even devoured human flesh at their great feasts. But since then they have become quiet, peaceful citizens, very industrious and skilled artisans. The chiefs wear the European dress, and the pure Malay taught in the schools is gradually replacing the thousand local dialects. This remarkable change is mainly due to the cultivation of the soil, and especially to the coffee plantations, which since 1822 have been rapidly developed throughout the Minahassa districts. Besides coffee, the chief cultivated plants are sugarcane, tobacco, kosso (Marilla hemp), the nutmeg, sago, rice and maize. This district also yields for export gutta-percha, wax, honey, mother-of-pearl, tortoise-shell, edible nests and algae. Nearly all the Minahassans have accepted Christianity, whereas most of the other cultured Celebians are followers of the Prophet.

## TOPOGRAPHY OF CELEBES.

The most famous city in Celebes is *Mangkassar* (*Macassar*), the *Ujung Pandang* of the natives, and by the Dutch often called *Vlaardingen*, from the fort of that name erected in the centre of the town. North of this fort stretches the busy native quarter, with its crowded streets, shipping, and Bugi, Chinese, and Arab traders; to the south lies the European quarter, with its avenues of large trees, and numerous shady gardens. Macassar, occupying one of the most convenient positions for trade in Indonesia, had already been much frequented by the Malays when it was seized by the Portuguese in 1538. The Dutch occupation dates from the erection of Fort Vlaardingen in 1665, after which trade rapidly increased till 1846, when Macassar was declared a free port, to the detriment of its commercial prosperity. A chief item of the export trade is the *lakalava* extract from the pulp of the badu plant, long known in Europe by the name of Macassar oil. The roadstead is well sheltered from all winds by the numerous chains of islets and reefs forming the Spermonde Archipelago.

Although held by the Dutch for over two centuries, the province of Macassar has but few good roads. The most important is the route skirting the coast north and south of the capital, leading northwards to *Maros*, residence of a vassal prince, and running thence through several petty states to *Tanette*. Another highway running east crosses the rugged region north of Mount Bonthain, reaching the east coast at *Sinjai* and *Balang Nipa*. The southern route, after passing *Gowa* (*Gowa*), residence of a former powerful sovereign, traverses *Glisong*, *Takalar*, and other coast towns inhabited by daring mariners. On the south coast of the Macassar peninsula the chief place is *Bonthain* (*Bantaeng*), which has succeeded *Bulukomba* as capital of the district.

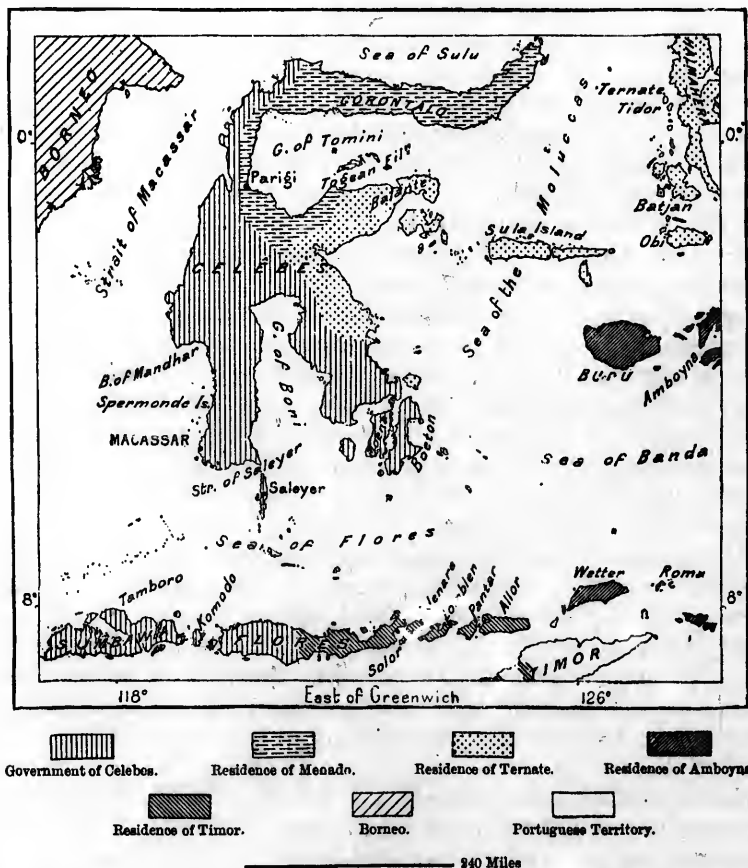
Other "kingdoms" occupy the eastern slope of Macassar and of the two peninsulas radiating eastwards; but their capitals are mere hamlets, like the numerous fishing stations on the creeks and sheltered straits of these waters. *Bajoa*, the port of Boni, at one time the most powerful state in Celebes, is an active centre of trade. But the eastern shores of Celebes present little but a monotonous succession of headlands, inlets, and wooded tracts, mostly destitute of inhabitants, and visited only by the Orang-Bajo, the "Gipsies of the sea," in quest of trepang and tortoise-shell.

Farther north the shores of the gulf of Tolo or Tomaiki, with all their natural advantages, present the same desolate aspect. Even most of the adjacent islands are deserted, and of the Sula (Xula) Archipelago the only inhabited islands are Sula Besi and Sula Taliabo. The Togeian Archipelago also, which lies in the northern gulf of Tomini (Gorontalo), has a mixed population of not more than four hundred souls. *Parigi*, at the neck of the northern peninsula, occupies a favourable position for trade at the narrowest part of the connecting isthmus, and within 21 miles of the Bay of *Palos* on the opposite coast. Palos itself, lying in a fertile district on a deep and well-sheltered bay, enjoys quite exceptional commercial advantages.

North of Parigi the peninsula still continues to contract between the Bays of Dondo and Tomini. But the whole region is almost depopulated, and *Tomini*, which gives an alternative name to the vast Gulf of Gorontalo, is an obscure hamlet comprising some ten or twelve native cabins. *Gorontalo* (*Holontalo*) which gives its name both to the gulf and to the northern peninsula of Celebes, lies in a

Fig. 96.—ADMINISTRATIVE DIVISIONS OF CELEBES.

Scale 1 : 12,500,000.



dried-up lacustrine plain at the mouth of a narrow valley watered by a torrent which issues from Lake Limbotto. Beyond this point the coast is almost uninhabited as far as the shores of Minahassa, where follow the two ports of *Belang* and *Kema*.

These places are connected by good routes across the peninsula with *Manado*, capital of the province, and northern rival of Macassar in political and commercial

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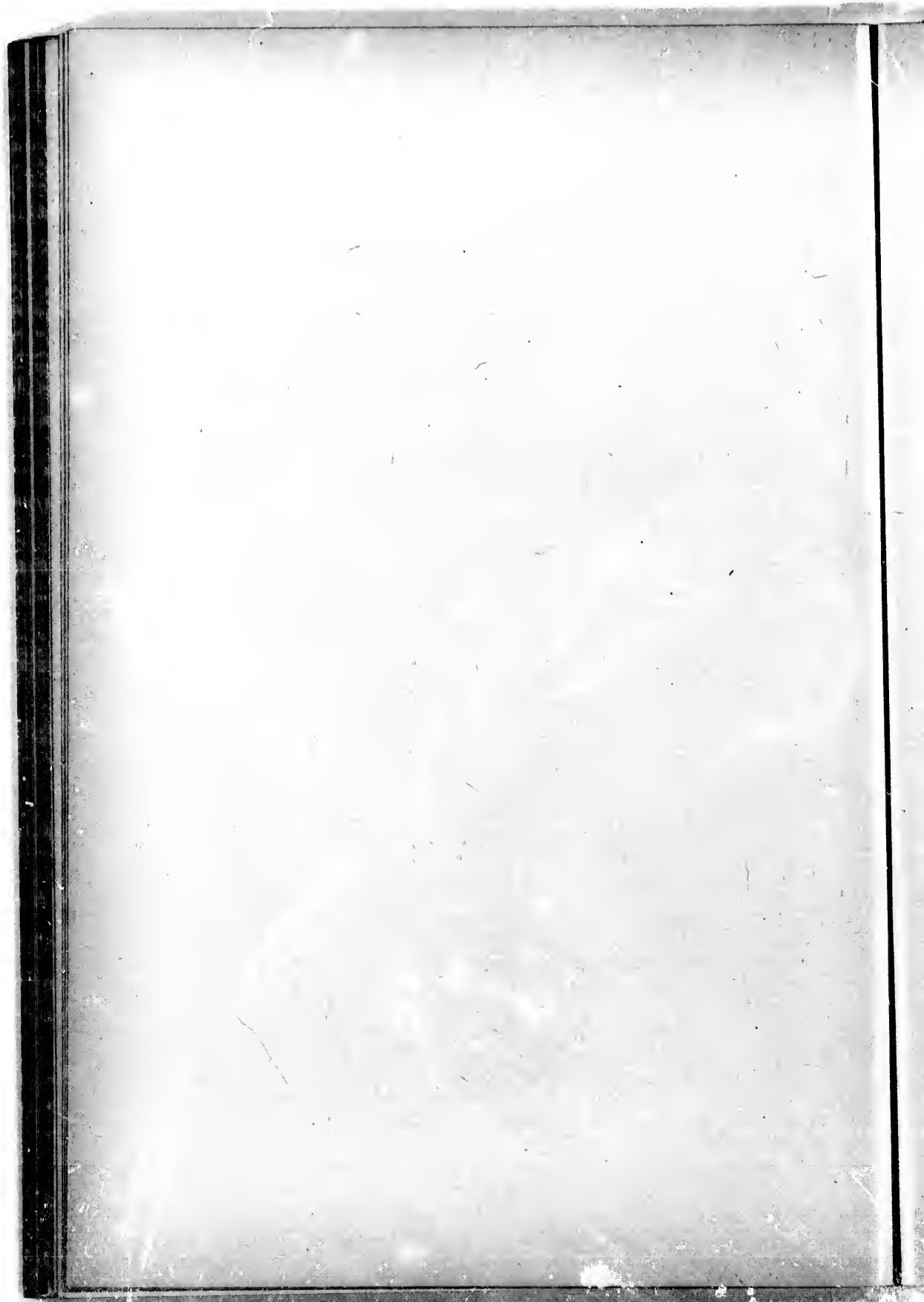
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GENERAL VIEW OF MENADO.



importance. Manado (Manado), the *Wenang* of the natives, lies on a spacious inlet open to the west and sheltered on the north by several islets, one of which, *Manado Tuca*, or "Old Manado," marks the site of the old town, which was abandoned in 1682 for the present more secure position on the mainland. Here a pleasant little Dutch quarter gradually sprang up round about the foot of *Nieuw-Amsterdam*. But the town itself is little more than a vast garden dotted over with rural dwellings and crossed by shady avenues, each terminating with a lovely view of sea, islands, and extinct or still smouldering volcanoes.

The district is enriched by cultivated grounds, which have replaced the primitive forests, and which are traversed by good roads giving access to the magnificent plateau of *Tondano*, with its coffee plantations, its woodlands, romantic winding lake, and waterfall of the river Manado. A little to the west of Tondano stands the village of *Rurukan*, 3,300 feet above the sea, being the highest group of habitations in Minahassa, if not in the whole of Celebes.

The political and administrative in no way correspond with the natural divisions of Celebes. Thus Sumbawa, one of the lesser Sunda Islands, forms part of the Macassar "government," while the petty states on the Gulf of Tolo belong to the Sultanate of Ternate, and consequently depend politically on a remote eastern islet. The greater part of Celebes is still divided amongst local rulers, some classed as direct or indirect feudatories, others as allies, and others again as still completely independent. Thus the districts under direct Dutch administration occupy but a relatively small part of the territory; and even here the old administrative measures have been partly maintained, the authority being exercised by native regents under the control of Dutch Residents or Assistants. The system of government varies also in the numerous native "kingdoms," most of which are electoral monarchies limited by custom, the authority of the notables, and priestly influence. Wajo, on the east coast of Macassar, is an oligarchy of powerful families, with a prince elected as nominal chief, and a council of forty delegates, including some women. The various Bugi states constitute similar oligarchies, where the nominal sovereign merely executes the pleasure of his vassals.

#### THE SOUTHERN MOLUCCAS: BURU, CERAM, AMBOYNA, BANDA.

A submarine bed less than 100 fathoms deep connects Celebes and the Xula (Sula) Archipelago with Buru, westernmost member of the Moluccas. On the other hand this oval island forms a link in a chain disposed in the form of an arc comprising Ceram, Goram, sundry islets, and in the Kei group intersecting another chain of upheaved lands, the already described South-Eastern Islands. The chain of the Southern Moluccas, sweeping round some 450 miles first west and east, then south-east parallel with New Guinea, is well defined by deep waters both north and south. Thus Ceram is separated from the Northern Moluccas by an abyss of over 1,500 fathoms, while on the opposite side the Banda Sea has a depth of 3,000, and at one point near the Banda volcano 4,280 fathoms. Precisely in the centre of this sea rises the submarine plateau of Lucipara, marked by a few

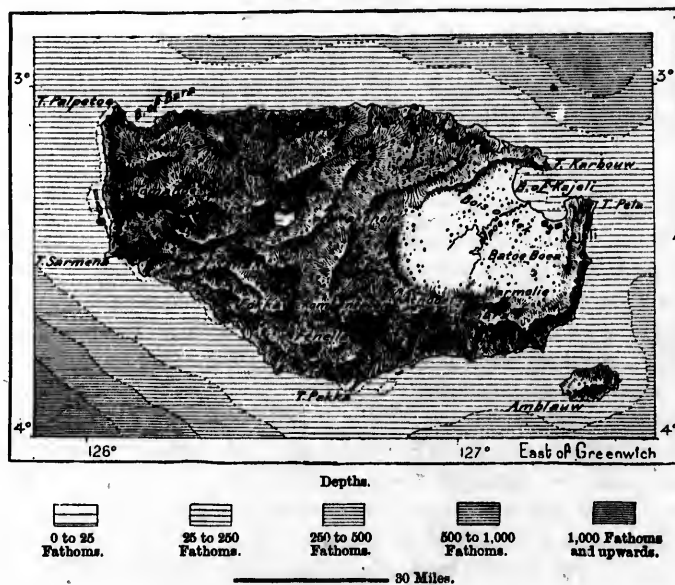


reefs appearing above the surface. With the exception of Amboyna and Banda, which do not lie along the general axis of the Southern Moluccas, all these islands are situated beyond the Indonesian volcanic zone.

The small island of Amboyna, and the still smaller cluster of the Banda islets, formerly enjoyed a commercial importance far beyond that of the larger islands in these waters. They even still retain their political supremacy, though the centre of gravity will probably be eventually shifted towards Buru and Ceram,

Fig. 97.—Buru.

Scale 1 : 2,000,000.



which have already outstripped them in population, and which also possess excellent havens.

Despite its fertility and abundant natural resources Buru is still one of the least-known lands of Indonesia. Near its rock-bound west coast it culminates in the lofty Mount Lamandang, or Tomahu (8,540 feet), with which are connected other mountain masses falling gradually eastwards, but more elevated and precipitous along the southern than the northern side. The whole system is disposed in a semicircle with its convex side facing eastwards, and leaving in the centre of the island a large crater-like depression flooded by Lake Wakoholo, 1,900 feet above sea-level. The east coast is indented by the superb Bay of Kayeli, which is encircled by an extensive plain enclosed by an amphitheatre of hills. A geographical dependence of Buru is the hilly and reef-fringed islet of Amblauw, off the south-east coast.

The islets of Manipa, Kelang, and Bonoa, connecting Buru and Ceram, are

mere geographical fragments of the latter. Amboyna with the Uliasser group (Oma or Haruku, Saparua, and Nusa Laut) all rest on the same submarine plateau as Ceram. Amboyna is formed as it were by two peninsulas, Hitu and Ley-timor, connected by a sandy isthmus little over a mile wide. Although regarded by Wallace as of igneous origin, European residents deny the existence of any volcano in Amboyna.

Ceram, or Serang, largest and loftiest of the Southern Moluccas, is covered by a dense forest on its western slope known as Howamul, or "Little Ceram." The island culminates in Mount Musaheli (9,710 feet); its prevailing formation appears to be granite. Its shores are encircled by fringing reefs, and the islands continuing the mainland south-eastwards are mainly formed of coralline limestones. Goram, one of the largest of these groups, consists of a rocky central nucleus, round which the polyps have constructed their coral reefs. But others, such as Manawoko and Matabello, are composed exclusively of upheaved coral.

The little Banda group presents a marked contrast to all the surrounding lands in its complete isolation, and the incessant activity of its Gunong Api, or "Burning Mountain." Of the six islets of the cluster, three, Great Banda (Lonthoir), Banda Neira, and the Volcano, are so disposed as to form the margin of an inner lake, probably representing an old crater of vast extent. Both Bandas are clothed with verdure to their summits, while the superb cone of Api presents on its lower flanks a mere fringe of vegetation, and higher up nothing but heaps of rocks whitened with saline efflorescences. The craters emit constant wreaths of vapour, and all the Banda Islands are subject to frequent earthquakes. In this neighbourhood is best seen the curious phenomenon of the "Milky Sea," the water during the months from June to September appearing white at night and illumined by a strange phosphorescent glow.

Lying between Indonesia and New Guinea the Southern Moluccas participate of both regions in their climate and animal and vegetable forms. But land mammals are almost completely absent, while on the other hand each island presents some original types. Noteworthy are the Marsupials (*Cuscus*), allied to those of New Guinea; the babirussa, which has reached Buru from Celebes, and especially the huge pythons which attack and devour man. The Moluccas are amazingly rich in birds, mostly resembling those of Papuasias. In Ceram alone Wallace enumerated fifty-five indigenous species, including a remarkable helmeted cassowary five or six feet high, the wings being replaced by groups of "horny black spines like blunt porcupine quills." The surrounding waters also teem with every variety of marine life, and in the ports and creeks of Amboyna alone Bleeker found no less than seven hundred and eighty species of fishes, nearly as many as occur in all the European seas and rivers. Amboyna also presents larger and more beautiful butterflies than any other spot on the globe. Yet by a strange and inexplicable contrast the eastern part of Ceram, with all its wealth of vegetation, is extremely poor in animal forms.

The "Alfurus," or uncivilised natives of the Southern Moluccas, are allied, not to the Indonesians of Celebes, Borneo, and Sumatra, but to the Papuans of New

Guinea. Those of Buru, absurdly supposed by some to be the western home of the Eastern Polynesians, are of middle size, with deep brown complexion and huge "mop-heads." Most of their settlements are on the coast, where, as in Ceram, the type has become largely modified by crossings with Malays and other immigrants. In Amboyna Hindu features are even said to occur, and here the language would seem to betray former Asiatic influences.

Except in Ceram most of the Alfurus have discontinued head-hunting and their other ferocious practices. All believe in a Supreme Being, creator and preserver of all things, great judge, rewarder of good and punisher of evil in this life and the next. But he is honoured by no worship, prayers and incantations being reserved for the innumerable beneficent and malevolent spirits, who dwell in the rocks, the trees, the streams, and the wind. These are appeased by wizards and astrologers, who also heal maladies, make the crops prosper, and preserve mariners from the dangers of the deep. Marriages are exogamous, and the women as well as debtors are treated with remarkable kindness. In the interior Mohammedanism has hitherto failed to gain a footing, but on the coastlands its influence is predominant, and steadily increasing with the ascendancy of the Malay intruders. On the other hand Christian missionaries from Amboyna have already baptized some thousands of Ceramese and other islanders. In some villages the Christians are in the majority, and on the coast of Ceram facing Amboyna all the natives are at least nominally Orang-Sirani, or "Nazarenes."

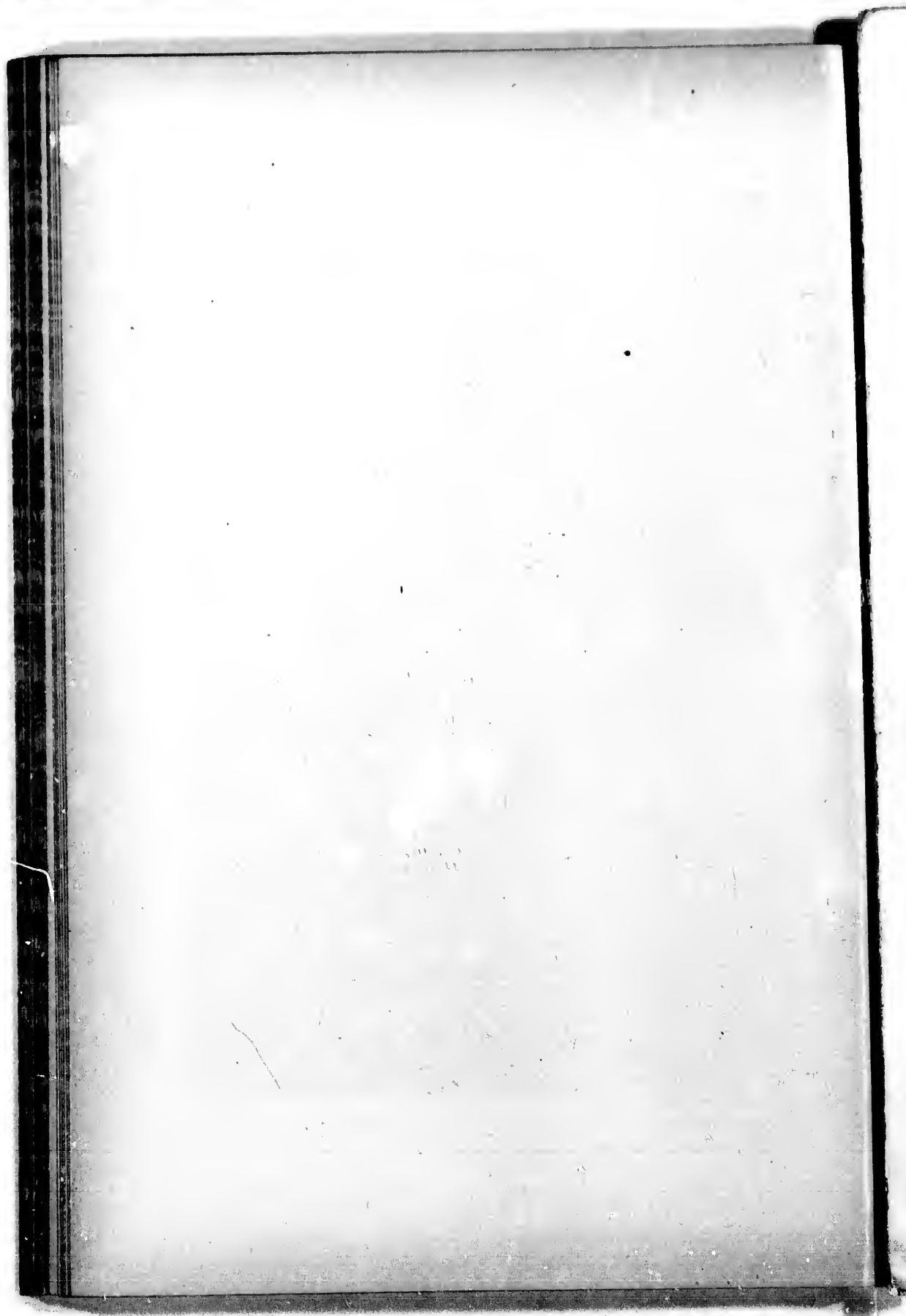
The general spread of Christianity is mainly the result of the early proselytizing zeal of the Portuguese, many traces of whose occupation still survive. In the first year of the seventeenth century the Dutch seized Amboyna and Banda, where they endeavoured to monopolise the trade in the famous spices "worth their weight in gold." They ordered the destruction of the nutmeg and clove forests everywhere in their domain except Amboyna and Banda, and even here the number of plants was strictly limited by numerous decrees. For two hundred and fifty years Amsterdam was the only market in the world where nutmeg, cloves, and mace could be procured; but this policy was followed by many evils, such as the depopulation of formerly flourishing islands, the spread of piracy, and the debasement of the natives condemned to forced labour on the plantations for half a year. All industries were sacrificed to the cultivation of the spice plants, and the monopoly itself became so burdensome and disastrous that it had at last to be abolished in 1860. Since then the yield has been greatly reduced in Amboyna, but the Banda growers, favoured by the conditions of soil and climate, still compete successfully with those of other spice-growing lands.

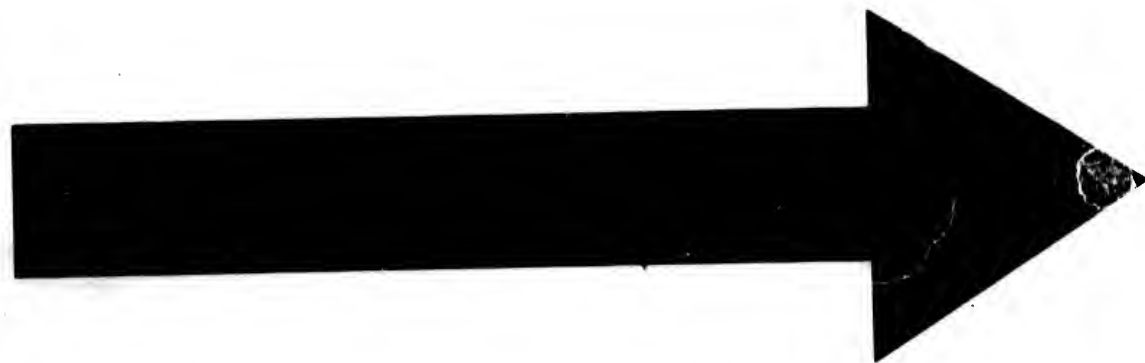
*Amboyna*, the native *Ambon*, capital of the Residence of the Southern Moluccas, lies on the south side of the bay of like name at the foot of Mount Soya; it comprises a central trading quarter and suburbs with broad shady avenues stretching for some distance in various directions, with a total population of thirteen thousand. It is commanded by *Fort Victoria*, and is now a free port, where the largest vessels ride at anchor in ten or fifteen fathoms of water. Amboyna is the centre of the religious establishments for all the surrounding

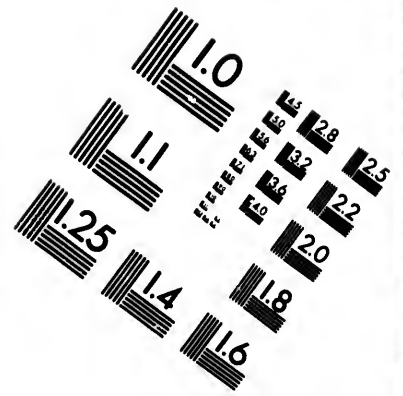
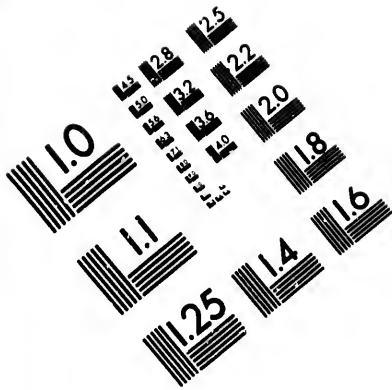
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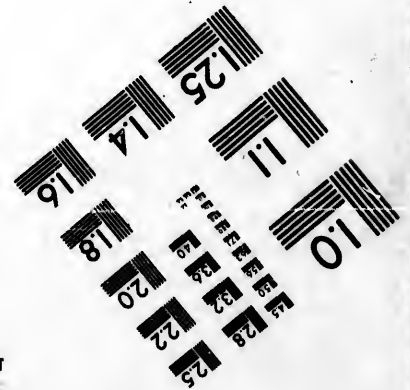
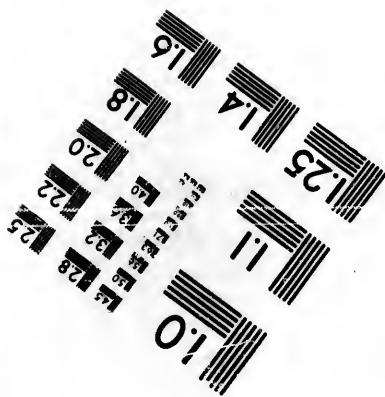
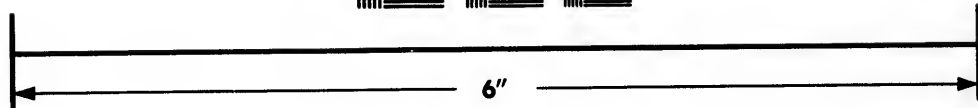
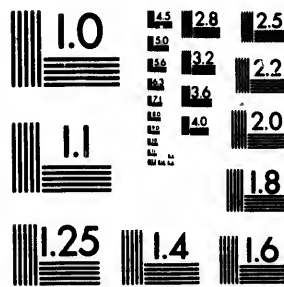
AMBOYNA.







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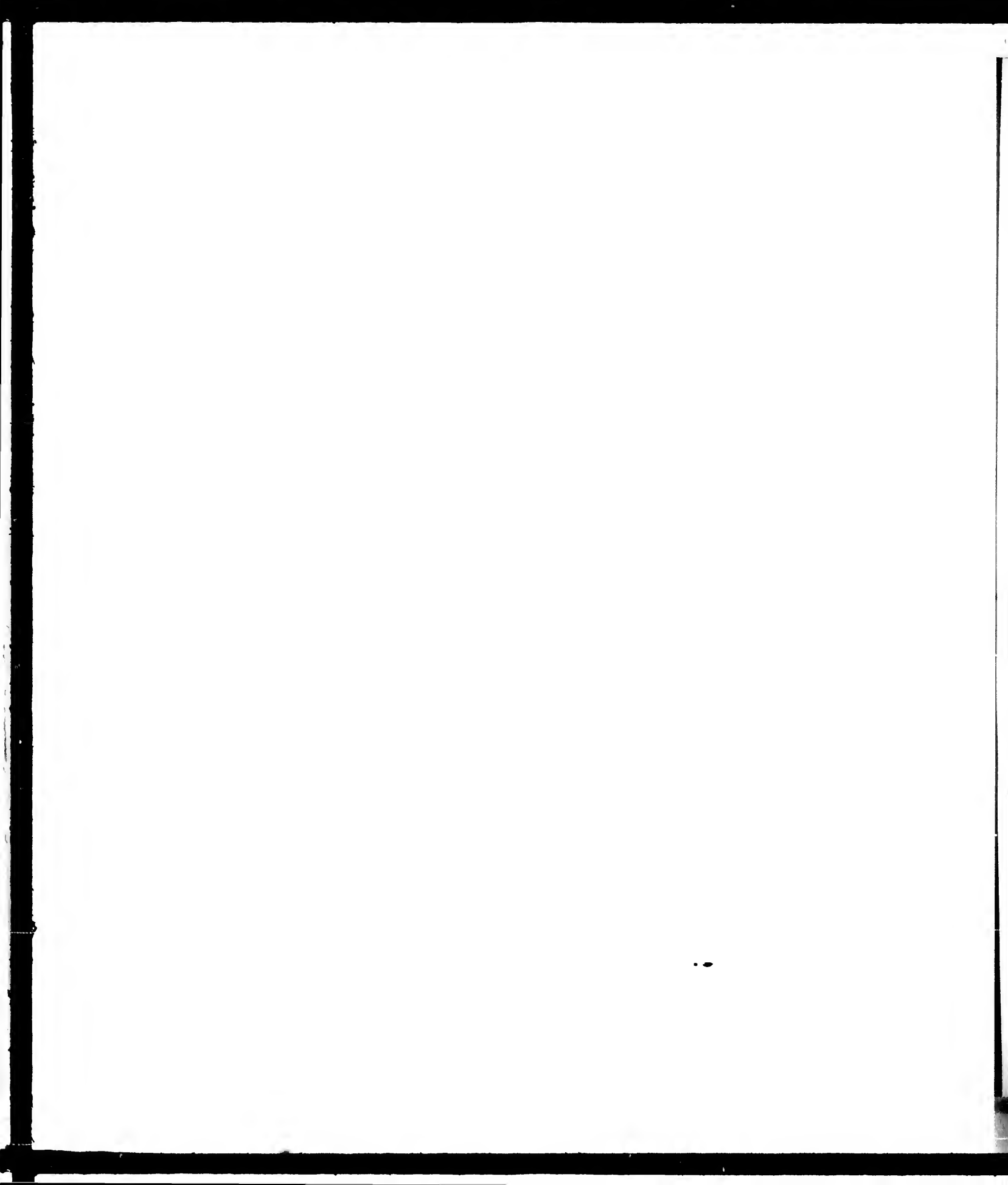


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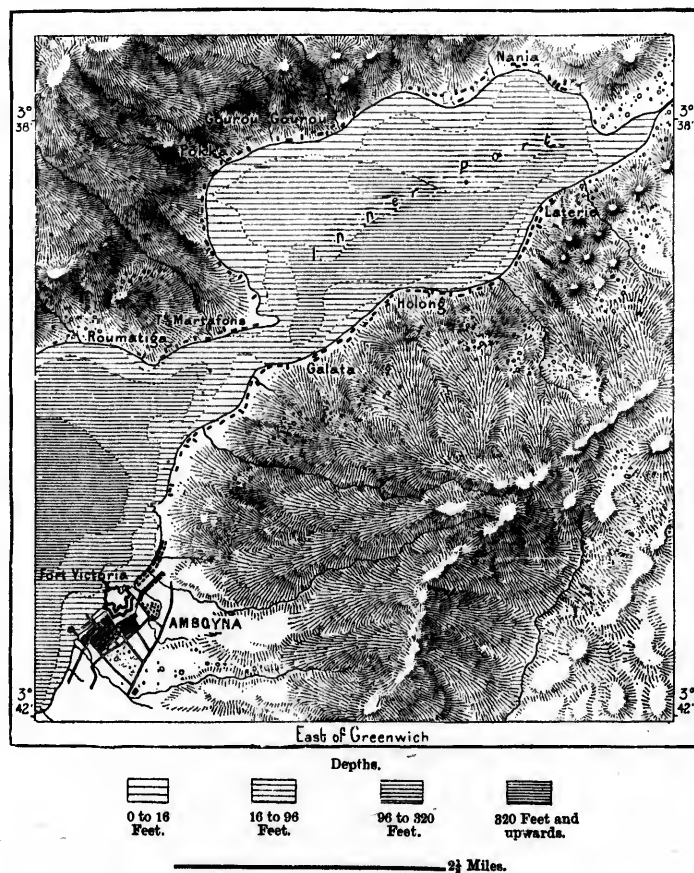


regions; here resided Valentijn, and here died Rumphius, the pioneers of scientific exploration in Indonesia.

The chief port in Buru offers all the material advantages for a great centre of trade, but on this magnificent and well-sheltered harbour nothing is seen except the obscure village of *Kayeli*, with a mixed population of about two thousand

Fig. 98.—PORT OF AMBOYNA.

Scale 1 : 80,000.



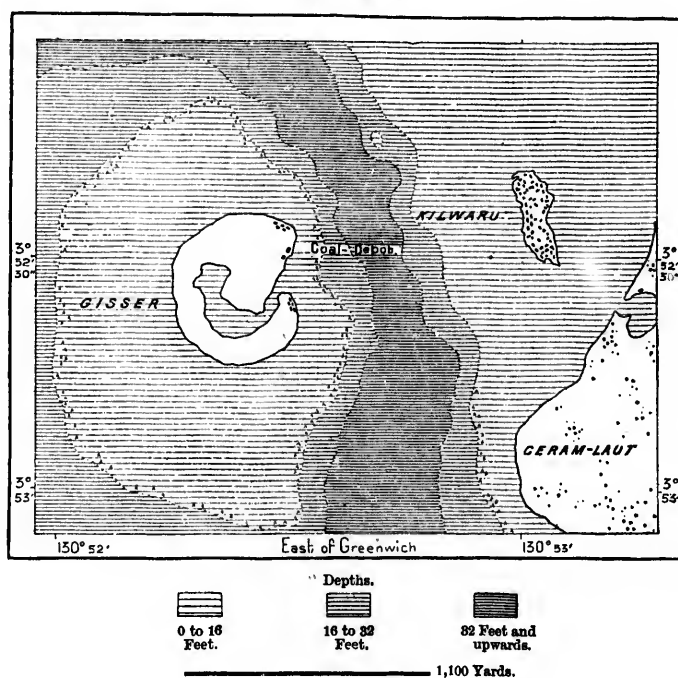
Mussulmans, Christians, and Chinese. The shores of Ceram also present no centres of population beyond a few groups of cabins occupied by Malays, some Moham-  
 medan and Christian Alfurus, and a few foreign traders. Of these groups, known as *negerijen*, from the Hindu *nagar*, a town, the chief are *Amahai*, centre of the Dutch administration on the south side, and on the north *Wahai*, a fortified village with an extensive harbour.

The islet of *Kilwaru*, off the east point of Ceram and near the ring-shaped Gisser, presents the aspect of a little "Malay Venice," where the pile-dwellings are so closely packed that the ground can nowhere be seen, and the whole island looks like a floating village. Lying on the only deep channel across the submarine banks of Ceram Laut, Kilwaru is a busy mart, the chief entrepôt of the trade between Amboyna and New Guinea.

East of Amboyna, the chief town of the Uliasser group is *Saparua*, in the island of the same name, near the shore of a good haven, and at the converging point of two routes which cross the island at its narrowest parts. But despite

Fig. 99.—KILWARU.

Scale 1 : 25,000.



these natural advantages, Saparua has less than two thousand inhabitants, nearly all Christians. The surrounding plantations yield a larger quantity of cloves than Amboyna, though the crops are very precarious. A good harvest will exceed 340,000 lbs. for the whole Amboyna group, while that of bad years will fall below 56,000 lbs.

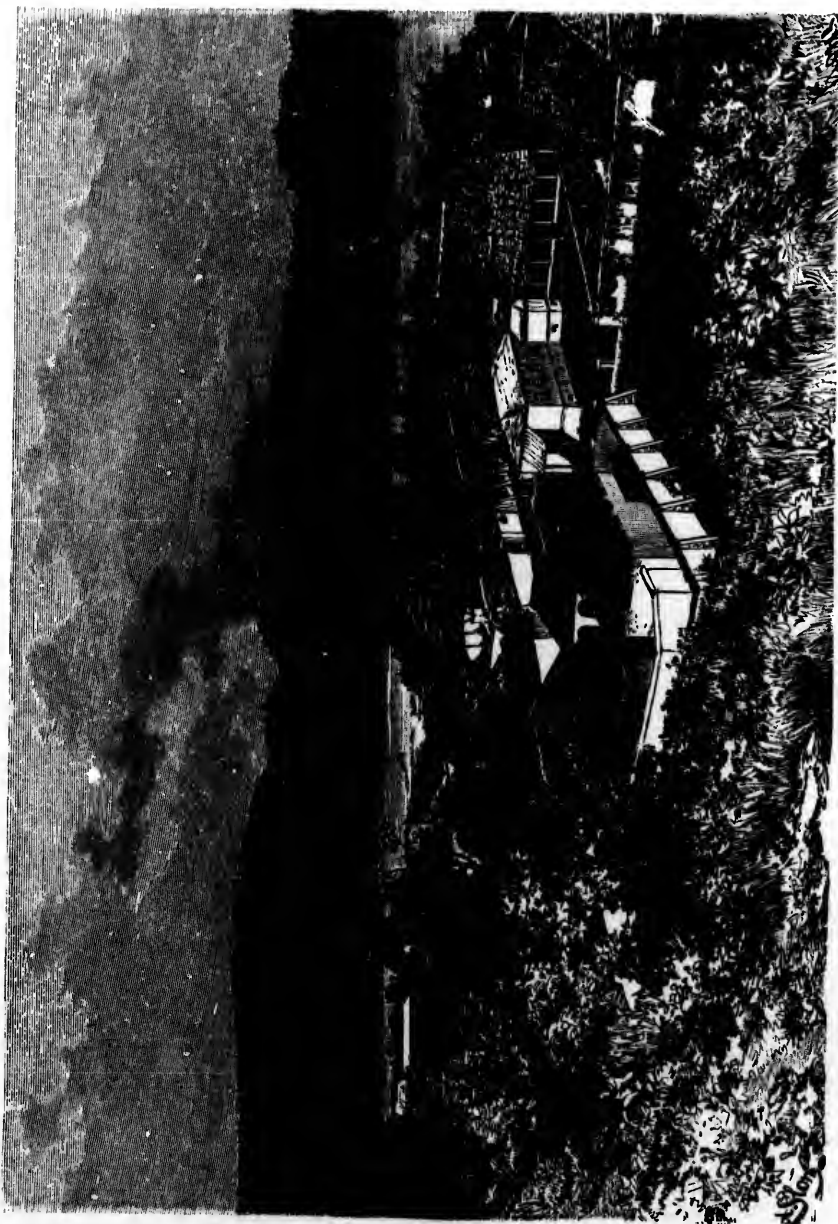
The fortified town of *Banda*, or *Neira*, in the island of like name, occupies one of the most picturesque positions in the Eastern Archipelago. It lies on the north side of Banda Bay, on the slopes of Mount Papenberg, amidst the loveliest nutmeg plantations in the world. The opposite island of Great Banda is almost covered

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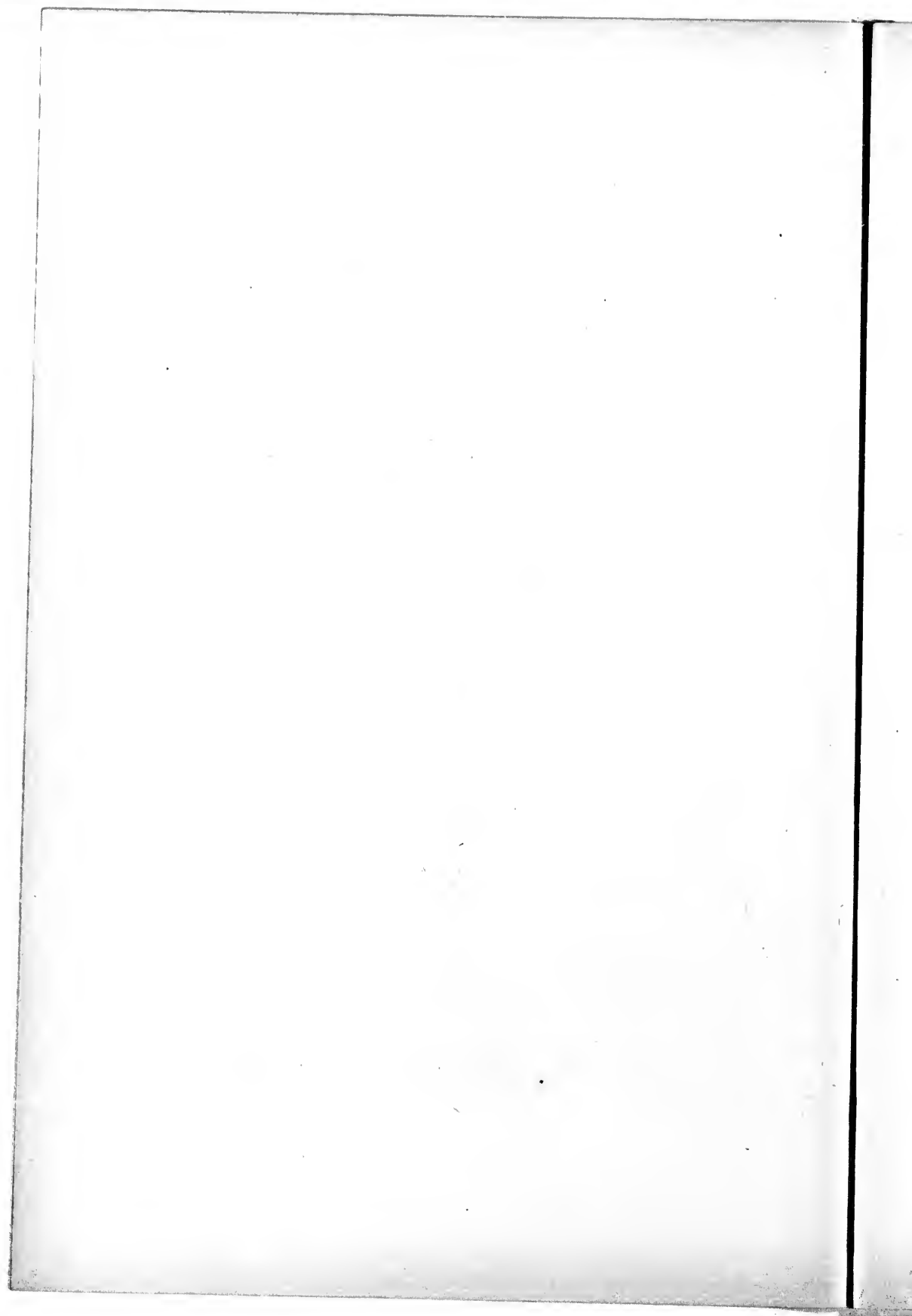
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BANDA-NIERA AND GREAT BANDA.

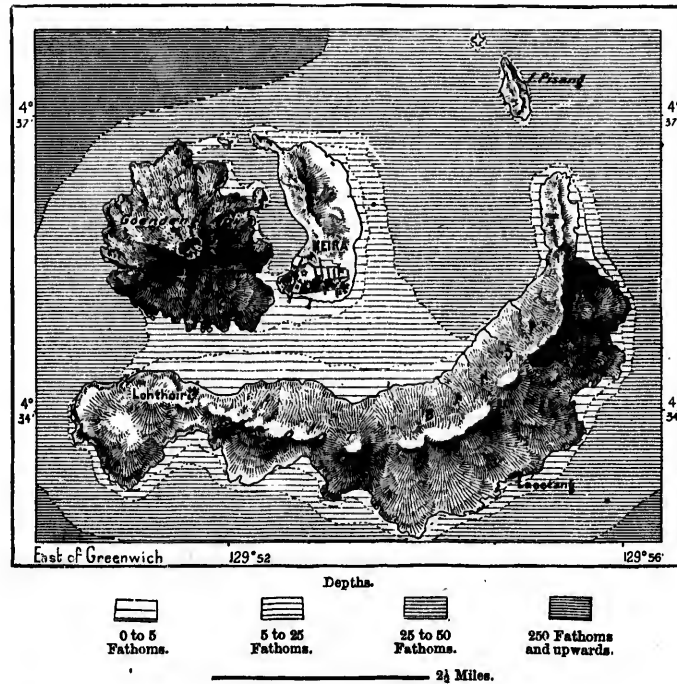


with the same shrub, and with others of larger growth planted for protection. The light volcanic soil, the shade, and the natural moisture of the climate are all conditions most favourable for the nutmeg, which here grows almost spontaneously, whereas in Singapore, Pulo Pinang, and other places successful crops can be raised only by most careful cultivation.

A fringe of cocoanut trees encircles the base of the neighbouring Gunong Api, which is inhabited by the descendants of immigrants from Buton. The islets of

Fig. 100.—BANDA GROUP.

Scale 1 : 115,000.



Run and Rozengain are also occupied by small colonies of cultivators, descended for the most part from transported convicts.

The residence of Amboyna is divided administratively into the four districts of Amboyna, Buru, the Uliasser group, Banda, and the three circumscriptions of Ceram.

THE NORTHERN MOLUCCAS: OBI, BATJAN, TIDOR, TERNATE, HALMAHERA,  
MOROTAI.

This northern group, of which Halmahera forms the centre, is completely enclosed on all sides by deep waters. On the west it is separated from Celebes by

abysses of over a thousand fathoms; on the north and north-west occur troughs of two thousand fathoms; southwards, a chasm of fifteen hundred fathoms yawns between Obi and the Southern Moluccas; lastly, towards the east, depths of five hundred fathoms, with a sill of over two hundred and fifty fathoms, mark the parting line between the insular world and the islands depending on Papuasia. The Northern Moluccas are mainly disposed longitudinally north and south, whereas the southern group runs east and west. The total area exceeds 6,000 square miles; but with the exception of the so-called "Little Moluccas" (Ternate, Tidor, Makjan, Motir, Kayoa) none of the islands are thickly peopled, while some even have no permanent residents at all. The two islands of Tifuri and Mayu, which depend politically on Ternate, may be included in this group, although rising in deep waters to the east of Minahassa.

The term *Molucos* was originally restricted by the Portuguese to the "Little Moluccas" of modern geographers, but has gradually been extended to all the eastern islands producing spices.

Igneous energy is far more active in the northern than in the southern group, and a whole range of active craters skirts the western edge of the archipelago. In the northern section of Batjan (Batchian) occur hot springs, and a geyser which, like those of Iceland, contains much silica. Farther north, beyond the basalt rocks of Kayoa (Kajoa) rises the Makjan volcano, which was partly blown away during the eruption of 1616. Motir also (1,020 feet) forms a burning mountain, which was still active down to the close of the last century. The southern portion of Tidor, a little farther north, consists of a perfectly regular cone, the highest in the Moluccas (5,720 feet), which emits vapours from time to time. Its neighbour, Ternate, somewhat lower and of less symmetrical form, is one of the most restless volcanoes in the whole of Indonesia; from the Dutch occupation at the beginning of the seventeenth century down to 1862 no less than eighty-four eruptions were recorded; the mountain is fissured in all directions, and vapours are constantly emitted from the seven craters opened on its flanks. Earthquakes are also frequent, and the town lying at its base has scarcely recovered from one disaster when it is overtaken by another.

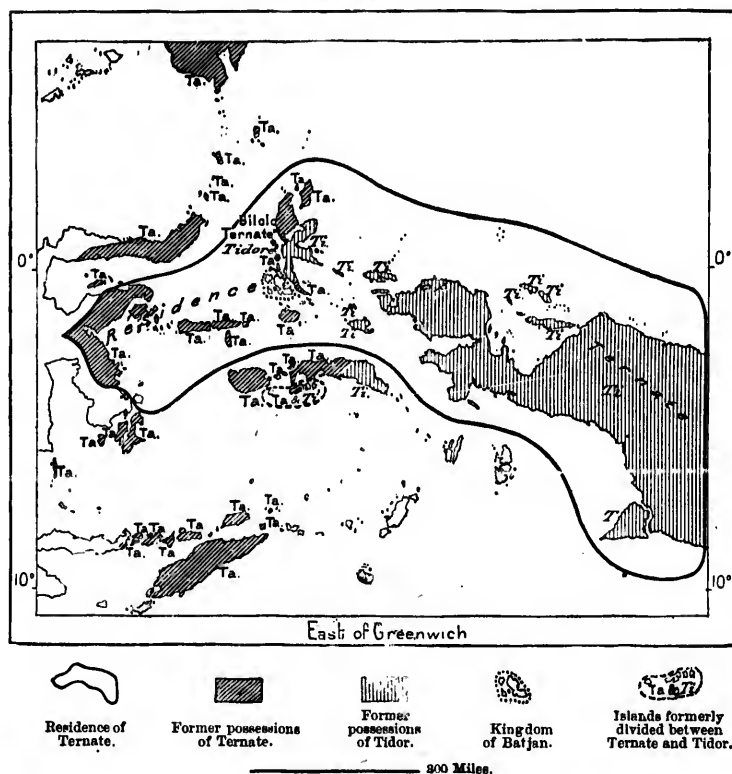
Farther north, the volcanic axis of the Little Moluccas strikes the projecting coast of Halmahera, and here also rise three eruptive cones visible from Ternate. In the same direction follow other centres of igneous activity, such as the Gunong Tarakan (Tafelberg), and Tolo, facing the island of Morotai (Mortai), whose scorïe forming barriers across the marine inlets have converted them into complete land-locked lakes.

Halmahera, or the "Great Land," presents in its outlines a curious resemblance to Celebes, consisting, like that island, of four mountainous peninsulas rooted in a central nucleus, and all disposed in similar directions. The trachytic island of Morotai, with the adjacent clusters, which appear to have been formerly attached to the northern peninsula, also correspond to the Minahassa region of North Celebes, while the southern and south-eastern peninsulas are similarly prolonged by the islands of Damar and Gebe.

The Northern Moluccas, where the political ascendancy is centred in the two volcanic islets of Tidor and Ternate, are distinguished, even more than the southern group, by their peculiarly specialised local forms. Thus Morotai possesses characteristic birds unknown in Halmahera, from which it is separated only by an island-studded strait twenty-four miles wide. The fauna, both of Morotai in the extreme north and of Damar in the extreme south, is much more allied to that of the remote Papuasia than the Moluccas. Specially remarkable is the fauna of Batjan, in

Fig. 101.—EMPIRES OF TERNATE AND TIDOR.

Scale 1 : 20,000,000.



whose spice forests is found the baboon-like cynopithecus, which here reaches its farthest eastern range.

The dominant element in the Little Moluccas are the Malays, who, after securing a footing in Ternate and Tidor, overran the whole archipelago. But intermarrying with the Alfuru women, their type has been variously modified. Another intruding element are the Orang Serani, that is, the Nazarenes or Christians, who are partly descended from Portuguese ancestors. But they have long forgot-

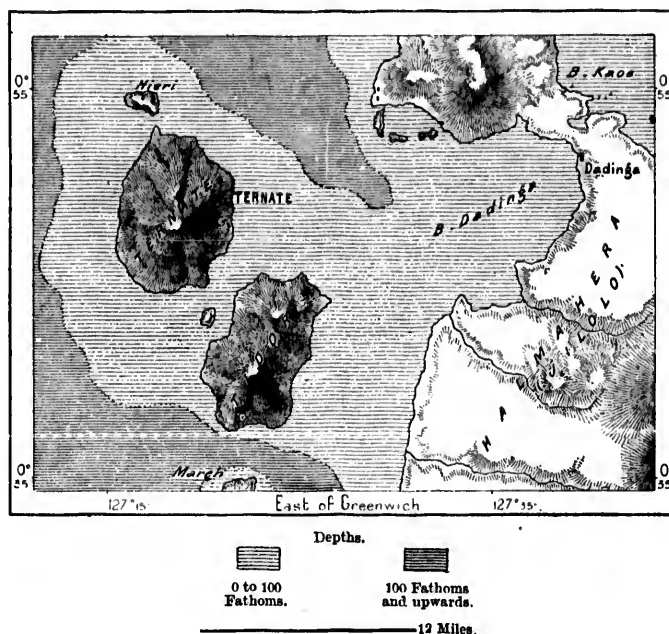


ten, if not their origin, at least their language and even their Catholic faith; they now speak Malay mixed with a few Portuguese words, and call themselves Protestants. Through crossings with the natives they have become as dark as the Papuans and greatly resemble the Brazilian half-castes of the Amazons. The Orang Serani are almost the only natives of Indonesia who eat the "flying-fox," that huge bat which is at times seen suspended by hundreds from the branches of dead trees.

The Alfurus, or aborigines, are now found chiefly in the central parts of the northern peninsula in Halmahera. Although many are as fair as the Malays,

Fig. 102.—TERNATE, TIDOR, AND DADINGA ISTHMUS.

Scale 1 : 600,000.



Wallace and others regard them as but slightly modified Papuans, with the coarse features, nearly aquiline nose, frizzly hair, and vivacity of the New Guinea natives. In other respects, and especially in their usages and social institutions, they resemble the Alfurus of Ceram and Buru.

The little island of Kayoa, north of Batjan, is occupied by a few hundred natives tributary to the Sultan of Ternate. The more fertile Makjan is also far more densely peopled; in former times its importance made it a bone of contention between the rival sovereigns of Tidore and Ternate. Afterwards it passed successively from the Spaniards to the Dutch, who ruined it by compelling the ruler of Ternate to destroy its clove plantations.

Nearly all the Northern Moluccas are divided between the two sultanates of



Fig. 103.—VIEW TAKEN AT TERNATE.

Tidor and Ternate, which are themselves for the most part now merged in the

Dutch administrative division known as the Residence of Ternate. One of the most remarkable phenomena in the history of Indonesia is the extraordinary political importance acquired by these two insignificant islets. At the very time when the Italian republics of Venice, Pisa and Genoa were enjoying a marvellous prosperity, these eastern Malay communities were, under analogous conditions, acquiring vast colonial empires stretching far over the surrounding archipelagoes and continents. Trading settlements from Tidor and Ternate were founded in all the markets of Malaysia, and their ascendancy was maintained as long as their operations were limited to trade. But decay set in as soon as their sultans became rich potentates surrounded by thousands of slaves, levying heavy tribute and plundering the surrounding regions with their armies of mercenaries and piratic fleets.

At present these sultans retain little beyond an empty title. The so-called

Fig. 104.—DENSITY OF THE POPULATION IN DUTCH INDONESIA.

Scale 1 : 45,000,000.



“kingdom” of Tidor comprises the central part of Halmahera with its two eastern peninsulas, besides the western shores of New Guinea with the adjacent islands. To Ternate are nominally assigned the northern peninsula of Halmahera with more than half of the south, the Sula Archipelago and about one-third of Celebes.

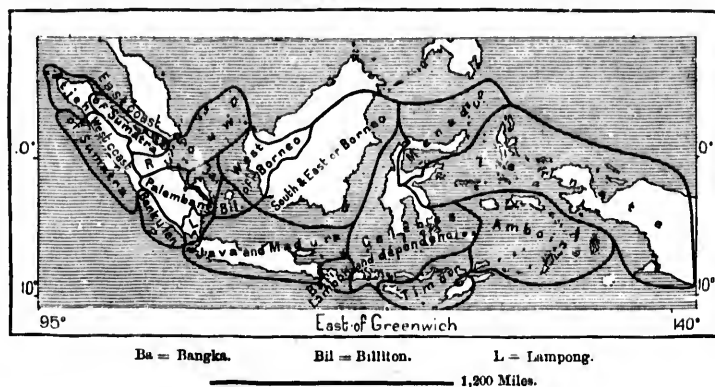
According to the local chronicles a treaty of peace was concluded in 1322 between the Molucca States, in virtue of which the first rank was awarded to the Kolano of Jailollo (Jilolo) in Halmahera; but in 1380 the Sultan of Ternate acquired the ascendancy under the title of Kolano Maloko, or “Prince of the Moluccas.” Since that time the relations between the various local states has been modified by the wars between the Portuguese and Spaniards, and by the arrival of the Dutch. At present the Jailollo prince is a mere vassal of Ternate, which in its turn is fain to recognise the suzerainty of Holland. In 1879 all slaves were officially declared free throughout the whole of these territories.

The capital of *Tidor* is a mere village on the west side of the island; but *Ternate* is a real town, although it has suffered much since the opening of the ports of Celebes to free trade. It is doubtless itself also a free port, but it has lost many of its Chinese, Bugi, and Arab traders, and has ceased to be the chief market for the feathers of the bird of paradise. The ruins of buildings overthrown by the earthquakes are scattered amid the modern dwellings, and the old Portuguese and Dutch forts have recently had to be rebuilt. Behind every stone house is a second structure in light wood where the sleeping apartments are contained, and where little risk is run in case of any sudden shock. The slopes of the neighbouring volcano are covered with orchards, which yield the finest durians, mangoes, and other fruits.

East of Ternate is developed the deep inlet of Dadinga Bay, by which the northern peninsula of Halmahera is nearly severed from the rest of the island. The connecting isthmus is commanded at its narrowest part by *Fort Dadinga*, the

Fig. 105.—POLITICAL DIVISIONS OF INDONESIA.

Scale 1 : 50,000,000.



strongest strategic point in the whole island, and the only place where the Dutch keep a garrison. Here the isthmus is scarcely two miles across, and although the route presents some difficulties, praus can be transported in three days from bay to bay, thereby saving a detour of 240 miles. North of Dadinga Bay follows that of Jailollo, formerly a flourishing capital which for a time gave an alternative name to Halmahera, now a mere hamlet surrounded by old cultivated tracts now overgrown with coarse grass and scrub. These regions, so popular and flourishing in mediæval times, have been almost entirely depopulated by slavery and monopolies.

Of the other villages in Halmahera the best known is *Galela*, which lies on an inlet in the north-east of the northern peninsula over against the island of Morotai. The Alfurus of the surrounding district, the most skilful and industrious peasantry in the whole island, are usually known as Galelas from the name of this place. *Tabello*, which lies farther south, and which is defended by numerous reefs and islets of difficult access, was long dreaded as a dangerous nest

of corsairs. In 1837 the Dutch authorities removed four hundred of these pirates to the island of Saleyer, where they received allotments of land to cultivate.

The large island of Morotai, which forms the north-east extremity of the Moluccas and of the whole of Indonesia, became entirely depopulated in consequence of the constant incursions of the corsairs. Thus the vast colonial empire of Holland, comprising over five hundred islands and too extensive for all its natural resources to be developed, terminates towards the Pacific Ocean in lands which were formerly thickly inhabited, but which are at present deserted. As shown by the statistical charts, Java, Madura, Bali, and Lombok are the only islands where the population is grouped in considerable masses. The eastern members of the Sunda group are far more sparsely occupied, while the other regions, such as Borneo, Celebes and the Moluccas, are relatively speaking almost uninhabited.

In the Appendix will be found a table of the Dutch possessions, with their administrative divisions, areas, and populations.





## CHAPTER IV.

### THE PHILIPPINES.



THE term Magellania, given to the Philippine Archipelago in honour of its illustrious discoverer, has shared the fate of other denominations, such as the Western Isles and the Archipelago of Saint Lazarus, all of which have yielded to the name conferred on this group by Lopez de Villalobos to flatter his master, Philip II. All these islands are also in a general way designated as the Spanish Indies, rivalling as they do the Dutch East Indies in extent, picturesque beauty, and the infinite variety of their natural resources. Luzon, the largest member of the group, has alone an area of 40,000 square miles; Mindanao, next in size, is very nearly as extensive; five others are each over 10,000 square miles in extent, while round about these larger masses is scattered a vast labyrinth of no less than two thousand satellites of all sizes.

Luzon and its neighbours scarcely yield to Java, Sumatra or Celebes, in the splendour of their tropical landscapes. Perhaps they even offer greater variety from season to season, thanks to the more marked alternation of the monsoons, due to their greater distance from the equator. The vegetation of the seaboard, which comprises the same or corresponding species, is fully as dense and leafy as that of Indonesia; the shores are everywhere deeply indented by bays and inlets; island-studded lakes reflect the surrounding woodlands; the horizon is bounded by lofty crests and cones wrapped in vapours. The inhabitants also, whether aborigines, Malays, Chinese, or half-castes of every shade, present many curious ethnological studies, and appear on the whole to offer more originality than their kindred of Dutch Indonesia. The action of their Spanish rulers, however violent at times, has weighed less oppressively on the natives, whose primitive character has consequently been less profoundly modified than in the Sunda Islands. Some members of the vast archipelago, as well as the more remote districts in the larger islands lying beyond direct Spanish control, have even remained unexplored, while even the regions directly administered by Europeans are still but imperfectly known. No methodic and detailed study of the Philippines has yet been made; the maps and charts are extremely defective, except for the seaboard, in the survey of which the leading maritime nations have co-operated. The official returns themselves, being left to careless functionaries and parish priests, too often give superficial and even contradictory results, while for the uncivilised

natives not even approximate estimates are available. Nevertheless the present population may be fixed at not less than seven millions, or more than nine millions, in a total area of about 118,000 square miles.

Although forming a group quite distinct from Indonesia, from which they are separated by two marine abysses, one nearly two thousand five hundred, the other

Fig. 106.—THE THREE ISTHMUSES OF INDONESIA AND THE PHILIPPINES.

Scale 1 : 18,000,000.



Depths.  
 0 to 1,000 Fathoms.      1,000 to 2,000 Fathoms.      2,000 Fathoms and upwards.  
 ————— 300 Miles.

deep waters of the Sulu Sea communicate with the still deeper Celebes Sea, is traversed by a system of alternating currents over two hundred and fifty fathoms in depth. Lastly, east of the nearly circular trough of the Celebes Sea the peninsula of Minahassa, with the Sanguir Archipelago and other islands, develop a third isthmus sweeping round to the southernmost point of Mindanao. This connecting

over two thousand five hundred fathoms deep, the Philippines are connected with the southern lands by three long ridges, partly rising above the surface, partly covered by shallow water. Of these three isthmuses the north-western is the most regular and best developed, being constituted for over half its extent by the long narrow island of Paragua. Between Mindoro and the north-west point of Borneo the deepest parts of the sill limited by Balabac and Bangney do not average more than twenty-five fathoms. Balabac Strait between Paragua and Borneo is occupied by reefs resembling in outline the alluvial islands of a delta, and formed under the influence of the marine current which, during the south-west monsoon, sets strongly towards the Sulu Sea. The second isthmus is formed by the Sulu Archipelago, which connects the north-east point of Borneo with the western extremity of Mindanao. But here the shallow channel, through which the

ridge is also broken by numerous openings, the broadest and deepest of which lies off the coast of Mindanao. As shown by the submarine explorations of the *Challenger*, the two basins enclosed between the Philippines and Borneo resemble the Mediterranean in the temperature of their lower depths. The cold waters of the oceanic depths are unable to penetrate across the intervening isthmuses into these inland seas, where the thermometer nowhere records less than 50° F.

These three lines of partly emerged, partly submarine, ridges, stretching from Indonesia towards the Philippines, continue their main axis in the interior of this archipelago, and constitute a great part of its relief. Mindanao, least known of the whole group, although one of the most remarkable for its volcanic phenomena, is formed, at least in the west and centre, by the prolongation of the two eastern ridges, indicated seaward by the Sulu and Sanguir Archipelagoes. The Sulu axis, whose normal direction is south-west and north-east, comprises all the western peninsula of Mindanao, while the Sanguir axis, running south and north, strikes the southern point of the same region at the Saragani volcano. Beyond this point it first continues its northerly trend and then gradually sweeps round to the west. East of this mountain range another parallel chain occupies all the eastern section of Mindanao bordering on the Pacific Ocean.

A broad survey of the whole orographic system shows in the same way that, from the southern point of Mindanao to the northern extremity of Luzon, the relief of all the islands is disposed in a line with or parallel to the southern isthmuses. Thus the coast range of the east side of Mindanao is continued north-west in a graceful curve through the islands of Leyte, Masbate, Ticao, and Burias; in the east is developed a parallel curve formed by the island of Samar, the Camarines peninsula in Luzon, and the Isla del Polillo. On the other hand the islands of Bohol, Cebu, Negros, and Panay are disposed in a line with or parallel to the Sulu Archipelago, while Mindoro and the main section of Luzon form the north-eastern extension of Paragua and Borneo. In many places volcanic or other masses mark the points of intersection, and it is noteworthy that in Luzon, most rugged of the Philippines, all the cordilleras converge like the ribs of a dome in the culminating crest of Caraballo. North of the Philippines the mountain ranges, interrupted by broad straits, are continued through Formosa and the Liu-Kieu group towards Japan.

The whole surface of the Philippines is essentially mountainous, the only plains that occur being the alluvial districts at the river mouths, and the spaces left at the intersection of the ranges. Most of the surface appears to be formed of old rocks, especially schists, and, in the north of Luzon, granites. Extensive coal-fields are found in the central islands, especially Cebu and Negros, and in many places these carboniferous beds seem to have been buried under more recent lavas. Later limestones have also been developed by the coral-builders round all the seaboard, and there is clear evidence that along extensive stretches of the coastline these formations have been upheaved to a considerable height above sea-level. They form at some points broad horizontal tables round the headlands, and here are found shells and other marine remains belonging to the same species still living in



the surrounding waters. But about the Gulf of Davao, in South Mindanao, the contrary movement of subsidence has taken place, as shown by the dead or dying forests invaded by the sea.

The Philippines abound in minerals. The natives collect gold in the alluvia of all the islands, but especially in the province of Benguet, Central Luzon, and about the north-east point of Surigao, in Mindanao. Copper is common in the Lepanto hills bordering on the same central district of Luzon, where from time immemorial the natives have extracted the ore and wrought it into implements and ornaments. The blacksmiths also have at hand an excellent iron ore for their arms and instruments. Cebu is said to contain lead-glance yielding nearly half of its weight in pure metal, while the solfataras of many extinct volcanoes have formed inexhaustible deposits of sulphur.

Extinct or still active craters are relatively as numerous in the Philippines as in the Eastern Archipelago, and all seem disposed in regular axes coinciding with those of the islands themselves. In the islet of Dumaran, at the north-east end of Paragua, rise the two active cones of Alivancia and Talarquin, and Sulu has also its burning mountain, which, however, appears to have been quiescent since the eruption of 1641. Sarangani, or Sangil, at the southern extremity of Mindanao, has also been at rest since the seventeenth century. On the range running thence northwards stands the Apo volcano, which was ascended by Montano in 1880, and found to be the highest in the Philippines (10,310 feet). The islet of Camiguin, belonging to the same coast range, forms another igneous cone, which was the scene of a violent outburst in 1871.

West of Apo follow in the direction from south to north several cones, such as Sugut (Cottabato), Macaturin, and Malindang, all probably extinct, but apparently connected through the western islands with the Taal volcano in Luzon. Along this line occurs the still active Malaspina or Canloon, in the northern part of Negros (9,040 feet).

The eastern coast range in Mindanao, consisting mainly of basalts, appears to contain no volcano, unless the large and deep lake Mainit, near the extreme headland of Surigao, is to be regarded as an old crater. The coast range is continued northwards through the island of Leyte, where the argillaceous soil, near the wooded crater of an extinct cone, yields about one-fourth of pure sulphur.

But the igneous energy of the Philippines is concentrated mainly in Luzon, where the superb Bulusan volcano stands at the southernmost extremity connected by a narrow isthmus with the peninsula of Camarines. Farther north follow the craterless Poedal, and on the Gulf of Albay, the Albay, or Mayon volcano, the most dreaded as well as one of the highest (9,000 feet?) in the whole archipelago. Mayon, which is of almost perfectly regular form, covers at its base a circuit of over eighty square miles, its flanks are clothed with forests to a height of about two thousand feet, but higher up little is visible except deposits of scoria, which are very difficult to scale. Nevertheless, both Jagor and Von Drasche reached the summit, the latter in 1876, when no trace could be detected of a crater properly so called. During its frequent eruptions Mayon ejects little lava but prodigious

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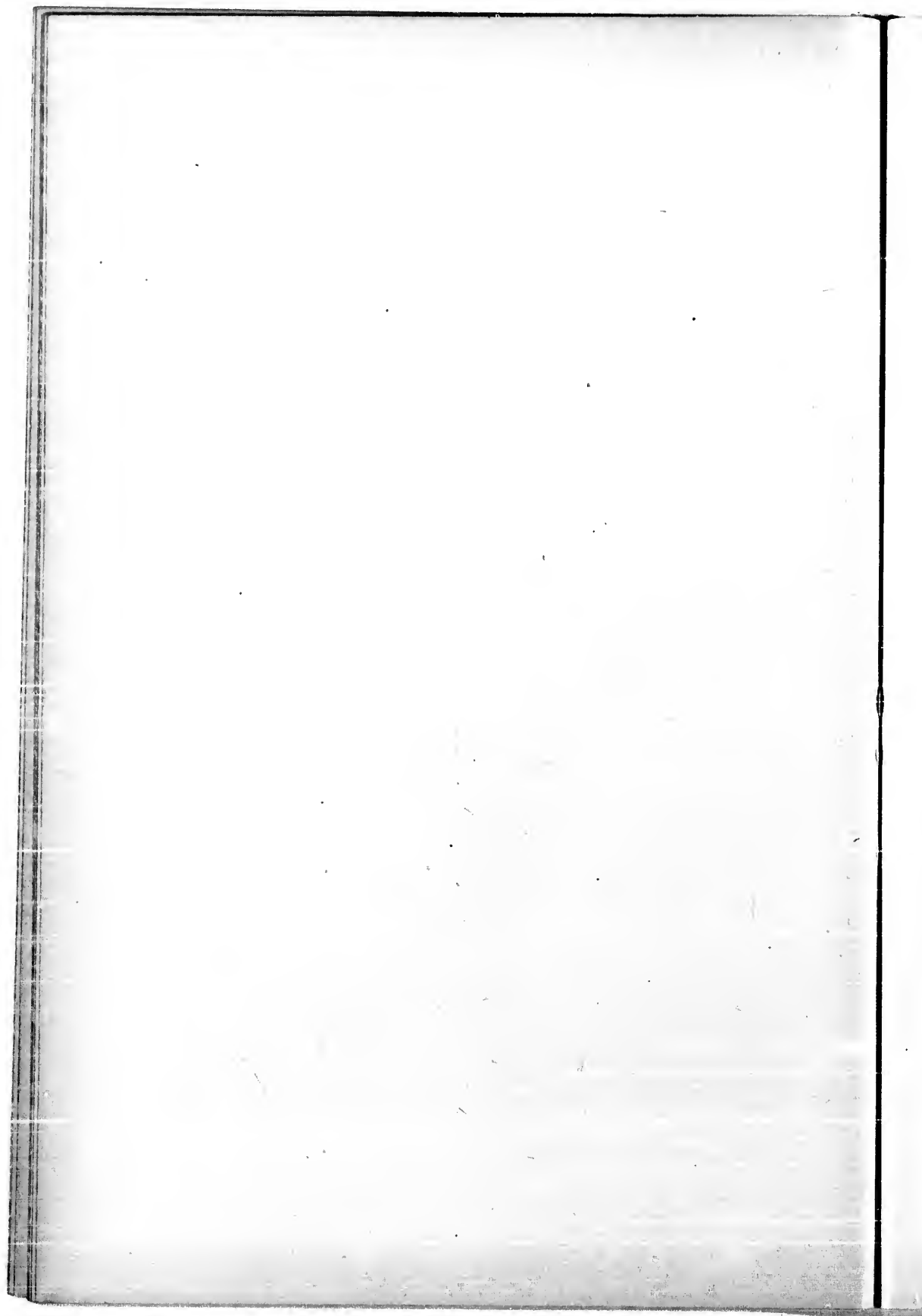
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GENERAL VIEW OF MOUNT MAYON.

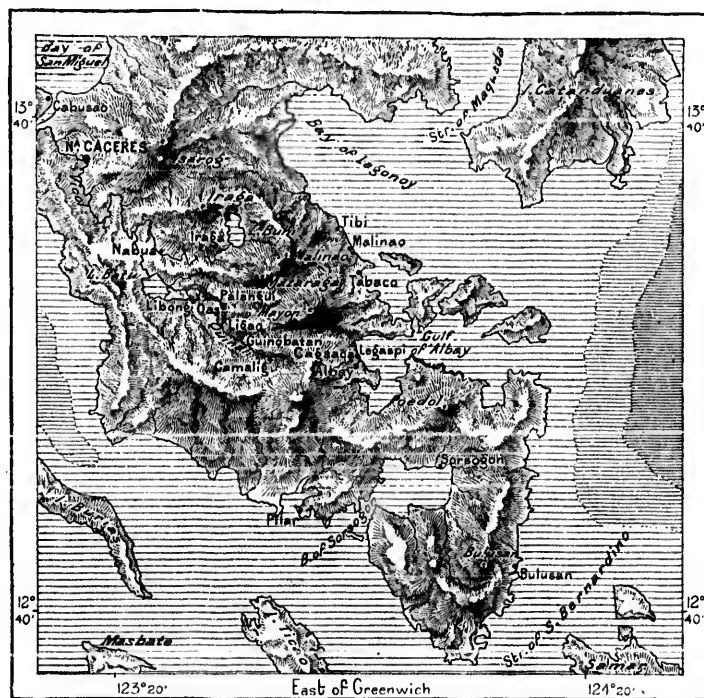


quantities of ashes cover the surrounding districts far and wide. In 1814 the town of Daraga was buried and the ejected matter was wafted as far as Manilla, two hundred miles distant.

Nazaraga (4,445 feet), a craterless dolorite cone, and Malinao, which appears to have been quiescent for ages, continue the igneous chain northwards to Iraga, the scene of a disturbance in 1641, when the little Lake Buhi was formed by a sudden

Fig. 107.—SOUTHERN PART OF LUZON.

Scale 1 : 1,500,000.



landslip. East of this lake the Tibi valley presents the most remarkable group of thermal, sulphurous, and silicious springs in the whole archipelago. They are copious enough to develop a rivulet of hot water, which the people of the neighbourhood utilise for culinary purposes. The springs precipitate considerable quantities of silica, covering the surface with dazzling white incrustations, and one jet of water and vapour has a temperature of no less than 226° F.

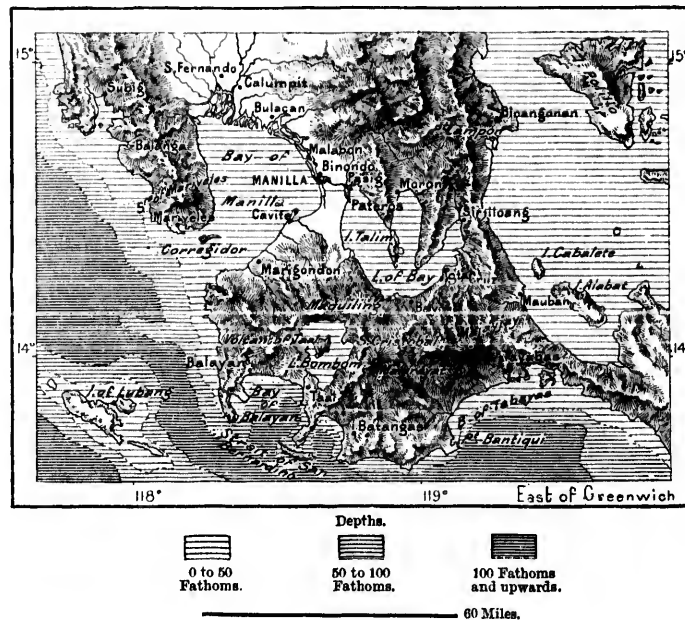
At the neck of the Caramuan peninsula stands the broad-based Ysarog (Isarog),

whose slopes occupy the whole space between the bays of San Miguel and Lagonoy, terminating in a regular cone, 6,450 feet high. Ysarog has been quiescent throughout modern times, and the only sign of former energy appears to be a spring of carbonic acid near the summit.

The northern part of the Camarines peninsula is dominated by the two volcanic masses of Colasi and Labo (Tetas de Polantuna), which, however, have no craters, and apparently have been at rest since prehistoric times. Mujayjay (6,500 feet) and San Cristobal (7,660 feet), south-east from Manila, are also extinct. But west of them stands the volcano of Tual, which, although only 780 feet high, is one of the most remarkable in the Philippines. It occupies, with two other lesser cones,

Fig. 108.—CENTRAL PART OF LUZON.

Scale 1 : 2,500,000.



an islet in the middle of Lake Bombon, which is separated from the China Sea by a low narrow isthmus. Tual, whose flanks are furrowed by deep gorges, terminates in an enormous crater, out of all proportion with its size. "Purgatory," as the natives call this crater, has a circumference of over 4,300 yards, and contains in its depths secondary craters, numerous crevasses emitting vapours, and two blue lakelets charged with sulphuric and hydrochloric acids in the proportion of over six per cent. Formerly the two other volcanoes in the island—the Great and Little Binintiáng—ejected ashes alternately, and the bed of the lake itself was occasionally in a state of eruption; but since 1749 all the underground forces have been centred in Mount Tual, which casts up showers of pulverised rock, but

no lavas. The last outburst in 1885 destroyed all traces of vegetation in the island.

Bombon, which is nearly 640 feet deep, was probably a vast crater, of which the islet with its three volcanoes is merely the central cone, while the walls of tufa, over 600 feet high, encircling the north and east shores of the lake, are the remains

Fig. 100. — LAKE BOMBON.

Scale 1 : 800,000.



of the original rim of the crater. But, like that of the island of Saint Paul, this crater was formerly open towards the sea, as shown by the present intervening barrier, which is entirely composed of eruptive scoriæ. The water of the old inlet, thus converted into a lake, is still somewhat saline, although constantly renewed by rain water, and although the overflow is carried off by an emissary running south-west to the coast. The marine fauna inhabiting the lake has gradually adapted itself

to its modified environment. The great Lake Bay, or the Laguna, south-east of Manilla, was also probably an ancient marine gulf cut off from the sea by the narrow isthmus of recent formation on which stands the capital of the Philippines. According to Semper, the Laguna is inhabited by the shark and another sea-fish found in the neighbouring marine waters. The peninsulas and islets in the northern part of the Laguna, as well as the island of Corregidor, at the entrance of Manilla Bay, consist of igneous rocks, but all have been quiescent throughout the historic period.

The contradictory statements of Spanish writers leave it doubtful whether any outbursts occurred in the seventeenth century at Mount Aringay, or Santo-Tomas (7,530 feet), which rises above the east side of Lingayen Bay. Data, lying to the north-east of Aringay, is certainly quiescent, although, like several other cones in this group, it is encircled by thermal springs and solfataras. No other volcano occurs between this district and the northern extremity of Luzon, where Cagud (3,920 feet), at the terminal headland, constantly emits wreaths of smoke. Beyond this point the igneous system is continued under the sea to the island of Camiguin (2,415 feet), which contains a productive solfataras. In the neighbouring Babuyan, an active volcano rose above the surface in 1856; four years later it had attained a height of nearly 700 feet, and since then has continued to grow, its present elevation apparently being about 800 feet. The reefs of Dedita, on which the new volcano stands, would themselves appear to be the remains of an old burning mountain. In this vast igneous chain, which extends from Sangil for about 1,000 miles northwards, the last member is Babuyan Claro, whose fiery cone, over 3,000 feet high, lights up at night the dangerous waters of the Sea of Formosa. This great island is connected with the Philippines through the reefs and islets of the intervening Batanes (Bashee) Archipelago.

Few regions are more subject to underground disturbances than the Philippines. Despite the numerous "safety-valves" which, according to certain theories, are offered by the active volcanoes to the subterranean forces, this archipelago may be said to be in a continual state of tremor. The seismographs of the Manilla Observatory are constantly vibrating; the crust of the earth is incessantly quivering with undulations, normally running in the direction from west to east, and few years pass without some disaster caused by these oscillations. The city of Manilla has been frequently wasted by such convulsions, and most of its public buildings and European houses built of stone were levelled to the ground by that of 1863, the most terrible on record. The no less violent shock of 1880 was far less disastrous, the edifices having in the interval been constructed on a plan better able to resist the effects of these oscillations.

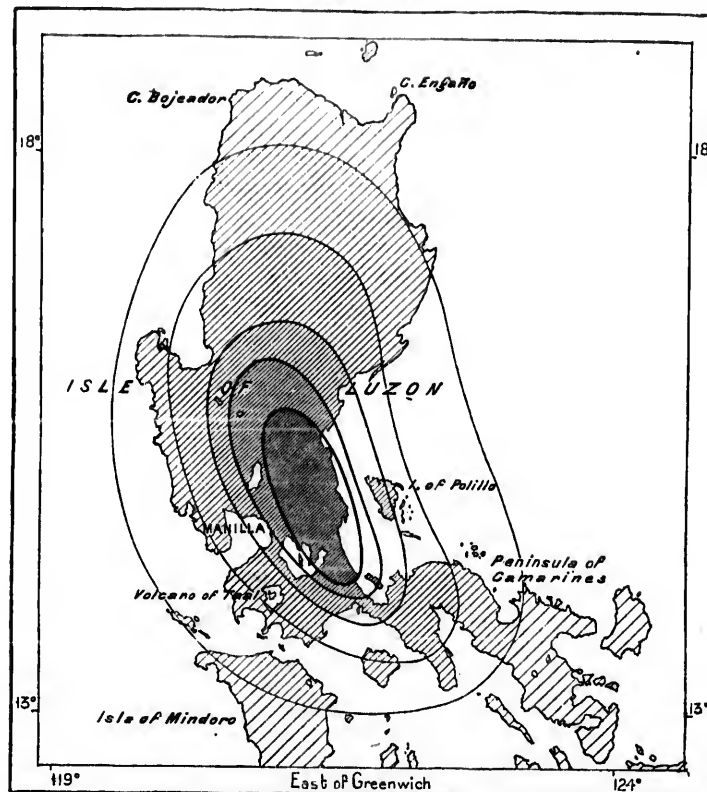
During the earthquake of 1880 Taal and several other volcanoes were in full eruption, and a submarine crater, between the island of Polillo and the east coast of Luzon, rose above the surface; but the following year this heap of ashes had entirely disappeared, washed away by the waves.

The disposition of the mountain ranges in parallel chains has afforded space for the development of some considerable streams both in Luzon and Mindanao. The

most copious is the Cagayan, or Rio Grande, which after a course of over 200 miles between two cordilleras in Luzon enters the sea through a broad estuary facing the island of Camiguin. The Agno, which reaches the coast on the south side of Lingayen Bay, receives the waters and auriferous sands of the Benguet Cirque, a limestone amphitheatre, supposed by some to represent an ancient upheaved atoll. The Pampangan, which traverses the vast plain of like name, after receiving the

Fig. 110.—EARTHQUAKE OF 1880.

Scale 1 : 6,500,000.



overflow of several lakes joins the sea on the north side of Manilla Bay, where it has developed a broad delta projecting beyond the old coast-line. The Pasig, which falls into the same bay, is only 12 miles long; but like the Russian Neva acquires great importance as the emissary of the Laguna, and because Manilla, capital of the Philippines, stands upon its banks; small, flat-bottomed steamers ply on the Pasig, between the lake and the sea.

In Mindanao the largest river is the Agusan or Butuan, which is navigable for over



60 miles from its mouth. Another stream, also known as the Rio Grande, is said to rise in Lake Magindanao, in the centre of the island, flowing thence south-west and north-east to Illana Bay in the Celebes Sea.

#### CLIMATE, FLORA, FAUNA OF THE PHILIPPINES.

The climate of the Philippines is essentially maritime and tropical; in other words, the temperature, normally very high, oscillates within very narrow limits. Thus the heat, varying little from month to month, is useless to distinguish season from season, and the year, as in Indonesia, is divided rather by the alternating wet and dry monsoons.\* The polar current from the north-east prevails from October to April, the moist south-west monsoon for the rest of the year. The change of the trade winds is always dreaded, being often attended by sudden *baguios* or typhoons, which rise in the Pacific, and sweep across the archipelago to the north of Mindanao, wrecking vessels by the dozen, demolishing villages, destroying thousands of lives, and spreading ruin far and wide. The typhoon that struck Manilla in 1882, the most terrific on record, travelled at the prodigious velocity of 140 miles per hour. At present a submarine cable communicating with Hong-Kong signals the approach of these storms, thereby greatly diminishing their disastrous effects.

Lying between Indonesia and Formosa, the Philippines present in their flora and fauna a natural transition between these two regions; nevertheless they also possess a number of characteristic species, which in some cases are even confined to a single island. Mindanao, the least-known region of the archipelago, appears to be also the richest in special vegetable forms. The sixty species of large trees in its forests, yielding valuable timbers for ship-building, cabinet-work or carving, include a myrtacea (*Xanthostemum verdugonianum*), an almost incorruptible wood whose range extends to Australia. The *balete*, or banyan, is very common throughout the archipelago, where it often attains enormous dimensions. Palms also are numerous, while the cinnamon, clove, and pepper grow wild in the southern forests. The tea plant has been discovered in Luzon, and is now cultivated in the botanic gardens with good results. In 1882 botanists had already recognised 1,163 genera and 4,583 species of plants in the archipelago.

No carnivorous animals occur except the ngiao, a species of wild cat, although the natives speak of a tiger or leopard in Paragua. Amongst the other mammals are the wild boar, dangerous in some districts, two species of antelope, several varieties of the deer family, the *Macacus cynomolgus* and other apes. Birds are very numerous, and the gallinaceæ especially are represented by some superb forms, such as the *labuyo* and *buticsigay*. The neighbouring seas abound in animal organisms of all kinds, and some of the rivers team with fish. Amongst these is the curious dalag, or snake-head (*Ophiocephalus*), furnished with water-pouches on either side of the head, which enable it to remain long out of its natural

\* Mean annual temperature of Manilla from 1870 to 1880 82° F.; highest (September), 97°; lowest (February), 59°; rainfall about 100 inches.

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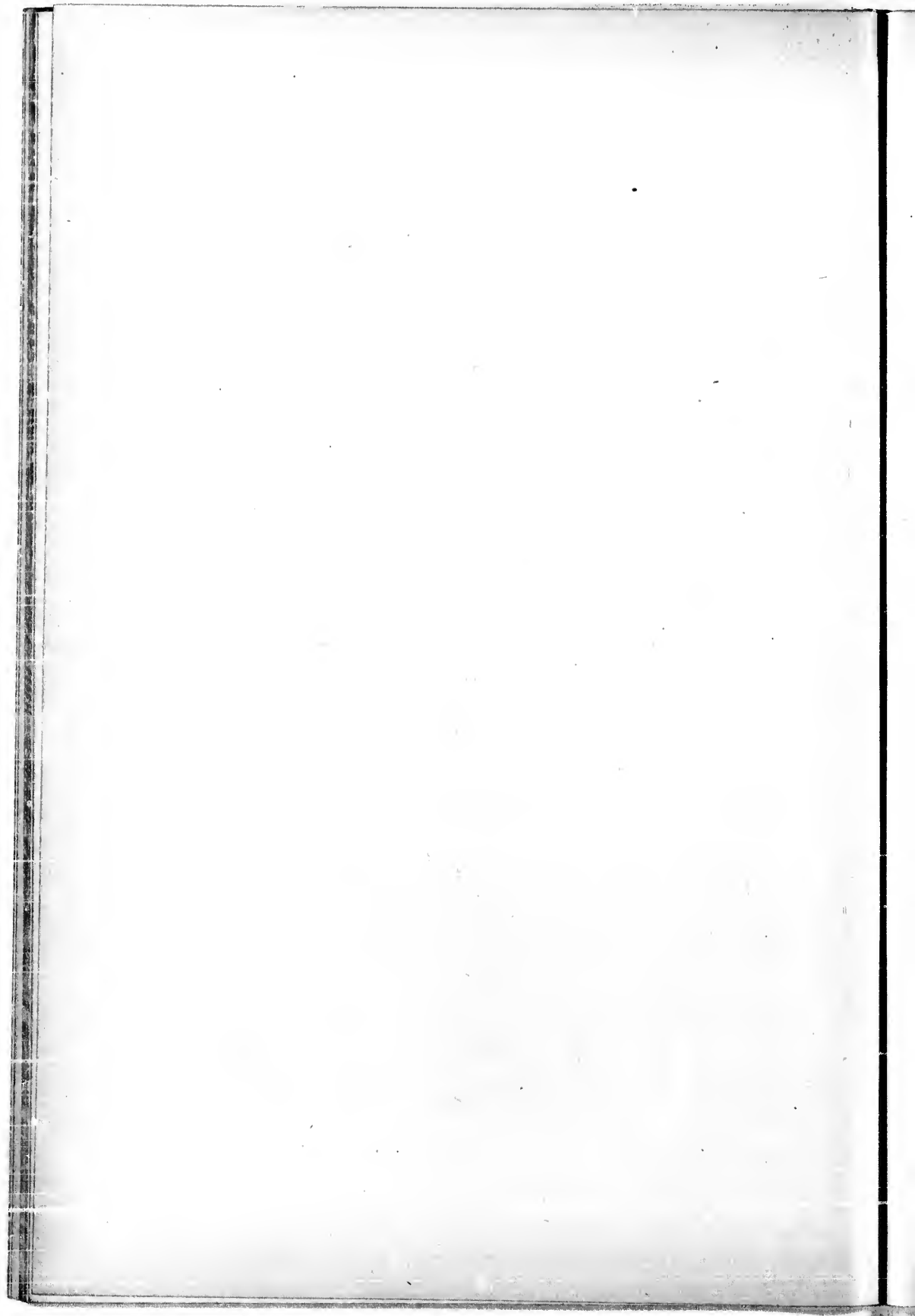
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PUEBLO OF CIVILIZED NATIVES, MANILLA DISTRICT.



element ; it is met browsing far from the streams, and even climbing up the stems of palm-trees. All the venomous orders of snakes are represented in the local fauna, and crocodiles grow to an enormous size, some having been met about 30 feet long, at least according to De la Gironnière.

## INHABITANTS OF THE PHILIPPINES.

The aborigines, gradually driven back or exterminated by the intruding Malays, have disappeared altogether from some of the islands, and in the others are now met only in scattered tribal or family groups. The full-blood Aetas (Atas, Itas), as these Negritos, or "Little Negroes," are collectively called, do not number at present more than twenty thousand in the whole archipelago ; but traces of Negrito blood may be detected in large sections of the population, which presents every shade of transition in physical appearance, culture, and usages, between the Negrito and Malay elements. The pure blacks are most numerous in the island of Negros, but they are also found in all the other islands, except the archipelagoes north of Luzon, and apparently Samar, Leyte, Bohol, and Sulu.

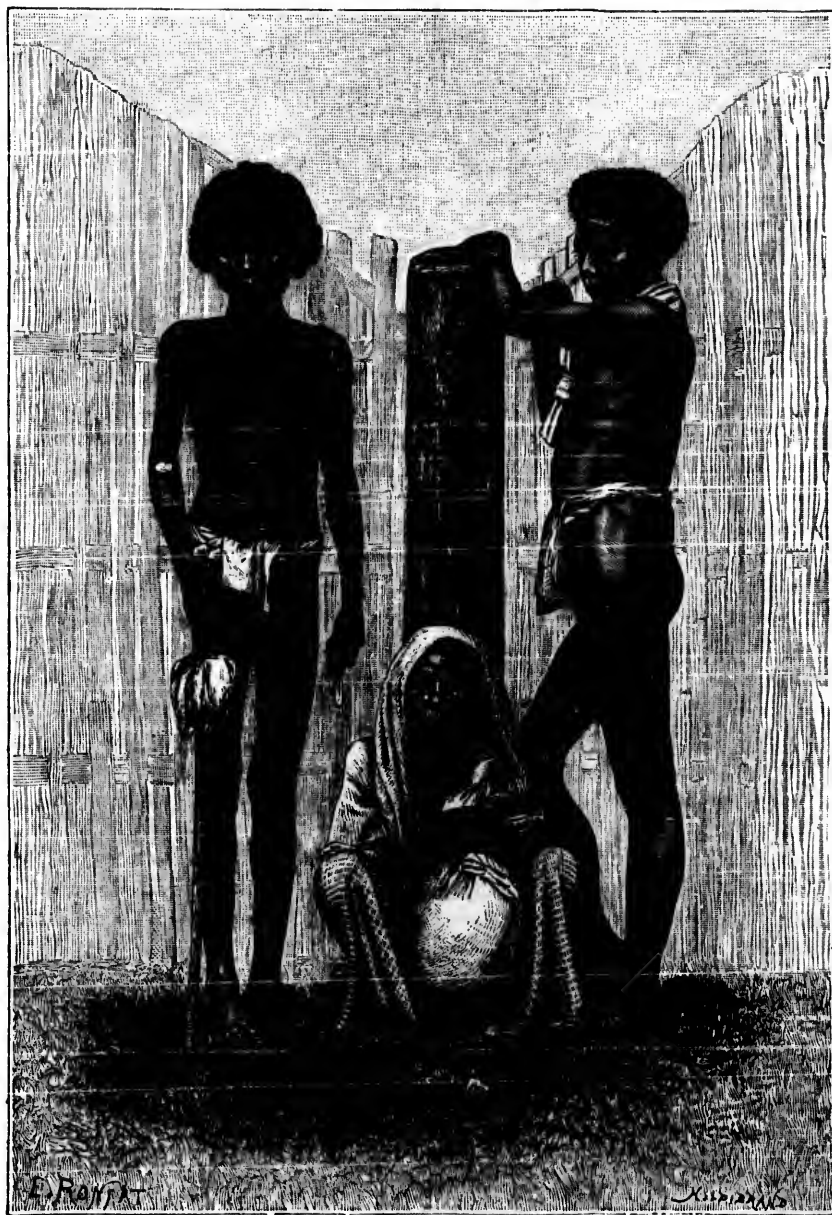
The Negritos fully deserve their name, for the average height is under five feet. The head is relatively large, with bright eyes, high forehead, abundant frizzly and at times almost woolly hair, slender extremities, calf almost absent, and great toe often standing wide apart. The wrinkles of the face combined with their projecting jaws give them at times quite a simian aspect. The Aetas speak Malay in their intercourse with their more civilised neighbours, but amongst themselves they use words of unknown origin, supposed to be derived from the primitive language which was still current in the seventeenth century. It appears, however, that many of their tribes must have been subject to Malay influences from very remote times, for the dialects spoken in some districts undoubtedly belong to the Malayo-Polynesian family, although the Aetas themselves are sprung from a totally different ethnical stock.

Most of the tribes practise tattooing ; circumcision is also very general, and in some parts the women artificially deform the skulls of their children. Except in the vicinity of populous districts little clothing is worn beyond a loin-cloth by the men, and a short skirt by the women. In some places they build huts of branches and foliage, and even pile-dwellings like those of the Malays ; but elsewhere their only protection from the inclemency of the weather are frail screens of palm-leaves, which are placed against the sun, wind, or rain. In the provinces where they are gradually becoming civilised, they clear and till the land, raise poultry and pigs, and enter into trading relations with the Malays. But being unable to reckon beyond four and five, they are easily cheated, and they have evidently a profound sense of their own inferiority, reserving the term *tao*, or "men," to the dominant race.

Apart from the Negritos, the Chinese settlers, the Europeans and half-castes, the entire population, at least north of Mindanao, is of Malay origin and speech. At some unknown, but certainly very remote epoch, the Malay ancestors of the

present inhabitants effected a permanent footing in the archipelago. The term

Fig. 111.—GROUP OF NEGROES.

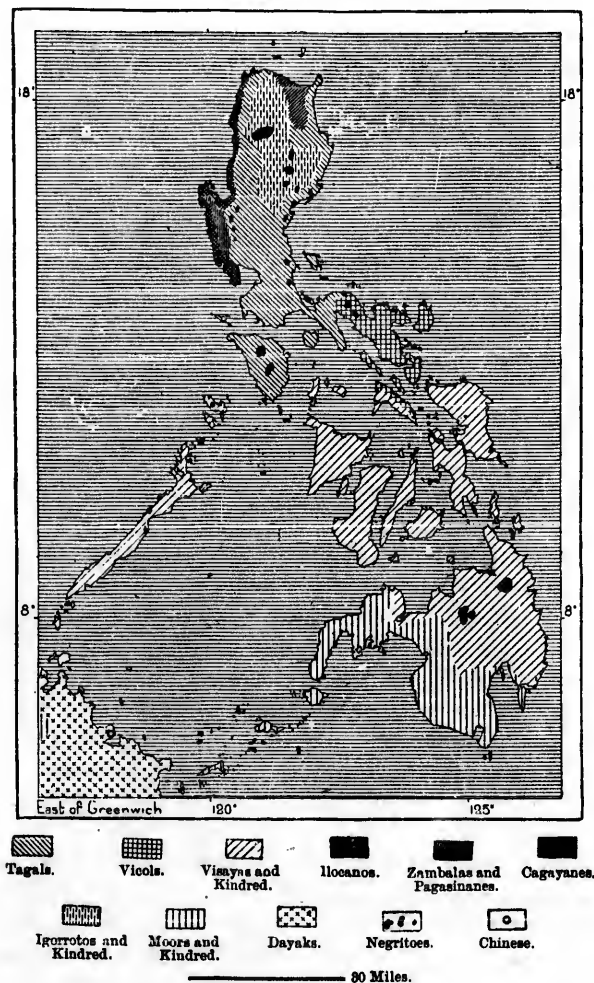


*balangay*, or boat, still applied to the villages, recalls the time when these mariners,

encamping on the beach, continued to lead much the same lives as when scouring the high seas in their praus. As was the case with the sampans or junks of the more recent Chinese settlers, every balangay became the cradle of a Malay colony. In general the Philippine Malays resemble those of Indonesia, except that in

Fig. 112.—CHIEF INHABITANTS OF THE PHILIPPINES.

Scale 1 : 12,000,000.



some places, and especially Luzon, a slight transition is presented towards the Chinese type. Thus the oblique eyes, rare amongst the southern Malays, is on the contrary a distinctive feature of the northern Malays. Independently of their special local characteristics and dialects, all are broadly grouped in three classes

according to their religion and pursuits. Those who have accepted the authority of the whites and the ministrations of the Catholic clergy are called *Indios*, or "Indians," and this class is gradually merging in a common nationality. Those of the south, who remain followers of the Prophet, are collectively known as *Moros*, or "Moors;" lastly, the tribes that have maintained their independence, or submit impatiently to the foreign yoke and still practise their old pagan rites, form the class of *Infieles*, or "Infidels."

Of the *Indios* the most civilised are the Tagals (Ta-Gala), who number 1,500,000, and are steadily increasing, less by the excess of births over deaths than by the gradual assimilation of the surrounding tribal groups. The Tagal domain, which comprises all the central parts of Luzon, is slowly encroaching on all the other populations of the island. Thus in the north it has already absorbed the territory of the Pampangos and Pangasinanes, in the north-east that of the Aetas, in the south-east that of the Vicolos, while the islands of Mindoro and Marinduque have also become "Tagalised." The Tagals are met everywhere along the seaboard, and are in fact the chief pioneers of European culture throughout the archipelago. Besides them there are other groups of *Indios*, even in Luzon, such as the Ilocos or Ilocanos on the west coast north of Lingayen Bay, and the Ibanags or Cagayanes in the extreme north and neighbouring islands.

The Vicolos, or Bicolos, who occupy the Camarines peninsula, with the islands of Catanduanes, Burias, Ticao, and half of Masbate, greatly resemble the Tagals, and like them were already somewhat civilised before the arrival of the Spaniards. They number at least 400,000, including the Cimarrones and a few other groups who still keep aloof in the more inaccessible hilly districts. The third great ethnical division of the *Indios* are the Visayas, or Bisayas, who are estimated at 2,500,000, and who give their name to the cluster of islands comprised between Luzon and Mindanao. They have also formed several settlements on the coast of Mindanao itself, and to the same division belong the inhabitants of the Calamianes Islands and of Paragua, although their darker colour and wavy hair betray evident traces of Negrito blood. The Visayas had formerly the habit of "painting themselves with fire," whence the term *Pintados* applied to them by the Spaniards. But since their submission and acceptance of Christianity, they have discontinued this practice, as well as that of head-hunting, formerly universal.

The "Moors," who occupy the Sulu Archipelago and the southern shores of Mindanao, comprise, like the *Indios*, a considerable number of distinct tribes or nations, united by the common ties of their Mohammedan faith and social usages. Amongst them are groups resembling the Bornean Dayaks, the Bayos of Celebes, and other Malayan peoples. The aristocratic families are Arabs, or else from Borneo or Ternate, while traces of crossings with the Chinese and Spanish renegades may also be detected. The roving habits of these corsairs, who were continually carrying off the women from all the surrounding regions, have made the Moors one of the most mixed populations in the extreme East.

Their essentially feudal institutions caused the whole social organization to rest on piracy. By the side of the sultans were their almost equally powerful vassals.

the *datu*, each of whom, with the reservation of the homage due to his suzerain, became proprietor of the lands conquered and wealth plundered by his retainers. The *tao marahay*, or "good men," that is, the free warriors, accompanied them on their predatory expeditions, while the *sacope*, or lack-land class, were reduced to a state of serfdom. Like the Norman knights they issued forth in search of adventure, to do battle against the infidel in the name of the true faith, or to acquire renown by carrying off women, slaves, and treasure. In the early years of the

Fig. 113.—IPUGAO INDIAN.



sixteenth century they were beginning to overrun the Philippine Archipelago, and but for the intervention of the Spaniards there can be no doubt that the Tagals would at present be Mohammedans. Piracy in these waters was not entirely destroyed till the latter half of the present century by the Spanish occupation of the Mindanao seaboard and the Sulu Archipelago.

The pagan populations, often confounded by the Spaniards under the general name of Igorrotes, still form a considerable section of the inhabitants both in Luzon and Mindanao. The Igorrotes, properly so called, dwell east of the Iloccs, in the



Benguet Valley and surrounding hilly districts. North of them are the Tinguianes, whose Christianity is limited to the possession of crucifixes used as talismans; eastwards the upper Cagayan basin is held by the Ilongotes, Ifugaos, Catalanganes, Irayas, and other pagan tribes. The Tinguianes, whose complexion is almost white, are regarded by most observers as half-castes of Chinese origin, whereas the Igorrotes appear to be Tagals, who have hitherto preserved their primitive religion and usages. They believe in a supreme God, and in other deities in whom are personified the phenomena of nature. To these they offer sacrifices, although their chief worship is that of their *anitos*, or ancestors, whose souls rustle in the foliage of the sacred tree planted at the entrance of every village. These *anitos* also appear at times in the form of animals, and in many parts of Luzon, as in Celebes, the fish ponds are stocked with eels which are tended by the natives with filial piety.

Strict laws of solidarity bind together the family group, and all outrages must be avenged by death; hence the hereditary feuds, and the prevalence of head-hunting amongst these tribes. The Ifugaos use the lasso to seize the passing foe and drag him suddenly under the sharp knife. Amongst the Igorrotes certain practices survive pointing at former Brahmanical influences, and the very term *divata*, applied to the national deities, is of Hindu origin.

In Mindanao, the "Infidels" comprise numerous communities, which are often grouped by the whites under the collective name of Manobos. But this term should properly be restricted to the natives of the north-east, who occupy the Agusan basin and the Surigao peninsula. Some of those dwelling near the coast have been conquered and converted by the Spaniards, others in the interior present the Malay type of the Visayans more or less modified by Negrito crossings. But most of the tribes appear to be of the Indonesian stock, which is closely allied to the eastern Polynesian, and characterized by high stature, fair complexion, and well-proportioned figures. The lobe of the ear is usually pierced for the introduction of bone and other ornaments; the teeth of the young men are filed according to a different pattern for every clan; the heads of the children are artificially deformed in many communities, and various systems of tattooing prevail amongst the different tribes.

The expression "Land of Terror," applied by Montano to the eastern regions of Mindanao, might with equal truth be extended to nearly the whole island. When the Manobos, led by their high priest with his divine talisman, have succeeded in surprising their sleeping enemies, they slaughter all the men and carry away the women and children into slavery. After the victory the high priest opens the breast of the victim with the sacred knife, plunges the talisman in the flowing blood, and eats the heart or liver raw. The Mandayas, who slay for honour, have a special term, *bagani*, to designate the hero who has cut at least fifty heads, and who has alone the privilege of wearing a scarlet turban. Vast territories have been transformed to solitudes by this incessant intertribal warfare.

Of foreigners settled in the Philippines the most numerous are the Chinese.

From time immemorial their colonies have fringed the seaboard, and in nearly all the tribes traces may be detected of Chinese crossings. According to the imperial annals, the native princes sent envoys and tribute to the "Children of Heaven," and objects of Chinese workmanship found in the local graves show that trading relations had long been established between the two regions. Three times during the seventeenth century the Chinese of Luzon rose against their Spanish masters, and each time the revolt was quelled in torrents of blood. After all manner of harassing restrictions were imposed on these troublesome immigrants, they were expelled in mass or massacred in 1763, soon after the temporary occupation of Manila by the English. But with them trade disappeared, and despite the contempt of Europeans and the hatred of Tagals, they had soon to be recalled, so that at present every town in the archipelago has its Chinese quarter. In 1887, they were estimated altogether at fifty-three thousand, almost exclusively men, most of whom return to China after making their fortune, and generally leaving behind them a family of half-castes. These half-castes, who resemble the Chinese much more than the native type, found new homes in their turn, and, thanks to their surprising vigour, they constitute at present the majority of the bourgeois class in most of the towns.

Although the Spaniards made their appearance forty-four years after the death of Magellan, the conquest of the archipelago is still far from complete. Although by an abuse of language spoken of as a colony, it is really a military possession, in which the whites are mainly officials, who control the natives, but found no permanent settlements in the country. The Spanish creoles, however, who have not maintained the purity of their blood, are perfectly acclimatised, and become the heads of numerous more or less mixed families. The white element, in which are also represented some Peruvians and Mexicans, numbers altogether about fourteen thousand, a proportion not greater than that of the Dutch in Indonesia.

Apart from the wild tribes in Mindanao and elsewhere, the inhabitants of the Philippines are amongst the most civilised in the extreme East. In most of the provinces the villages of the *Indios* are well kept and far superior, in many respects, to the irregular groups of cabins still to be seen in so many European lands. Each dwelling is isolated in the midst of a flowery garden, and separated from the adjoining plots by rows of palms and bananas. The houses are all raised on piles about seven feet above the ground, thus recalling the time when the natives dwelt on alluvial lands on the shores of lakes or the sea. The timber framework of these houses is carved with the greatest care and often with much taste; while the well-swept and polished apartments are fitted with good furniture and Chinese ornaments.

Except in the territory of the *Ilocos* and some other parts, each family has its little independent plot of land, and this system of small free lodgings prevails throughout most of the archipelago. Apart from a few Chinese half-castes nobody owns extensive domains, but all have enough, taking one season with another, to support their families and leave a little for the feasts and holidays. In the thickly peopled provinces the land is divided and subdivided into innumerable allotments

for the cultivation of rice, sweet potatoes, and other alimentary produce. All the plots belong to the cultivators themselves, who sell only the surplus of their crops, and this surplus, bought up by Chinese and other middlemen, constitutes the great bulk of the commodities exported by the Manilla merchants. But the exports are still far less than they might be, for the cultivated lands are estimated at not more than 4,500,000 acres, or scarcely one-fifteenth of the whole area of the archipelago.

One of the last of the old government monopolies was that of tobacco, which was not abolished till the year 1882. This plant is cultivated chiefly in the northern provinces of Luzon, and especially in the Cagayan basin. Formerly the labourers on the plantations were little better than serfs. Every village was bound to deliver a certain quantity of tobacco at a price far inferior to the real value. The result was that the cultivators, oppressed by official rapacity, found no time to till their rice-fields, and, despite the great fertility of the soil, they were constantly threatened with famine. The monopoly tended also to impair the quality of the leaf, and the Manilla cigars, badly prepared by servile labour, became greatly inferior to those of Havana. At present the Philippines hold the fifth place for the production of tobacco, standing before Cuba and coming next after the United States, Turkey, Brazil, and Indonesia. The plantations suffered much from the ravages of parasites before the introduction of certain insectivorous birds from Cochin-China.

Sugar, which stands first on the list of exports, goes almost entirely to the United States and Great Britain. The crop is about two-thirds of that of Java, and is now valued at about £2,000,000. Coffee, much neglected after the Franco-German war, has again acquired some importance; but cacao and other colonial produce contribute little to the export trade. An extensive local industry has been developed in connection with the *Musa abaca*, commonly known as "Manilla hemp," from which are woven textile fabrics superior in strength and lightness to those made of the best Russian hemp. These articles are seldom exported, being almost entirely bought up by the Chinese half-castes for the local consumption. The banana, which yields the fibre for this industry, flourishes best in the Camarines peninsula, where as much as thirty cwts. are raised on an acre of ground.

None of the other native industries have acquired any development, so that most manufactured wares have to be imported from abroad. During the last decade the movement of exchange has increased rapidly, thanks to the abolition of certain monopolies, the reduced customs dues, the free admission of foreign shipping, and the opening of new ports to trade. Regular lines of steam-packets ply now between Manilla and the two great British marts of Singapore and Hong-Kong, while smaller steamers maintain the communications between the capital and the chief seaports of the archipelago. But the great natural resources of many inland districts still lie dormant, owing to the almost total absence of good roads and of railways, beyond a short line running from Manilla northwards.

On the other hand, the social position of the people is greatly superior to that of the Javanese and other populations under Dutch administration. Most of the

Indios have learnt to read and write Spanish, and even when employing their native idioms they substitute the Roman for the somewhat rude and difficult characters of Hindu origin, which were in use before the arrival of the Spaniards. The civilised natives have also adopted the European costume, though in a modified form, wearing the shirt as a blouse, and the Chinese form of hat.

Speaking generally, the Indios of the Philippines may be regarded as amongst the happiest populations in the world. They lead a pleasant, easy life in the midst of their fragrant gardens, under the shade of fruit-laden palms, and on the banks of babbling brooks. In many places they sow their rice in cadence, to the sound of violin or clarionette. But they yield too readily to indolent habits, and omit no opportunity of indulging in the national vice of gambling. Cock-fighting is a favourite sport on feast days, and the Roman Catholic religion itself is for them little more than a succession of festive amusements. Troubling themselves little with questions of dogma, they display extraordinary zeal in the celebration of the pompous rites of the Roman liturgy, and a great part of their existence is thus passed in the observance of practices not greatly differing from those of their primitive cult. A domestic altar, with the images of the Madonna and saints, successors of the ancient *anitos*, occupies the place of honour in every household, and the humblest hamlet has its special feast, during which these sacred images, draped in embroidered silks and crowned with chaplets of flowers, are borne at the head of brilliant processions. The churches, built in the Spanish "Jesuit" style, are similarly decorated with rich hangings, bannerols and floral festoons, while every village has its band of musicians, who accompany the religious ceremonies with a flourish of trombones and cymbals. Actors also are frequently engaged to perform the "mysteries," and play comedies in which the sacred and profane are strangely intermingled, the feast days kept in honour of the saints usually winding up with a grand display of fireworks.

The curé, especially if a Spaniard by birth, is the most influential person in the district, and to him the "Capitan" applies for advice on all serious occasions. The church bells announce the hour of his siesta, and on him far more than on troops and arms the government depends for the absolute submission of the converted natives. But the increasing relations with the outer world, the spread of education, the diffusion of profane literature daily penetrating more and more despite the censure of the press, all tend to bring about a new order of things, under which the Indios, while becoming more assimilated to their European master, must gain in independence and moral freedom. Hence the local clergy show themselves little favourable to changes threatening to diminish their influence over their congregations. They even see with reluctance the slow spread of the Spanish language amongst the natives. But this result is inevitable since the official decree that no Indio can henceforth exercise any remunerative or public function, even in the villages, unless he can read and write Spanish.

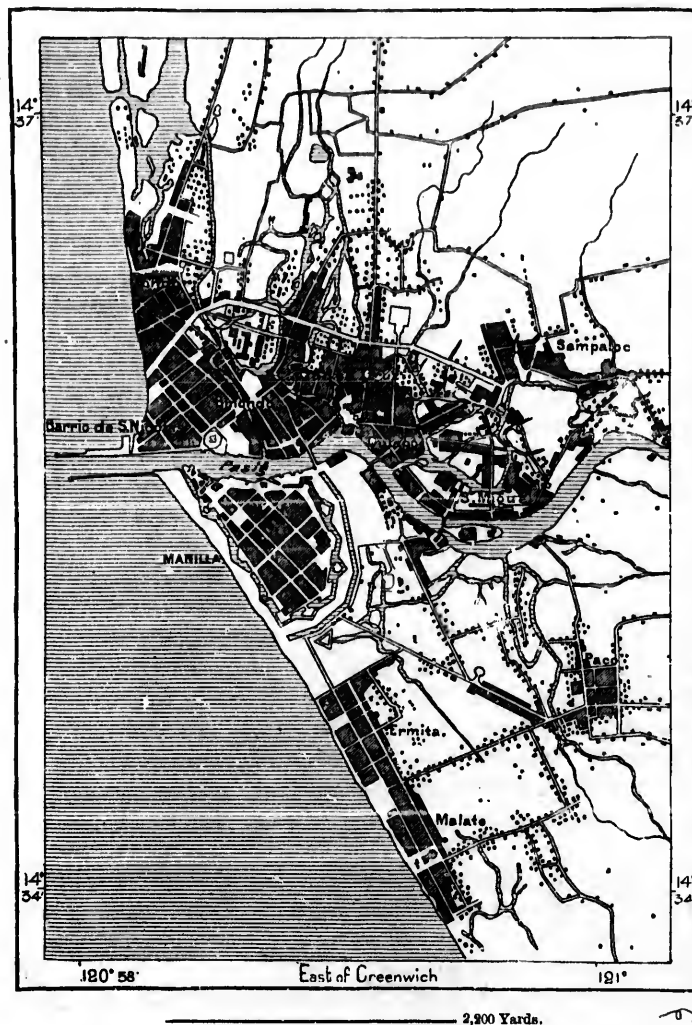
#### TOPOGRAPHY OF THE PHILIPPINES.

*Manilla*, capital of the Philippines, lies on a spacious oval-shaped bay at the

mouth of the Pasig emissary of the neighbouring Laguna. The city properly so-called, enclosed by a line of ramparts, occupies the site on the left or southern bank, which was chosen by Lopez de Leguspi in 1571 as the bulwark of Spanish power

Fig. 114.—MANILLA.

Scale 1 : 45,000.



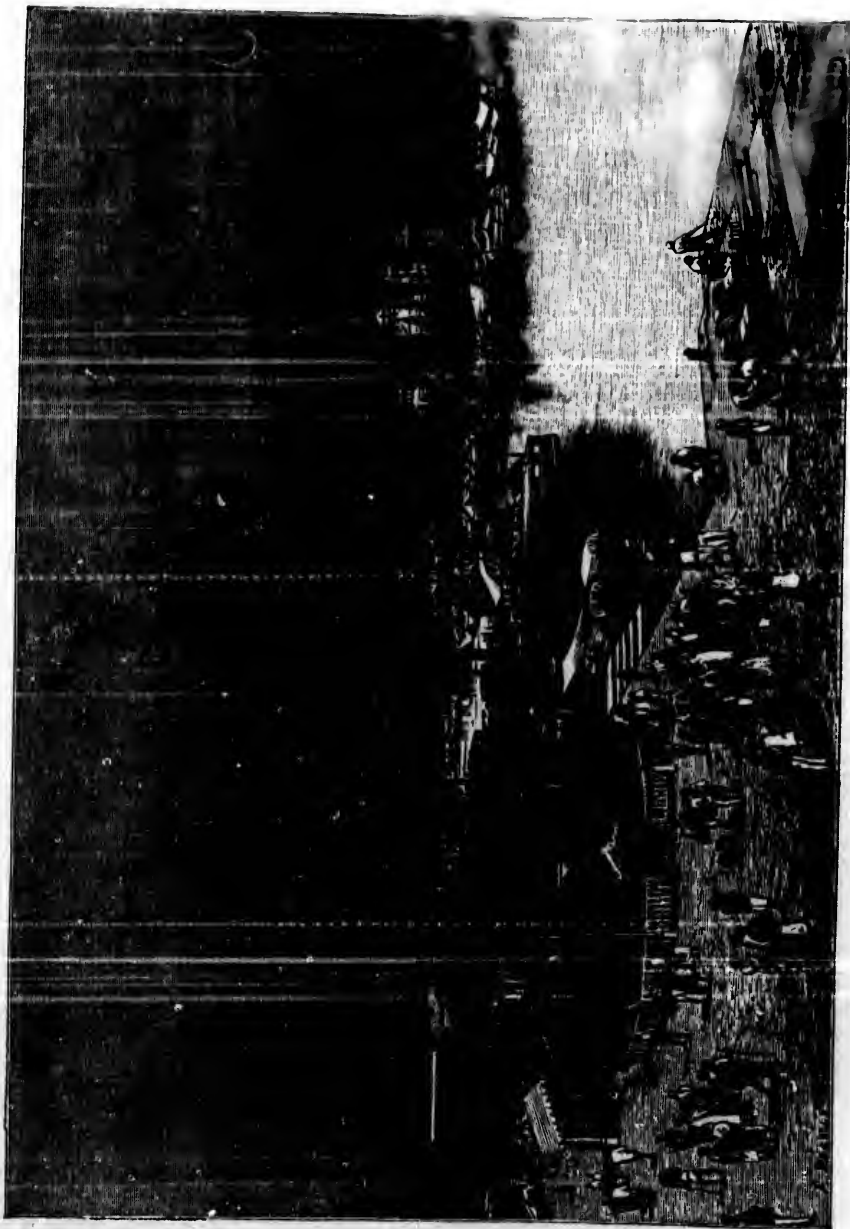
in the Eastern seas. Here are centred the administrative buildings, barracks, and convents, while trade and the industries have migrated to the quarters on the north side, which are connected by two bridges with "walled Manilla," as the old

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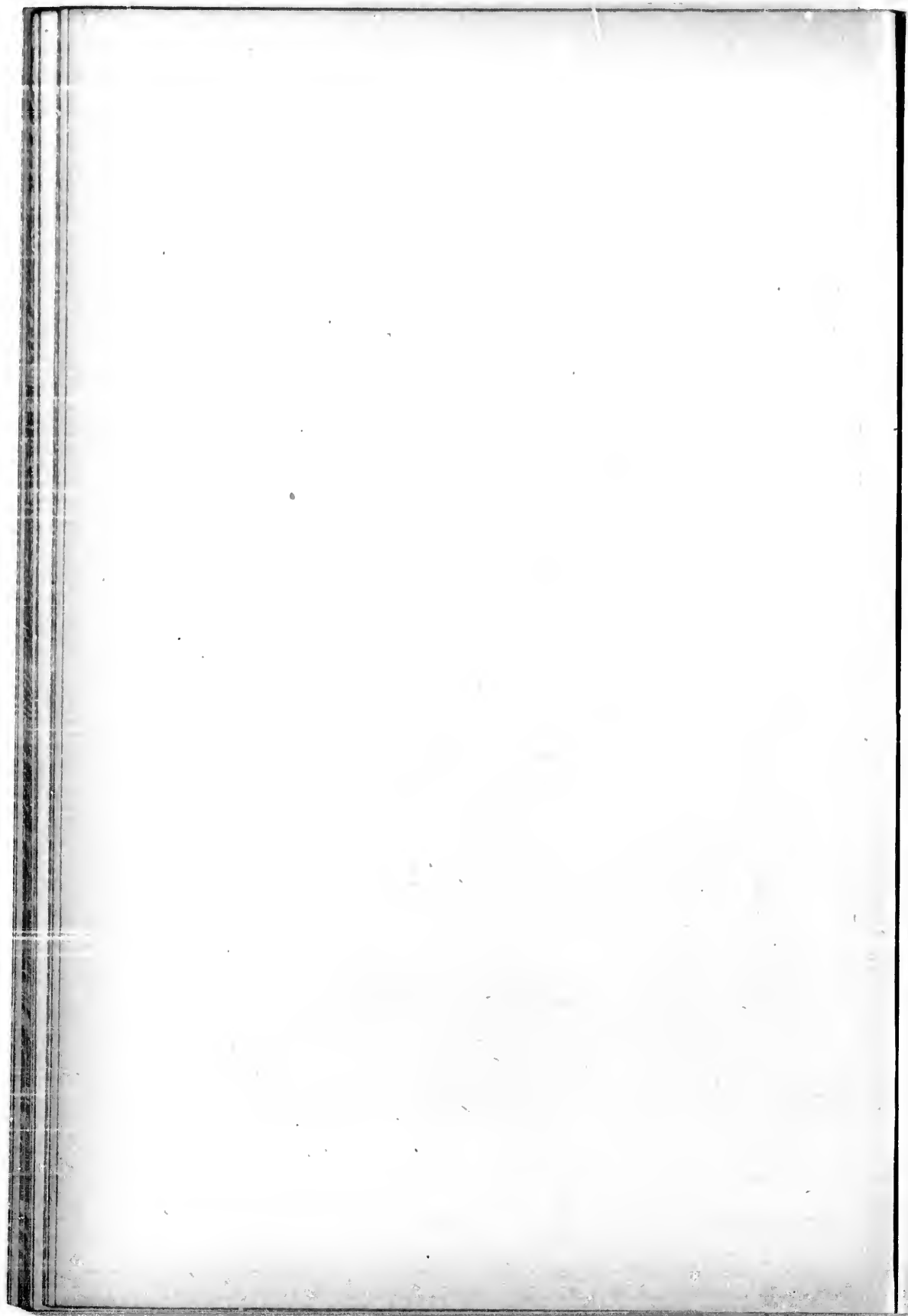
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PORT OF MANILA—GENERAL VIEW.



town is called. Extensive suburbs also stretch along both margins of the Pasig, the whole place covering an area of about five square miles.

The sanitary conditions are far from satisfactory. Thus the river, the water of which taken above the city is used for drinking purposes, is charged with all kinds of refuse floating up and down with the tides. The numerous canals derived from the Pasig, and ramifying through this "Tagal Venice," run dry for half the year, leaving deposits of fetid mud to poison the atmosphere. The fortifications also, now absolutely useless as defensive works serve only to prevent the free circulation of healthy sea-breezes. Often shaken by earthquakes, Manilla possesses no public buildings of an imposing character, but here are centred the chief educational establishments, the observatory, a school of design, a small museum, and a public library.

As a centre of trade Manilla occupies an admirable position at the outlet of an inland sea, and on a vast bay 120 miles in circumference, spacious enough to accommodate all the navies of the world. The approach to this roadstead is partly protected by the volcanic Corregidor island, while during the prevalence of the south-west monsoon ships of three hundred tons are able to ride at anchor in the Pasig estuary under shelter of a long pier. The inlet at *Cavite*, eight miles farther south, also affords a refuge at this season to small men-of-war, and a new port in course of construction off the old town will soon accommodate ships of the heaviest tonnage in its extensive basins. To its other advantages Manilla adds its commanding position on the main routes of navigation between the Sunda Strait and the Yangtze-Kiang estuary. Lapérouse asserted, perhaps with some exaggeration, that the capital of the Philippines occupied the finest commercial site of any city in the world. Until the year 1811 it served as the chief intermediate station for the trade between Spain and her American colonies.

Manilla is connected by a line of steam omnibuses with *Malabon*, which, like the capital, lies on the shores of a gulf at the mouth of a river. Here is the largest cigar manufactory in the Philippines, employing at times as many as ten thousand hands. Both *Malabon* and *Bulacan*, which stands a little farther north on a branch of the Pampanga, may be regarded as industrial dependencies of Manilla. The same remark applies also to the fortified town of *Cavite*, which lies to the south, and which, with its arsenal, docks, factories, and European buildings, has the most Spanish aspect of any town in the archipelago. The neighbouring district of *Indan* is noted for the prime quality of its coffee.

The two pueblos of *Pasig* and *Pateros*, on the Laguna, at the outlet of its emissary should also be considered as outer markets of the capital. For over three miles along the banks of the river nothing is to be seen except aquatic preserves for the ducks bred to supply the wants of the city. They are fed on shell-fish brought from the roadstead, and the eggs are artificially hatched at *Pateros*. The lake, *Laguna de Bay*, takes its name from a village on the south side of this inland sea; on the same side but more to the north-west stands *Santa-Cruz*, capital of the province. Here are also the much-frequented thermal waters of *Baños*, and the industrial town of *Lucban*, which, with its springs, grottoes, and cascades,

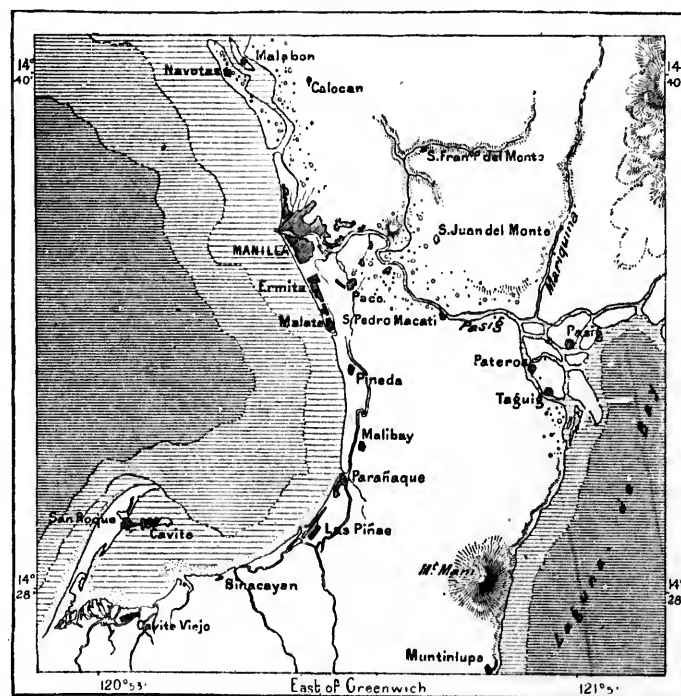


occupies one of the most romantic sites in Luzon, not far from the San-Cristobal volcano. On the north side of the Laguna lies the riverain port of *Moron*, also a provincial capital.

In the basin of the copious Pampanga river, a northern affluent of Manila Bay, are several populous towns, such as *Gapan*, near some gold and coal mines in the province of Nueva-Ecija, a more important place than its capital, *San-Isidro*. This is one of the regions which suffered most from the earthquakes of 1880, when

Fig. 115.—ENVIRONS OF MANILLA.

Scale 1 : 300,000.



Depths.

Sands exposed at low water.	0 to 16 Feet.	16 to 32 Feet.	32 Feet and upwards.

6 Miles.

vast tracts along the river bank were broken into more or less regular sections by yawning crevasses. Farther south is *Bacolor*, another provincial chief town, which was selected as the capital of the Spanish possessions during the temporary occupation of Manila by the English in 1762. The steamers plying between Manila and the Lower Pampanga stop at the station of *Guagna* below Bacolor. *Calumpit*, an agricultural centre east of this place, stands at the confluence of the Pampanga and Quingoa rivers, in the most fertile district of the archipelago.

*Balanga*, facing Manilla on the west side of the bay, is followed round the intervening promontory by the well-sheltered port of *Mariveles*, which gives its name to the neighbouring volcano. Beyond it is the harbour of *Subig*, said to be the safest in the Philippines, being protected on three sides by the southern headlands of the Zambales Mountains. *Iba*, capital of the province, lies on a dangerous creek a little farther north. In the spacious Lingayen Bay are several excellent havens, notably that of *Sual*, which, though now opened to international trade, is still little frequented by shipping. The rugged Zambales highlands and the lack of communications with the interior prevent trade from being attracted to this part of the Luzon seaboard. The large town of *Lingayen*, whence the bay takes its name, lies between *Sual* and the port of *Dagupan*, on a branch of the Agno Grande delta. In the interior of this basin, which comprises the three provinces of Benguet, Tarlac, and Pangasinan, the chief town is *San-Miguel de Camiling*, where several tribes of distinct speech are conterminous.

Along the north-west coast follow several considerable towns, such as *Santo-Tomas*, *Aringay*, *San-Fernando*, and *Vigan*, this last in the delta of the Abra river. *Laoag*, near the north-west corner of Luzon, ranks next to Manilla for population, although it possesses no harbour, nor any resources beyond the agricultural produce of the surrounding district. Beyond this point the seaboard is nearly uninhabited, the population of Luzon being mostly concentrated on the west side facing the Asiatic mainland. Even in the basin of the Cagayan, the most copious river in the Philippines, the only large towns are *Tuguagarao* and *Lallo*, formerly Nueva-Segovia, which in recent times has acquired some importance as the depôt for the best tobacco grown in the archipelago. *Aparri*, the port of this place, stands on the right side of the Cagayan estuary.

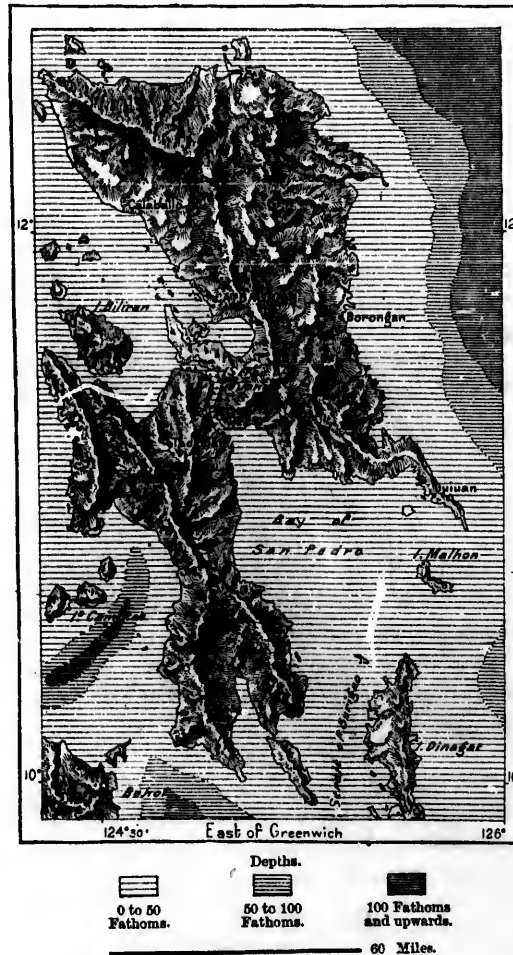
Then for 420 miles along the northern and eastern coasts of Luzon no seaport occurs until *Binangonan* is reached, in about the latitude of Manilla over against the island of Polillo. The Babuyanes and Batanes groups between North Luzon and Formosa are almost uninhabited, although favourably situated near the ocean highway between Hong-Kong and Sydney. This route is longer but safer, and, consequently, more frequented than that of Torres Strait and the intricate waters of the eastern archipelago.

*Marigondon*, *Barayan*, and *Taal*, on the west side of Luzon below Manilla, all lie in extremely fertile and highly cultivated districts. Here also *Batangas*, one of the largest towns in the archipelago, occupies a position of vital importance at the entrance of San-Bernardino Channel, the great commercial highway between Luzon, the Visayas Islands, and Mindanao. On the north side of Mindoro, nearly opposite *Batangas*, lies *Calapan*, round which are grouped nearly all the inhabitants of this island.

Along the narrow Camarines peninsula follow several busy marts, such as *Tayabas* and *Mauban*, on a roadstead well sheltered by the islet of Alabat. But here the population is concentrated chiefly in the basin of the river Vicol, where are crowded together the rural towns of *Camalig*, *Guinobatan*, *Ligao*, *Oas*, *Polangui*, and *Libong*, each with over twelve thousand inhabitants, though distant less than

two miles from each other. Below Lake Batu, where it becomes navigable, the Vicol flows by *Nabua* and *Naga* or *Nueva-Caceres*, capital of the province of Camarines-Sur, beyond which it falls into San-Miguel Bay opposite the fortress of *Cabusao*, and not far from *Daet*, capital of the province of North Camarines.

Fig. 116.—SAMAR AND LEYTE.  
Scale 1 : 2,500,000.



*Albay* and its neighbour *Daraga* occupy a charming position at the foot of the verdant lower slopes of the Mayon volcano. *Daraga*, officially designated *Cagsaua*, replaces an older town of this name which stood higher up on the flanks of the mountain, but which was destroyed by the eruption of 1814. The port of both towns is *Legaspi*, which is exposed to the full fury of the north-east monsoons, and consequently inaccessible during the winter months; at this season all the traffic is transferred to *Sorsogon* on the west side of Luzon. Other ports in this region are *Tibi* and *Tabaco*, north of *Albay*, and *Bulusan* at the east foot of *Mayon*.

In the island of *Samar*, which forms a south-eastern extension of the *Camarines* peninsula, there are no large towns. The most important centres of population are *Guinan* near the southern extremity; *Borongan* on the east coast, like *Guinan* surrounded by vast forests of cocoa-nut palms; and the

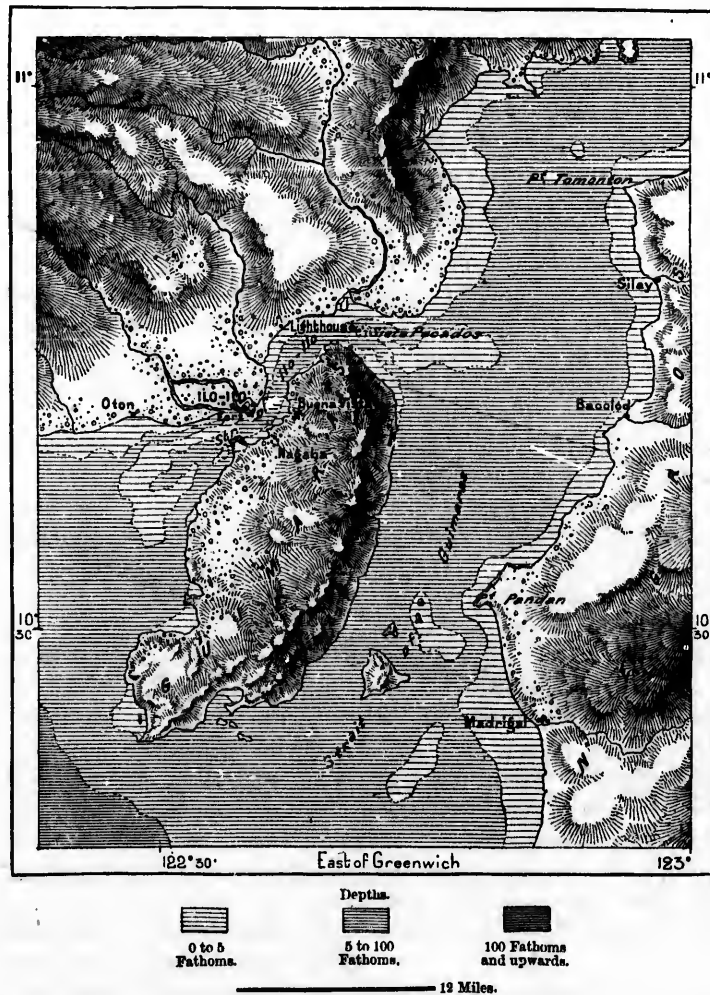
capital *Catbalogan* on the west coast, on an almost inaccessible roadstead.

Of the adjacent island of *Leyte* the capital and chief seaport is *Tacloban*, at the southern entrance of the channel separating the two islands. This channel, some twenty-four miles long, contracts in some places to a narrow defile, expands in others to a broad lake, and at certain points is only a few hundred yards wide.

Both shores are fringed by primeval forest, interrupted only by a few village clearings and their cocoa-nut groves. Here and there occur picturesque cliffs pierced by caverns where the islanders formerly deposited their dead. In the vicinity of Bases on the Samar side opposite Tacloban the poisonous plant known as Saint

Fig. 117.—ILO-ILO AND STRAIT OF GUIMARAS.

Scale 1 : 650,000.



Ignatius' bean (*Strychnos Ignatia amara*) grows in the greatest profusion. Another tree of the *dipterocarpus* species yields the *balao* or *malapajo*, a resinous oil, which is highly prized for its property of preserving iron from rust.

Panay, situated about the centre of the archipelago, is relatively the most

populous member of the whole group. Here are several more or less important places, such as *Capiz* on the north coast; *San José de Buenavista* and *Antique* on the west side; *Sibalon* farther inland in the same district; *Concepcion* in the north-east, and in the south-east *Ilo-Ilo*, on the well-sheltered channel separating Panay from the islet of Guimaras. Next to Manilla, Ilo-Ilo is the most frequented seaport in the Philippines. Since it has been thrown open to foreign trade, it has rapidly attracted to itself a large share of the export trade in sugar and other colonial produce, as well as of the import trade in European and Chinese wares. A little to the north of Ilo-Ilo lies the episcopal suburb of Jaro.

Although Ilo-Ilo is the central emporium for the whole of the Visayas Islands, *Cebu* or *Zebu*, the chief place in the island of like name, ranks as the capital of the group, probably owing to the priority of its foundation. Its first buildings were erected by the conqueror Legaspi in 1571, just fifty years after Magellan had met his death on the islet of Mactan close to this spot. Cebu, which like Ilo-Ilo was thrown open to international trade in 1863, exports the rice of Panay, the abacá of Leyte, the wax, ratans, and mother-of-pearl of Mindanao, the sugar and tobacco forwarded from *Tagbilaran* and *Maribojoc*, capital of the neighbouring island of Bohol. In the Cebu district are some carboniferous beds, which yield a coal of good quality.

The large island of Mindanao, still almost entirely occupied by independent tribes, has no Spanish stations except a few here and there on the seaboard. One of the most promising of these stations is *Misamis*, in an auriferous district on the north coast. *Butuan* has the advantage of being situated on the estuary of the great river Agusan; *Surigao*, at the northern extremity of the island, commands the chief channel opening eastwards in the direction of the Pacific; *Bislig*, towards the middle of the east coast, possesses an excellent harbour on a seaboard exposed to fierce gales during half the year. Here is the only safe anchorage on the east side of the island south of Suragao. West of *Vergara*, recently founded on the spacious Gulf of Davao or Tagloc, the only settlements are *Cotabato* and *Polloc*, in the fertile plain watered by the Rio Grande, and *Zamboanga*, an old station at the extremity of the south-western headland dating from the year 1635. This place, which exports the best coffee in the archipelago, is remarkably salubrious, notwithstanding its position on a low-lying plain broken by brackish lagoons or swamps at the foot of wooded hills. Its inhabitants, nearly all half-breeds, are none the less proud of their Spanish descent, and speak Castilian with great purity. In the last century Zamboanga temporarily disappeared under a shower of ashes from a neighbouring volcano.

In the Sulu (Jolo) archipelago, since 1876 formally annexed to the Spanish colonial possessions, each of the larger islands has its military or naval station to keep the unruly inhabitants in awe, and guard the neighbouring seas from their piratical excursions. At *Basilan*, against which the French had sent an expedition in 1845 to avenge the murder of some sailors, the Manilla government fearing a permanent French occupation, has founded the town of *Isabella*, which, thanks to its excellent harbour facing Zamboanga, seems destined one day to acquire some

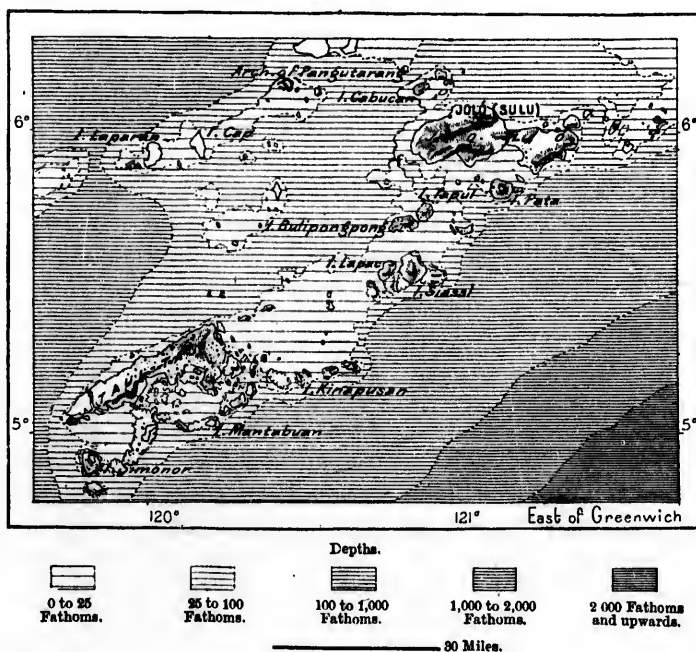
importance. Unfortunately the climate is so unhealthy that some hundreds of convicts sent to clear the ground in the vicinity of the rising town all died of fever.

The ancient city of *Sulu*, at the western extremity of the island of like name, has also become a Spanish station, and the descendant of the dreaded sultans who ruled the whole archipelago together with North Borneo, is now nothing more than an obscure pensioner of the Philippine Government. His capital has lost all its industries, and the famous krisses made at this place are now replaced by weapons of English or German manufacture.

In the large island of Paragua or Palawan, Spain also maintains two military

Fig. 118.—SULU ARCHIPELAGO.

Scale 1 : 2,250,000.



stations: *Tay-tay*, near the northern extremity on a well-sheltered inlet, and *Puerto-Princesa*, on a fine natural harbour on the east coast. The forests in the immediate neighbourhood of the latter station are still occupied by the Tagbanuhoy, wild tribes of Malay origin, and the mountains of the interior are inhabited by the Bataks, who are supposed to be of Negrito stock.

In the island of Balabac, facing the Bornean archipelago of Banguay, the only centre of population is a mere village, while the islets studding the China Sea farther west are uninhabited.

## ADMINISTRATION OF THE PHILIPPINES.

The Philippines are governed directly from Madrid by the Crown and Cortes ; hence, without being fundamentally changed, their administration is modified with the vicissitudes of political power in the Iberian peninsula.

At the head of affairs stands the governor-general, who commands the military and naval forces, and personally administers the island of Luzon, the Visayas group and Mindanao being placed under the authority of subordinate governors. The governor general is himself assisted by an administrative council, the members of which are chosen by the central power. A sort of ministry, irresponsible except to this central power, is also constituted by some of the higher officials, including the government secretary, the head of the staff, the directors of financial and civil affairs. The governor-general is considered as the "vice-patron" of the church.

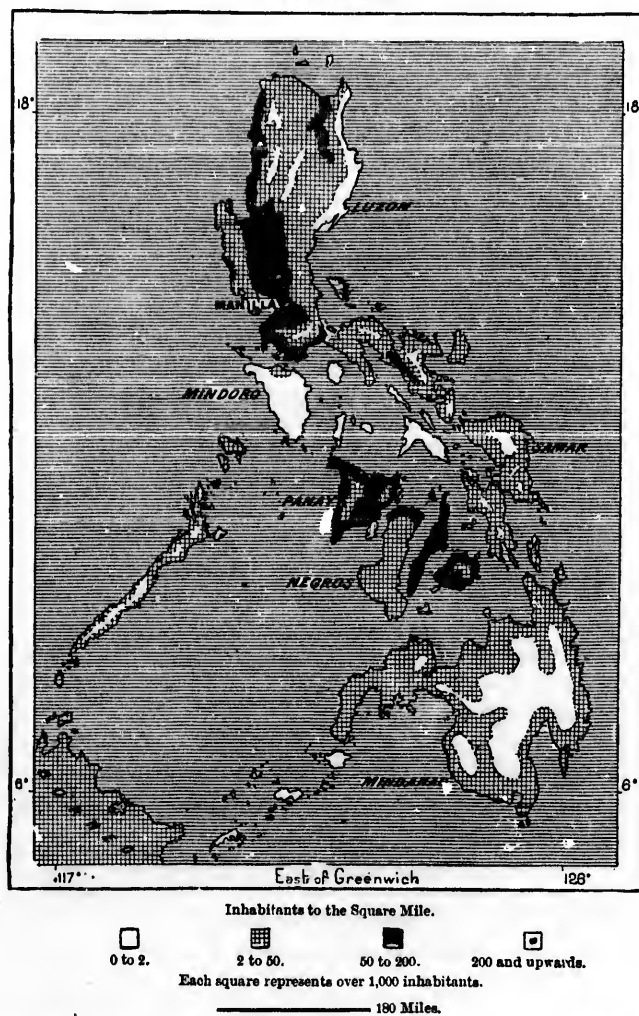
The three governments of Luzon, the Visayas and Mindanao are divided into provinces administered either by military governors or by civil alcaldes who are at the same time judges in the first instance in both the civil and criminal courts. In most of Luzon the civil system prevails ; but the régime is strictly military in Mindanao, and even in the Visayas, although the population of these islands is entirely civilised and almost as dense as in the industrial countries of Western Europe. Each province is divided into *pueblos*, a term which comprises both the district itself and its chief town ; hence some of these pueblos have a considerable population, ranging from ten thousand to fifteen thousand, and even twenty thousand. Such are those in the neighbourhood of Manilla, in the southern regions of Luzon, in Panay, and some other members of the Visayas group, and each of these districts is administered by a *gobernadorcillo*, or "little governor," who delegates his powers to *tenientes*, or "lieutenants," placed at the head of each village or hamlet in the pueblo.

All the higher functionaries are exclusively Spaniards appointed directly from the mother country ; but the smaller officials of the pueblos are drawn from the half-caste or indigenous classes, and elected for three years by the leading citizens of the district. The *gobernadorcillos*, called also "captains," are at once mayors and judges ; but appeal is allowed from their decisions to the alcaldes and the *audiencia*, or supreme court of Manilla. The notables of the pueblos are collectively responsible for the taxes, which average about six shillings for every adult between sixteen and sixty years of age.

The collection of these taxes constitutes the main function of the local officials, and the chief impost still retains the name of *tribute*, as at the time when the natives of the Philippines were still regarded as conquered pagans. This tribute, a kind of poll-tax, formerly about four, but at present exceeding ten shillings a year, is usually levied on the family group, and supplies the elements for the summary statistics of the population. Besides this tax, the men are required to give forty days' work to the government for the construction of roads and communal buildings. But such an apparently excessive extent of statute labour

is but a slight burden amongst the indolent populations of the archipelago, where every native may purchase exemption for a sum which in no instance exceeds twelve or thirteen shillings. The Chinese pay a tribute of twenty-five shillings, which for their mestizos is reduced to one-half, while all Europeans are entirely

Fig. 119.—DENSITY OF THE POPULATION OF THE PHILIPPINES.  
Scale 1 : 12,500,000.



exempt from this poll-tax, which was originally a mark of subjection. Other chief sources of revenue are the taxes levied on industries and real property, the customs and navigation dues, the postal and telegraphic services, lotteries, excise, cock-fighting, and some other minor taxes. The cultivation of opium is interdicted

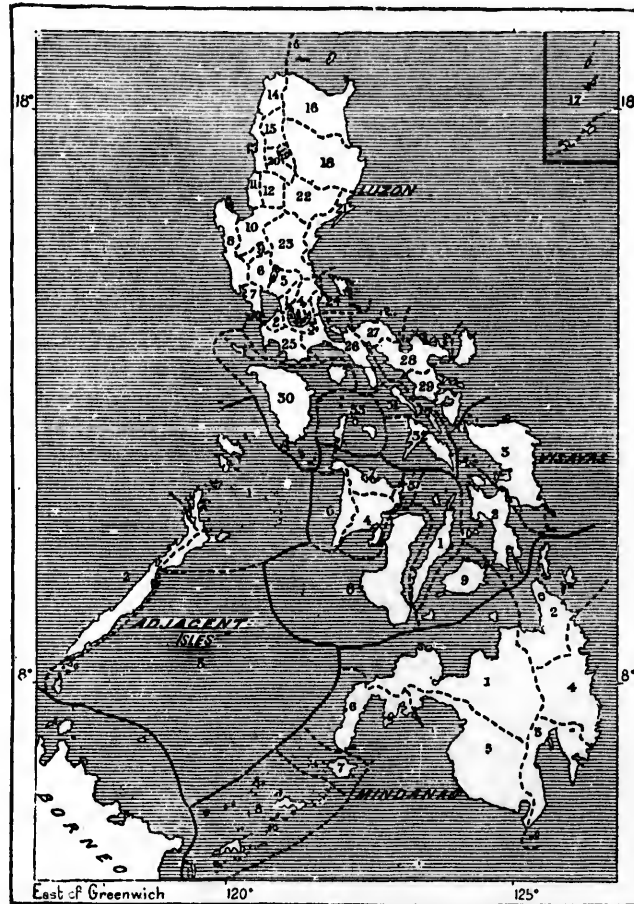


and its importation restricted to certain Chinese traders. The yearly outlay, which includes the maintenance of the diplomatic service in China and Japan, is usually in excess of the income.

Although the Inquisition has been abolished in the present century, the

Fig. 120.—PROVINCIAL DIVISIONS OF THE PHILIPPINES.

Scale 1 : 11,300,000.



exercise of no public worship is tolerated except that of Catholicism, the State religion. A part of the tribute is strictly reserved for the support of the clergy, who have also a right to exact direct contributions called *pie de altar*, because paid by the faithful at "the foot of the altar." The Spanish secular clergy, comprising a small number of ecclesiastics, reside chiefly in the archiepiscopal city of Manila, and in the three bishoprics of Nueva-Caceres, Jaro and Cebu. The

pueblos are administered either by native priests, or by the different religious orders, such as Dominicans, Franciscans, Jesuits, and especially Augustinians, the wealthiest and most influential of all. According to their regulations, these missionaries are bound to reside at least ten years in the archipelago, and few of them entertain any hope of ever returning to the mother country. But they are not a numerous body, and the local clergy does not number altogether as many as twelve hundred persons. The native priests are educated in the large diocesan seminaries.

Public instruction, obligatory in the civilised districts, is under the control of the priests, who have established primary schools in nearly all the pueblos. Here the children learn to read and write Spanish, and although this language is generally forgotten after they leave school, it is gradually becoming the idiom of the civilised classes, and reducing the native tongues to the position of provincial patois. Secondary instruction is provided for by two colleges, one directed by the Dominicans, the other by the Jesuits. The university of Santo-Tomas, founded in 1645, is essentially a theological institution, although also comprising scientific and medical courses. The censure, however, still prohibits the introduction of most foreign scientific and literary works, and so recently as 1882 Bernardin de Saint Pierre's *Paul and Virginia* was specially interdicted! The one Tagal and eight or ten Spanish periodicals are also subjected to the ecclesiastical censure.

The nucleus of the colonial forces consists of about 1,450 Spaniards, forming a regiment of artillery, the rest of the army being made up of some six thousand natives. These are enlisted for a period of eight years; but substitution is allowed, the average price in time of peace ranging from £8 to £10 in the wealthy provinces. A militia of *cuadrilleros* is occasionally enrolled for local service.

The navy comprises about twenty corvettes, avisos and gun-boats, manned by two thousand hands, and stationed chiefly at Cavite, Manilla, Lingayen and Zamboanga. Seven seaports are open to foreign trade: Manilla, Legaspi and Sual in Luzon; Taeloban, Ilo-Ilo, Cebu and Sulu in the other islands.

A table of the fifty-four provinces with their areas, populations and chief towns will be found in the Appendix.



## CHAPTER V.

### MICRONESIA.

#### I.—THE MARIANA OR LADRONE ISLANDS.



THESE islands, politically united to the Philippines for over two centuries, are also associated with them in the history of maritime exploration. They were the first group met by Magellan in 1521 on his voyage round the globe, and ten days afterwards he had reached the Philippine island of Cebu and the adjacent islet of Mactan, where he met his death. Later, when the Spaniards had permanently occupied the Philippines and established the regular service of their galleons across the Pacific, the island of Guam in the Marianas became the indispensable station for their mariners between Manilla and Acapulco on the Mexican coast; and when the aborigines of the Marianas had almost entirely disappeared this group was repeopled by immigrants from the Philippines, bringing with them new plants, usages, and language.

The name of the Ladrones, or "Robbers," given to these islands by Magellan, has fallen into abeyance, and, like the Philippines, they are indebted to flattery for their more usual designation conferred on them in honour of the Spanish Queen, Mariana of Austria, wife of Philip. After their discovery by Magellan they were explored chiefly by Anson, Byron, Wallis, and Freycinet.

A space of about 1,200 miles going eastwards separates the most advanced land in the Philippines from the first south-western island in the Mariana group, and this space is everywhere almost entirely free from islets or reefs of any sort. Nothing but a few rocks, such as Parece Vela, are visible in the north as the archipelago is approached from Japan, while some other lands announce the proximity of the Pelew Islands to mariners advancing from the south. Thus the chain of the Marianas is limited westwards by a perfectly open sea about 80,000 square miles in extent, and in some places from 1,200 to 1,500 fathoms deep. Hence it is evident that this archipelago is in no way connected with the formation of the Philippines, but belongs to an independent geological system.

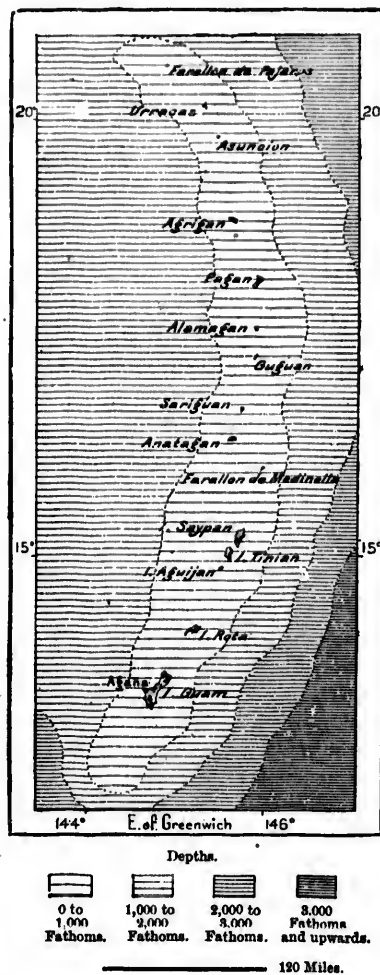
The disposition of the chain shows at a glance an obvious analogy with the volcanic ranges of the Kuriles and Aleutian Islands, describing as it does an arc of surprising regularity, as if traced with a compass with its fixed point resting on the north coast of Luzon. The Marianas also constitute a volcanic range, some

of whose cones rise many hundred feet above the sea, while others, failing to reach the surface serve as a foundation for a crown of coralline limestones rising above the surrounding waters. The chain stretches north and south a total distance of about 600 miles, and the seventeen islands with their islets and reefs have a collective area, estimated by Agius at little more than 400, and by Behm and Wagner at scarcely 560 square miles. Guam, or Guahan, the largest island, comprising nearly half the extent of the whole group, is continued southwards by the Rosa Bank, which lies on the northern edge of the deepest cavity in this part of the Pacific (2,475 fathoms). North-east of this abyss the soundings of the *Challenger* show everywhere depths of over 1,500 fathoms.

Considered as a range of half-submerged mountains the Marianas begin with a few basalt and tufa crests, which in Guam attain a height of from 1,300 to 1,600 feet, dominating the grassy or wooded plateaux, the sandy or argillaceous plains, and steep coastline of this picturesque island. Northwards the chain, interrupted at first by a channel thirty miles wide, reappears in Mount Tempingan and the rock-bound island of Rota or Sarpan. Then follow Aguijan; the charming Tinian with its gently undulating hills; Saypan with two extinct volcanoes at its northern extremity; Alamagan, whose smoking crater is probably the culminating point of the archipelago (2,320 feet); Pagan, composed of two mountainous islands united at the base, bearing two active and one quiescent volcano; Agrigan with an extinct cone; and Assumption (2,100 feet), whose fissured flanks still emit vapours. The Uraccas, or Mangas, near the northern extremity of the chain, seem, like the Dedicia islets off the north coast of Luzon, to be the remains of a circuit of marine craters, while Farallon dos Parajos, terminating the whole system, is a still active volcano 1,300 feet high. Altogether the chain appears to contain six not yet extinct cones.

Fig. 121.—MARIANA ARCHIPELAGO.

Scale 1 : 8,000,000.



Exposed during the so-called dry season from October to May to the regular north-east trade winds, the Marianas receive their most abundant rains from the moist south-west currents, which prevail during the four summer months from June to September. But moisture is precipitated at all times, and the streams are everywhere copious except where absorbed by the porous calcareous soil and volcanic scoria. The destruction of the forests has also reduced the rainfall and rendered the freshets more sudden and the droughts more protracted.

The indigenous flora, consisting chiefly of Asiatic species, has mostly disappeared, and the present vegetation has been mainly introduced by man in recent times. Here, as in most tropical islands, the prevailing forms are the cocoa-nut palm and the *rima*, or bread tree. The only indigenous mammal is the large "Keraudren" bat, the flesh of which is eaten by the natives, notwithstanding its disagreeable odour. There are but few species of birds, and the paroquets, so richly represented in the Moluccas, are totally absent. Even insects are rare, and the reptile order is limited to a few kinds of lizards and a single species of serpent.

When first visited by Europeans the archipelago was found to contain a considerable population. The Chamorros, unjustly stigmatised by Magellan as Ladrones, or robbers, appear to have been akin to the Tagals at least in speech; but the physical appearance of their few descendants would lead to the supposition that the aborigines were a half-caste Indonesian and Papuan race. These two elements may have been represented by the two distinct classes of nobles and people, between whom marriage and even contact were forbidden. But however this be, the Spanish conquest ended by reducing all alike to a common state of servitude.

Long after the occupation of the archipelago the Chamorros continued to hold out valiantly against the oppressive measures of the authorities, and when all resistance ceased towards the end of the seventeenth century, it was found that of the fifty thousand or sixty thousand natives more than half had perished or escaped to the Caroline Islands; over two-thirds of the 180 villages had fallen to ruins. Then came the epidemics, which swept away most of the natives of Guam, and when they were replaced by compulsory immigration from Tinian nearly all the new arrivals perished of inanition: Tinian had been entirely depopulated without any advantage to Guam.

In 1760 the population of the Marianas had been reduced to 1,654 souls, and it was then that recourse was had to Tagal-colonists from the Philippines, who absorbed most of the surviving aborigines. In 1875 not more than six hundred in a total population of nearly nine thousand were regarded as of more or less pure Chamorro stock. In Guam are concentrated six-sevenths of all the inhabitants, who have steadily increased since the outbreak of measles in 1856. The northern islands are occupied only by a few families engaged in fishing; Tinian has only a single village and a community of lepers; Rota and Sayan have each not more than a few hundred souls.

The natives of the Marianas have fallen off in culture as well as in numbers;

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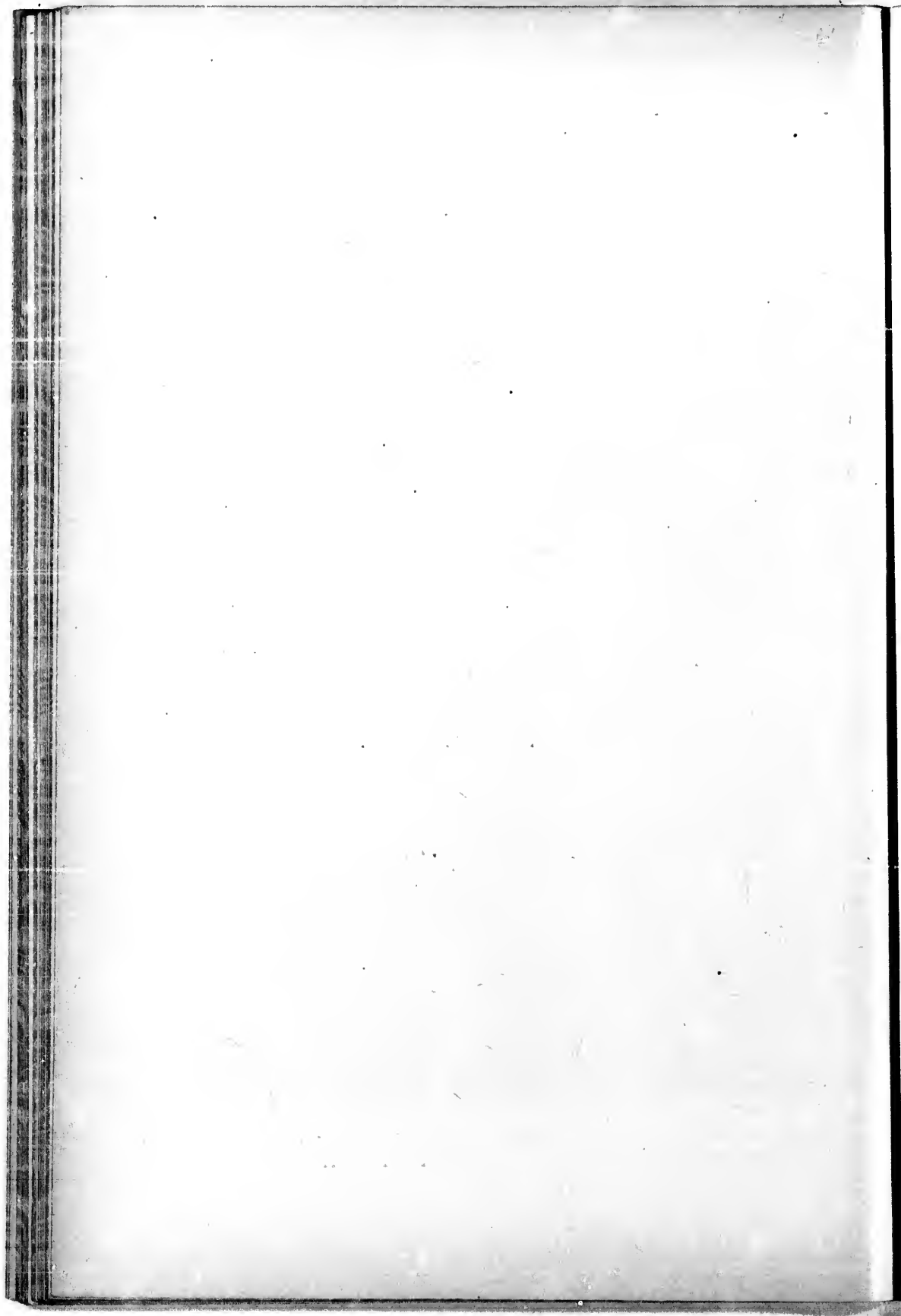
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VILLAGE OF SAYPAN, MARIANA ISLANDS.



although baptised and capable of reading Spanish they have forgotten the industries practised by their forefathers. Agriculture has greatly deteriorated, the art of pottery has disappeared, the woven fabrics are coarser than formerly, the perfectly symmetrical houses seen by Anson in Tinian are no longer constructed, and rude canoes have replaced the beautiful outriggers admired by the early navigators. Anson's crew calculated that this craft could make twenty knots an hour running before a brisk trade wind; when driven from their proper route they often reached islands lying at great distances from the Marianas.

*Agaña*, capital of the archipelago, on the north-west coast of Guam, contains more than half of the whole population, as well as all the political prisoners banished to this region. The port is accessible only to small boats, and the postal service with Manilla is made only once in the twelvemonth.

The government of the Marianas is military, the garrison consisting of three hundred natives recruited by conscription. The clusters of islets, such as Parry and Volcano, scattered over the northern waters in the direction of the Ogasavara or Bonin group belonging to Japan, are nearly all uninhabited. On many marine charts they are still designated by the collective name of the Magellan Archipelago, but their total area scarcely exceeds forty square miles.

## II.—THE PELEW OR PALAOS ISLANDS.

This archipelago is often regarded as belonging to the chain of the Carolines, just as Yap and the neighbouring islets have frequently been included in the Pelew group. The Spaniards, political masters in these seas, comprise all alike under the common designation of the Caroline Islands. Nevertheless they clearly constitute different systems, as shown by the disposition of the chains, the Carolines running west and east and then bending round to the south-east, while the Pelews are disposed north-east and south-west. However, the geological constitution of both groups is the same, all being formed of mountains of eruptive origin, trachytes or basalts, or else of coralline rocks, either as low atolls or upheaved to considerable heights by the oscillations of the ground.

Collectively the Pelew Islands have an area of little over two hundred square miles, of which more than half are comprised in the single island of Baobethuap (Babelthuap). From north to south they have a total length of about 550 and a breadth of over 240 miles at the widest point, being thus spread over an expanse of 40,000 square miles, and bounded east and west by abysses over 1,000 fathoms deep. The population is variously estimated at from ten thousand to fourteen thousand.

The northern islands, which were first visited by the Spanish navigators and which Villalobos designated by the name of Arrecifes, form a perfectly distinct group, comprising Babelthuap with its south-western extensions terminating in the insular mass of Niaur (Ngaur), most fertile and healthiest member of the archipelago. The loftiest eruptive eminences lie near the west coast of Babelthuap, where one of the peaks rises to a height of 2,130 feet. This island is partly covered

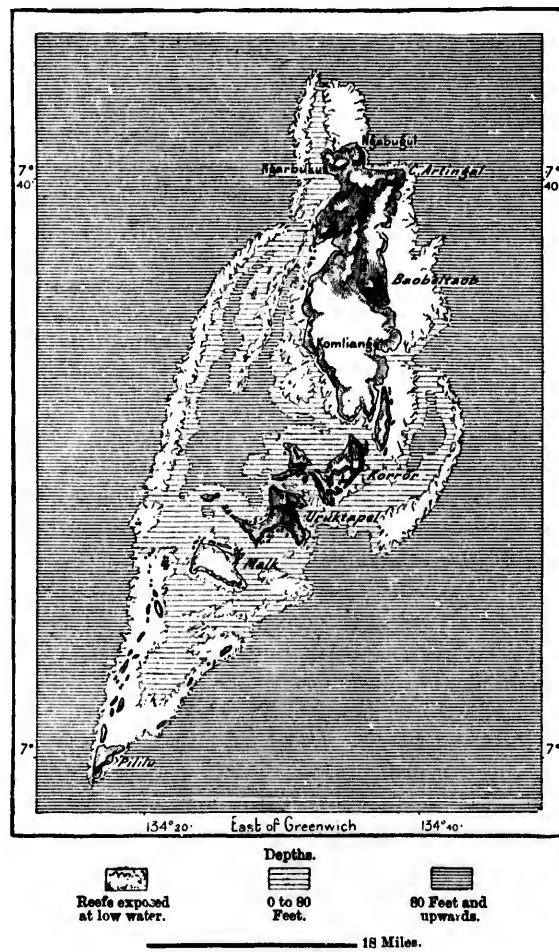


with timber, whence its Spanish name of *Palos*, afterwards changed to *Palao*s, and by English mariners corrupted to *Pelew*.

Although very poor in animal forms, the Pelews have nevertheless some types not elsewhere found, such as the *psamathia*, a species of bird, and a grey rat.

Fig. 122.—PELEW ISLANDS.

Scale 1 : 900,000.



Both the crocodile and the dugong, formerly numerous on the coast, have become extremely rare, if they have not already disappeared altogether. The first vertebra of the dugong is considered the most precious object that a chief can bestow on a subject, being a distinctive mark of an order of nobility. When a happy mortal is judged worthy of this honour, his fingers are bound tightly

together, and the hand is then thrust by sheer force through the narrow aperture of the bone. The distinction is thus often purchased with the loss of a finger.

The Pelew islanders have a darker complexion than the natives of the Marianas and Carolines, and most of them have crisp or frizzly hair. Although there has evidently been a mixture of Malay and Polynesian elements, the Papuan type predominates, and the southern islands lying nearer to the New Guinea coast belong ethnically to the Papuasian world. According to Semper many might be taken for Jews, while others are distinguished by small eyes, flat nose, and massive jaws. Formerly all pierced the cartilage of the nose; but this practice is falling into abeyance, although connected with a religious legend. The teeth are blackened by means of an earth which causes the gums to swell and prevents mastication for several days. The body is also painted a bright yellow, and tattooed; not so elaborately, however, as by the Caroline islanders. The practice is even falling off owing to the dangerous nature of the operation; nor has it any longer a sacred character. On the other hand some of the Pelew dames wear beauty spots, like the fashionable ladies of the eighteenth century in Europe.

Wilson, being ignorant of the native language, fancied that the people had no form of belief. But although there are scarcely any religious ceremonies, their mythology is very intricate, and the *kalites*, who act as mediators with the spirit world, are very powerful, often more so than the chiefs themselves. These magicians of both sexes can raise the souls of the dead, cure ailments, dispel or evoke public calamities. Their powers are hereditary, and five of them enjoy a supremacy over all their associates throughout the archipelago. The privileges of the *kalites* and of the chiefs combined with the belief in spirits have surrounded the existence of the natives with a multiplicity of prescriptions and observances. The life of each individual is regulated by strict rules, and many places and things are *mongul*, that is, tabooed.

The women are respected and may even acquire authority whether as *kalites* or supreme chiefs. They form sisterhoods, whose privileges are recognised, and some travellers have reported that in criminal cases they are judged by their peers. Traces of a former matriarchal system still survive. Thus power is inherited, not from father to son, but from brother to brother, and the sister ranks before the wife of the chief. The men also of the different castes, noble or military, are grouped in brotherhoods, and possess special *pai* or "clubs," into which no one can penetrate without their consent. These clubs are relatively sumptuous edifices, which are carefully decorated with carved and painted figures. A symbolic group is set up in front, and on the walls are disposed rows of wooden images painted in red, yellow and black, some representing religious myths, others recording social scenes and constituting a sort of national history. There is also a graphic system analogous to the Peruvian *quippos*, consisting of cords and strings, which serve to exchange ideas according to an elaborate method of knotting.

In the Pelew Islands there are almost as many petty states as villages. But, thanks to the support of Wilson after his shipwreck in 1783, the "king" of the

island of Koroer, south of Babelthuap, acquired a sort of suzerainty over his neighbours. His successors, however, have lost much of their ascendancy, and most of the other chiefs hold themselves as fully his equals. These chiefs bear different titles, one of the most significant being *mad*, or "death," meaning that the potentate's mere glance is fatal to his subjects. But associated with him is a *krei*, a sort of military "mayor of the palace," often more powerful than the *mad* himself. Round him are grouped the *rupaks*, or vassals, each with his suite of fierce retainers. War, the essential occupation of this feudal system, is carried on with relentless cruelty, the victors sparing neither women nor children. The chief object of the hostile raids is to obtain skulls; for "the great Kalite," say the natives, "likes to eat men," and the heads are consequently laid at the feet of the magicians, his representatives on earth. But even during warfare the rights of hospitality are still respected, and any fugitive who succeeds in penetrating to the house of the hostile chief has nothing further to fear.

To this intertribal strife is mainly due the moral and material decadence of the islanders, who are no longer the simple, kindly people described by Wilson at the end of the last century. Even Miklukho-Maklai, with all his sympathy for inferior races, speaks of them as false and rapacious. Since the arrival of the Europeans the social conditions seem in other respects to have undergone a complete change. The natives are more civilised, at least outwardly; they ornament their dwellings with engravings and photographs; they possess iron implements, firearms, and even books; many speak a little English or Spanish, while their mother tongue has been enriched by numerous European words, required to express the new ideas. The age of stone has passed away, or survives only in the local currency, which is of jasper or agate for the chiefs and nobles, of stones of less value, glass or enamelled beads, for the lower classes.

But with all this the population continues to decrease, having fallen from probably fifty thousand at the end of the last century to little over twelve thousand at present.

### III.—THE CAROLINE ISLANDS.

The archipelago formerly known as the "New Philippines," and afterwards named the Carolines in honour of Charles II. of Spain, is spread over a considerable expanse. From the westernmost island of Ngoli to Ualan in the extreme east the distance in a straight line is no less than 1,800 miles, with a mean breadth of about 350 miles. Thus the Caroline Sea comprises an area of about 640,000 square miles, where the total extent of some five hundred islets disposed in forty-eight clusters is estimated at no more than 500 square miles. The water, however, is very shallow, and several of the insular groups are enlarged by extensive reefs. The greatest depths occur at the western extremity of the archipelago, the "Challenger Trough" in the north, the "Nares Trough" in the south, with an intervening submarine bank connecting the Carolines with the Pelew group.

The Carolines were discovered by the Portuguese in 1527, when Diogo da

Rocha reached the western island of Ngoli or Matalotes. He was followed in



Fig. 123.—GENERAL VIEW OF UALAN.

1542 by Saavedra and Villalobos, who traversed the Caroline Sea and sighted some

of its islands; others were seen by Legaspi, conqueror of the Philippines. But their position not having been accurately determined, it was impossible to identify them, and every passing navigator laid claim to their discovery. The existence of the lands south of the Marianas was well known; but instead of endeavouring to fix their position, mariners rather avoided them, owing to the dangerous shoals by which they were surrounded.

No serious attempt was made at an accurate survey till about 1686, when the first "Caroline," from which all the rest were named, was discovered by the pilot Lazcano. This was perhaps Yap, or else Farroilep (Farraulep), which lies on the meridian of the Marianas some 340 miles south of Guam. Then Cantova prepared the first rough chart of the region round about Lamurek (Namurek) in the central part of the archipelago; but the scientific exploration of the Caroline Sea was first undertaken by Wilson and Ibargoita towards the close of the eighteenth century. Between 1817 and 1828 occurred the memorable expeditions of Kotzebue, Freycinet, Duperrey, Dumont d'Urville and Lutké, after which nothing remained except to fill up the details and explore the interior of the several islands. This work of exploration has been stimulated by the question of sovereignty lately raised between Spain and Germany, and finally settled by papal arbitration in favour of the former power.

The names of the islands, islets and reefs strewn over the Caroline waters are far from being everywhere clearly defined. Except for some of the larger lands, such as Yap, Ponapé and Ualan, custom has not yet decided between the native appellations variously pronounced by the seafarers of different nationalities, and those given to the different groups by English, French, or Russian explorers.

Most of the Carolines are of coral formation, upheaved some few yards above sea-level, and many lack sufficient vegetable humus for trees to strike root between the fissures of the rocks. Some, however, have gradually been clothed with dense verdure down to the water's edge, and here native settlements have been formed beneath the shade of the cocoanut palm, the bread-fruit tree and the dark green barringtonia. Some of the groups form perfectly regular atolls, where lagoons accessible to boats through narrow channels are encircled by a verdant fringe. Satoan, one of the circular islands of the Mortlock group, consists of no less than sixty islets, some a few miles long, others mere pointed rocks, but all disposed symmetrically round the periphery of the coralline enclosure. Others again, such as Ruk, Ualan, and Ponapé (2,860 feet), attain considerable elevations, and these are often clothed to their summits with magnificent trees of few species, conspicuous amongst which are the superb tree-ferns. This evergreen forest vegetation is supported by copious rains, which fall on the slopes of the hills especially during the south-west monsoon.

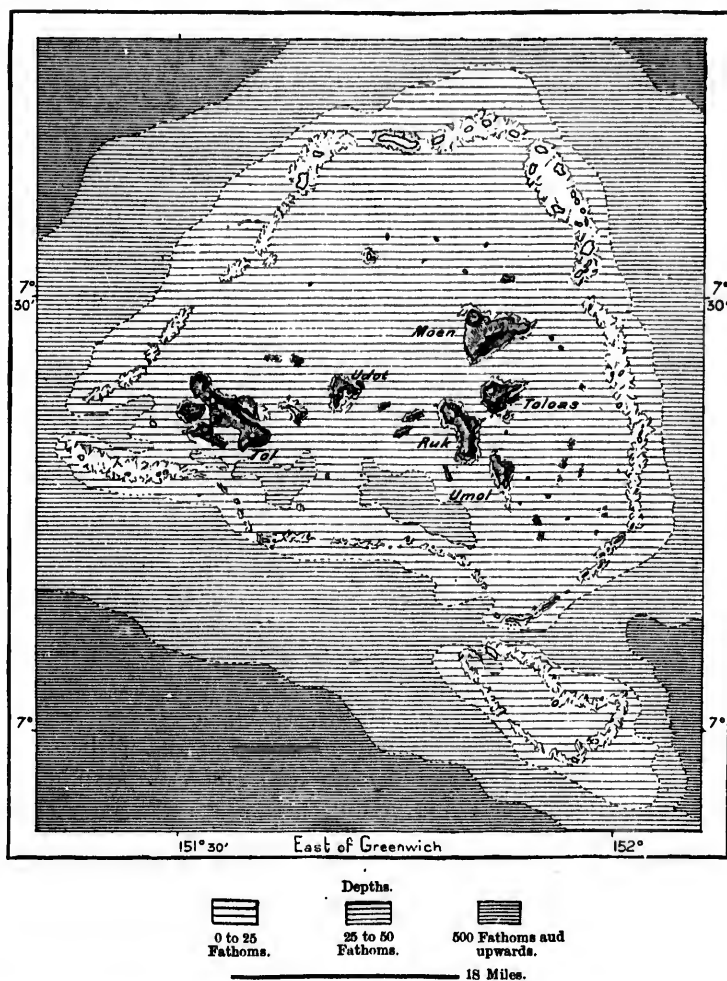
The fauna, like that of the Marianas, is extremely poor, the mammals being represented only by a dog with pointed ears and long pendent tail, and a single species of rat, which is said to have taught the natives the art of obtaining palm-wine by gnawing the crests of the cocoanut palm to get at its sap. The vegetation

also affords shelter to some lizards and iguanas, while the sandy beach is visited by turtles during the season.

The population of the Carolines is variously estimated at from twenty thousand to thirty thousand souls, two-thirds of whom are concentrated in Ruk, Ponapé

Fig. 124.—RUK ISLANDS.

Scale 1 : 800,000.



and Yap. Owing to its proximity to the Philippines, Yap has been chosen as the centre of the administration for the Western Carolines and the Pelew Islands. Although the great majority of the natives are of Indonesian stock crossed by sundry foreign elements, the various insular groups present considerable contrasts

in their physical appearance. The western islanders with their fair complexion resemble the Visayas and Tagals of the Philippines; those of the central islands have a red coppery colour, while farther east the natives of the Seniavin group are almost black and like the Papuans. In Ualan they are still darker, with slightly crisp hair. The people of Nukunor and Satoan are descendants of Samoan immigrants, as is evident from their physique, language and usages. Lastly, in some of the islands the European element is already so strong that most of the children present a type approaching that of the whites.

The population has certainly decreased since the arrival of the Europeans, but not, as has often been asserted, in virtue of some mysterious and inevitable law affecting inferior races. Epidemics little dreaded in the West doubtless become terrible scourges in Oceania, and such is the terror caused by measles, for instance, that in Yap and elsewhere the people combine to attack the infected villages, and stamp out the plague by killing the victims and compelling the others to withdraw for some weeks to the interior. Nevertheless the maladies introduced by foreign sailors do not suffice to explain the disappearance of the race, which has suffered still more from the raids of these foreigners, who carry off the natives to work on the plantations in Fiji and other archipelagoes. After the Caroline Islanders have thus been swept away, philosophic travellers indulge in meditations on the fatality which dooms the so-called inferior races to perish at contact with the civilised whites. Nevertheless there are certain favoured spots such as Lukunor, "pearl of the Carolines," in the Mortlock group, where the population is even rapidly increasing by the natural excess of births over the mortality, and where every inch of the land is carefully cultivated.

Taken as a whole, the Caroline natives are a mild, hospitable, industrious, and peaceful race. They allow their women much freedom, treat their children with great tenderness and faithfully observe the laws of friendship, comrades becoming brothers by an interchange of names. In certain places, notably Ualan, the people had no weapons of any sort, no strife or warfare. They even still lead simple, peaceful lives, except in the neighbourhood of the factories and missions, where their habits have been modified by contact with Europeans. Tattooing is extensively practised, the systems varying greatly according to the localities, tribes, and social position. Some of the chiefs and nobles are further distinguished by badges such as the white shell worn on the hand by the aristocratic families in Yap, where combs of orange-wood and ebony are reserved for the free men.

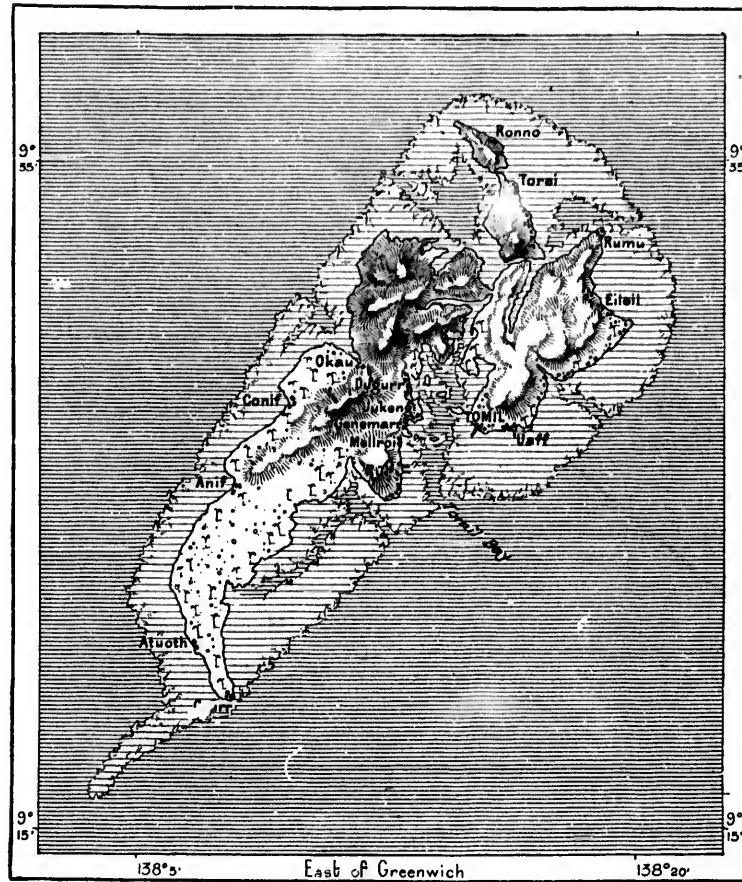
Their food consists chiefly of the *rima* or bread fruit, the taro (*arum esculentum*), the sweet potato introduced from the Philippines, fish and other marine fauna. They cultivate no rice, which the planters are said to have vainly attempted to introduce into the archipelago. The dwellings, in general much smaller and far less commodious than those of Melanesia and Papuaasia, are in many places mere roofs of foliage resting on the ground and entered on all fours through openings at both ends. But every village possesses one spacious and more carefully constructed building, which serves at once as a boat-house, a hostelry for strangers, a refuge during rainy weather, and a playroom for the children. Although they

purchase hatchets, saws, and knives from the traders, the people have scarcely yet outlived the stone age, most of their implements still consisting of shells, fish-bones and the like.

In the eastern islands the American missionaries, who arrived in 1849, have

Fig. 125.—YAP.

Scale 1 : 350,000.



converted some thousands of the natives; but hundreds have returned to their ancestral practices, while in the western groups the prevailing religion is still animism associated with the worship of trees, of mountains, of everything that lives and moves, the fear of the spirits of air, and homage paid to their forefathers.



Much veneration is shown for the dead and for those animals, such as lizards and eels, into whose bodies they are supposed to have migrated. The Polynesians of Nukunor and Satoan are the only natives who have carved wooden idols before which they prostrate themselves in solemn adoration. But the religious rites vary greatly in the different islands, and in respect of customs and institutions the Caroline tribes are broken into endless fragments. Even some of the smaller islands are divided into "several kingdoms" incessantly at war, or else maintaining an "armed peace." Most of the chiefs succeed by hereditary right, while others are elected by their peers. They are usually regarded as owners of the common territory, and most of the produce is their property.

Although since European skippers have monopolised the trade of the Pacific islands, they have ceased to make distant voyages in their famous outriggers, the natives of the Carolines are still daring navigators, for whom the deep has no terrors. Their pilots are able to navigate the high seas guided only by the stars and the direction of the waves. Formerly they maintained schools of navigation and astronomy, where the young of both sexes were taught the relative position of the constellations, the hours of the rise, azimuth, and setting of the stars, the revolutions of the planets, the course of winds and currents, the divisions of the circle, the direction of remote archipelagoes from the Philippines in the west to Hawaii in the east. The horizon was divided into twelve, and even twenty-eight and thirty-two arcs of a circle, and in some atolls there were special names for thirty-three stars or stellar groups by which they were guided on the boundless ocean. They visited the Marianas, over 250 miles distant, without any intermediate station and even against cross currents. The pilots of the Caroline and Marshall groups possess the so-called *medos*, a sort of chart ingeniously constructed with shells or pebbles to represent islands, and bits of stick for the equator, the meridian, the route to follow, the degrees or periods of navigation and the cross currents. They understand the compass almost at a glance, and soon learn to make long voyages by the magnetic needle.

*Yap* (*Uap, Guap*), the large island lying nearest to the Philippines, is the most Europeanised in the archipelago. The centre of government for the Western Carolines and Pelew group is stationed at *Tamil*, near the chief roadstead; here also are settled the foreign traders, mostly Germans, who export copra and bêche-de-mer. The natives, formerly much given to trade, have lost nearly all their traffic, and profit little by the movement of exchanges. For currency they still use shells and other objects pierced with holes and strung together, like the Chinese coins.

*Ponapé*, largest and formerly most populous of the Carolines, is likely to acquire great importance as a re-victualling station for shipping; several ports accessible through passages piercing the reefs are sheltered by the encircling barrier, and the foreign traders have already extensive plantations on the island. On the coralline cliffs near the east side are seen the remains of prehistoric structures consisting of thick walls which are built of huge basalt columns placed horizontally, and measuring from 26 to 36 feet in length. The natives have no tradi-



## IV.—EASTERN MICRONESIA: MARSHALL, GILBERT, AND ELLICE ARCHIPELAGOES.

These groups, which stretch east of the Carolines about 2,500 miles transversely to the equator, all belong to the same geological formation, and are all disposed in the same direction. From the geographical standpoint they should be studied together, although inhabited by different ethnical populations. The Ellice and part of the Gilbert Islands are in this respect Polynesian lands, while the more important Marshall group belongs to Micronesia.

Politically also they form different areas, being already distributed officially amongst two European powers. The Marshalls, whose trade is monopolised by Hamburg merchants, form part of the German colonial empire, whereas in 1886 the Gilbert and Ellice Archipelagoes were declared to lie within the sphere of British interests. But were priority of discovery to confer any right of possession, all should certainly be assigned to Spain. The San Bartolomeo sighted by Loyasa in 1525 was probably one of the Marshalls; but in any case the "Jardines," so named by Alvaro de Saavedra in 1529, certainly belonged to this group, as did also the Pescadores visited by other navigators during the sixteenth century. In 1567 Mendana de Neyra also sailed through the southern Ellice group. None of these islands, however, were exactly determined before the systematic exploration of the Pacific two centuries later.

In 1767 Wallis first surveyed two members of the Pescadores; then Marshall and Gilbert, returning from Port Jackson in 1788, traversed these regions of Eastern Micronesia, and studied in detail the position and form of the groups henceforth known by their names. Other designations, however, have also been given them, and the Gilbert, for instance, have been called the Kingsmill and the Line Islands. Marshall and Gilbert were followed by other English navigators, and then at the close of the Napoleonic wars Kotzebue and Chamisso made their memorable expedition through the Micronesian atolls on board the Russian vessel, the *Rurik*. In 1823 Duperrey also visited two important members of the Marshall group, and since then interesting memoirs have been published by traders and missionaries long resident in various parts of these archipelagoes, whose collective area may now be estimated at about 350 square miles, with a total population of fifty-five thousand.

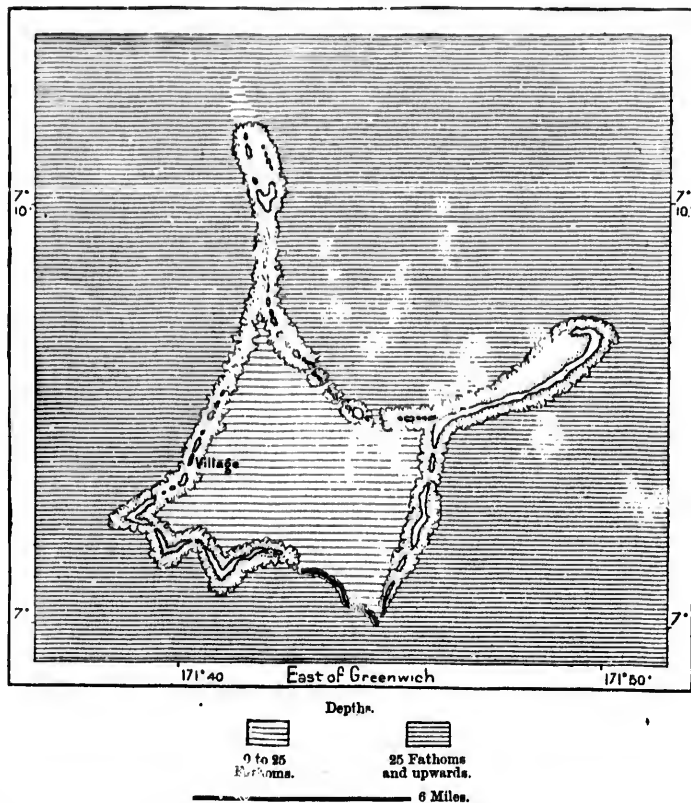
Nearly all the islands in the three archipelagoes, which rest on a common marine bed less than 900 fathoms deep, are disposed in the direction from north-west to south-east. A moderate upheaval of this bed would unite them all with the Samoan Archipelago in a long narrow stretch of dry land. With the exception of three or four islands probably upheaved by igneous action, all the Marshall, Gilbert, and Ellice groups are of low coralline formation, rising little more than five or six feet above sea-level, except where shifting dunes have been formed by the winds.

Some of these coral islands have been united by the marine alluvia in continuous lands without break or lagoons. But most of them are atolls with an outer circuit of islets and reefs, and a central lagoon offering shelter to boats, and some-

times even to large vessels. From the peculiar character of this formation the Ellice group has even been called the "Lagoon Islands," and is habitually so named by the missionaries. Seen from a distance all generally present much the same aspect: below, the white zone of breakers; above, a fringe of green foliage. In all these low-lying clusters the highest land is an eminence in Pleasant Island, one of the Gilberts, which is scarcely 230 feet high.

Most of the Marshall and Gilbert atolls are remarkable for their eccentric forms.

Fig. 127.—ARHNO.  
Scale 1 : 275,000.

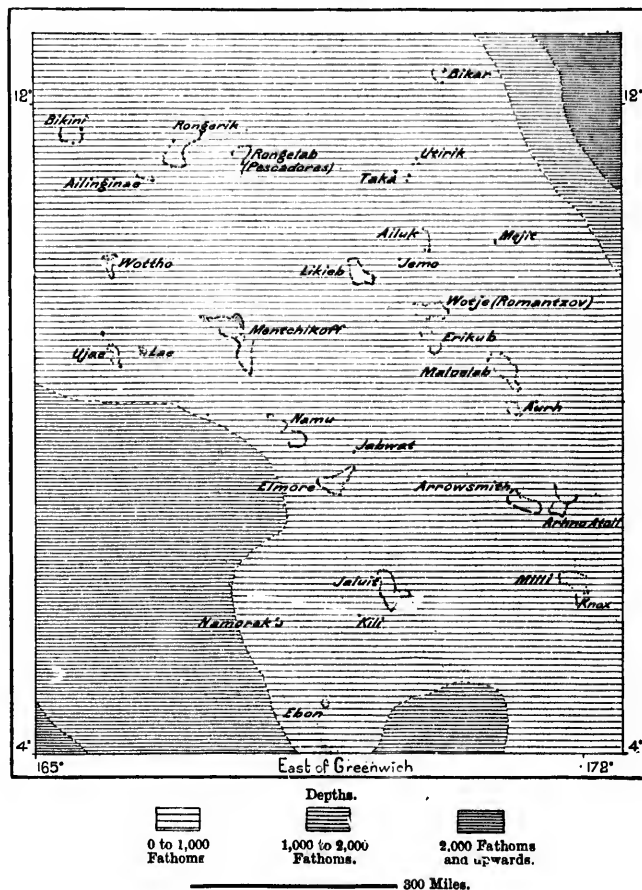


Very few are circular, a fact doubtless due to the irregularity of the igneous foundations on which the coral-builders have raised their structures. Triangles and trapezes prevail in the Marshalls, where Arhno resembles a bull's head and horns, while others are suggestive of such curious objects as shuttles, stirrups, or harps. Nearly all the atolls have continuous fringing reefs on the east side alone, the west side being traced only by a line of white surf. The reason of the contrast is not difficult to understand. On the west face the slow and sluggish waves roll

over the reefs without destroying them, whereas on the east the far more furious breakers displace and heap up huge fragments, which are gradually bound together in a compact mass by the shells and sands. The seeds of plants drifting with the current strike root on the ground thus prepared: shrubs spring up and in course of time the reefs are covered with dense forest. Of all these wooded atolls Maraki

Fig. 128.—MARSHALL ARCHIPELAGO.

Scale 1 : 8,650,000.



in the Gilbert group is the most picturesque. Seen from the mast-head it looks like a green garland floating on the blue waters; here also nearly all the islets have become united in a single unbroken ring.

The climate of the Marshalls is one of the most delightful in the oceanic world. Here the normal tropical heats are tempered by the north-east winds which prevail regularly from November to February, and which at other times are replaced

by breezes from the east and south-east, or else interrupted by calms. Storms are to be dreaded chiefly in October and November. Being also further removed from the continents than the Marianas and Carolines, the Marshall group enjoys a more oceanic climate.

At the same time its flora and fauna are much poorer, although still comparatively rich for lands of coralline origin. To the fifty-nine species of plants found in the archipelago by Chamisso subsequent explorers have scarcely added any new forms; one alone seems peculiar to the Marshalls. The most useful plant is the *pandanus odoratissimus*, of which there are some twenty varieties, and from which the natives derive their chief nourishment. Both the pandanus and the bread-fruit tree grow to greater perfection here than in any other oceanic region. There are also several distinct varieties of the cocoa-nut palm; but this plant is less used for food since the development of the export trade in copra and cocoa-nut oil.

There are no indigenous mammals or birds; but the goats, pigs, and cats introduced from Europe have multiplied rapidly, and the domestic poultry have reverted to the wild state.

The indigenous populations become gradually modified in the direction from north to south. Thus the natives of the Marshalls resemble those of the Carolines, and like them belong to the Micronesian group, whereas the people of Ellice are of nearly pure Polynesian stock, like those of the eastern archipelagoes. Between these extremes stand the Gilbert islanders, of mixed descent but fundamentally Micronesians. They are the finest race in this oceanic region, tall, sometimes even gigantic, often with quite European features, and occasionally acquiring a somewhat Jewish cast from their slightly aquiline nose. Except in the remoter islands not yet visited by the missionaries the old dress—a loin-cloth and fringes—as well as the practice of tattooing have been abolished, and the few ornaments now worn are flowers or foliage inserted in the pierced lobe of the ear, bird's feathers and necklaces.

In 1817, when Chamisso explored the Marshall group, the natives, still free from the influence of traders and missionaries, seemed to be possessed of high qualities, intelligence and enterprise. Everywhere was presented a picture of peace, love of work, and domestic harmony, combined with a strong sense of equality, even in the presence of the chiefs. Yet these populations, which seemed to give promise of a prosperous future, are precisely amongst those that have most rapidly declined. The young are carried off by consumption; all initiative is killed by the introduction of European wares; there is no longer any necessity for exercising the faculty of thought, and listlessness takes the place of an active life. In some of the islands not a single article of native manufacture is now to be found, and here the villages resemble the wretched suburbs of some American city.

Traditions still survive of former cannibal practices, at least in some of the groups. Other sanguinary rites also prevailed, as in the Ratak Isles, where the mother was allowed to keep her three first children; if a fourth was born she had to bury it with her own hands. But much tenderness was shown for the

survivors, who, in case of the mother's death, were at once adopted into other families. In general the wife was much respected, the men performing all the hard manual labour, and leaving to the women nothing but the preparation of food and the weaving of sails and matting.

Their religion was little more than a kind of spirit-worship, and the temples were merely a square space between four stones, or under the shade of a rock or some high tree. The influence of the priests was but slight compared to that of the chiefs, most of whom enjoyed absolute power. Hager speaks of a ruler who, having learnt the alphabet, beheaded all those whose progress was more rapid than his own. The social hierarchy is clearly defined. Under the *iroiy*, or royal class, from whom are selected the kings in the female line, come the nobles, the land-owners, and last of all the poor, who may be deprived of the land they cultivate without compensation, and who are restricted to one wife. Amongst this proletarian class were till recently recruited the labourers for the plantations in Samoa. But in the Marshall archipelago the population has so greatly fallen off that scarcely sufficient hands now remain for the cultivation of their own palm-groves. Even in the barren and relatively more populous Gilbert group the supply of living freights has been nearly exhausted.

Since 1864 European traders have been settled in the Marshall Islands. Although mostly representing German houses, they have to compete with the missionaries, as well as with English, American, Hawaiian, New Zealand, and even Chinese dealers. In order to secure their commercial preponderance against these rivals, they induced the German government to extend its "protection" to the archipelago in 1885. To this protectorate were added the two little groups of the Brown (Eniwetok) and Providence Islets, which, according to the convention with Spain, should rather have been included in the zone of the Caroline Islands.

*Jaluit* has become the administrative centre of the German possessions, as it had already been the commercial centre of the Carolines, the Gilbert and all other groups in these waters. Plantations and factories have also been established in Milli, Namorek, Arhno, Majuro, Likieb, Ebon, and elsewhere. The religious stations are chiefly under the direction of Hawaiian missionaries, who are much disliked by the traders. Conflicting interests have given rise to dissensions, which have in all cases been settled by the protecting power in favour of the Jaluit dealers.

North of the Marshalls are scattered a few clusters, which should be regarded as belonging, if not to the same groups, at least to the same geographical zone. Such amongst others is Cornwallis or Gaspar Rico. The islets and reefs following in the direction of Japan are separated by abysmal depths from the submarine bank above which rise the Marshall atolls.

In the Appendix will be found a table of all these archipelagoes, with their respective areas and populations.



## CHAPTER VI.

### NEW GUINEA AND ADJACENT ISLANDS.

(PAPUASIA.)



**T**HIS vast region owes the appellation of New Guinea, conferred on it by the Spanish explorer, Iñigo Ortiz de Retis, in 1545, to the resemblance observed by him between its inhabitants and those of Guinea on the West African seaboard. Next to Australia it is the largest continental mass in the Pacific, and exceeds even Borneo in extent. From the north-west to the south-east extremity the distance in a straight line is nearly 1,500 miles, exclusive of the groups and chains of islands by which the mainland is continued in both directions. At the broadest part it is over 400 miles from north to south, and the total area is estimated at 314,000 square miles, or 326,000 including the Aru Islands and other adjacent groups scattered like fragments round a shattered continent.

New Guinea, which is thus half as large again as France, seems destined to take an important part in the future evolution of the oceanic lands, for it is abundantly watered and rich in various natural resources. Hitherto, however, it has remained almost entirely excluded from civilising influences. The fringing reefs, marshy coastlands, dense forests, and even its very vastness have protected it from white intruders, while the scattered indigenous populations, divided into endless hostile tribes, have nowhere merged in a compact nationality.

#### PROGRESS OF DISCOVERY.

But although still unexplored to any great extent, Papuasias has already been partitioned amongst three European powers. Holland, which had laid claim to the whole island for over half a century, is henceforth recognised as mistress of the western section as far as 141° east longitude, while the rest of the territory has been divided between England and Germany by the treaty of 1885. To England is assigned the south-eastern slope, facing Torres Strait; to Germany the northern seaboard washed by the Pacific.

The honour of having discovered New Guinea belongs to none of its present political rulers. A letter addressed by the Florentine Corsali in 1515 to Julian dei



Medici mentions the existence of a very extensive region stretching east of the Moluccas, and the reference was probably to Papuasias. But most historians attribute its actual discovery, or at least that of some of its contiguous islands, to the Portuguese Jorge de Menezes. The "good haven of Versiya," where this navigator wintered in 1526-27, was perhaps the present Warsai, near the north-west extremity of the mainland. But, however this be, there can be no doubt as to the direction followed by Menezes's immediate successor, the Spaniard Alvaro de Saavedra. In 1528 this explorer cast anchor near an "island of gold," which seems to be one of those situated in Geelvink Bay, and the following year he coasted a land south of the equator, which extended south-eastwards across several degrees of longitude, and which was certainly the New Guinea seaboard. Sixteen years later Retis gave this region the name it now bears, and took possession of it for

Fig. 129.—CHIEF EXPLORATIONS ON THE COASTS AND IN THE INTERIOR OF NEW GUINEA.

Scale 1 : 24,000,000.



the Spanish crown. At that time, however, it was still uncertain whether it was an island or a part of the Australasian mainland. Doubtless some charts dating from the sixteenth century already represent Papuasias as an island; but on others, notably that of Valentijn, prepared in the eighteenth century, it still figures as a part of Australia.

Yet its insular character had already been practically demonstrated in 1606 by the Spanish pilot, Torres, who had penetrated into the dangerous strait named from him, and who had at the same time surveyed the south coast of New Guinea. But this discovery, carefully concealed as a state secret in the archives of Manilla, had at last been forgotten by the Spaniards themselves. It was again brought to light, however, by Dalrymple during the temporary occupation of Manilla by the English in 1762; and in 1770, Cook, resuming the itinerary of the Spanish navigator, traversed the strait which he supposed he was the first to visit. Henceforth

the great island assumed on the charts a form somewhat approaching its real outlines.

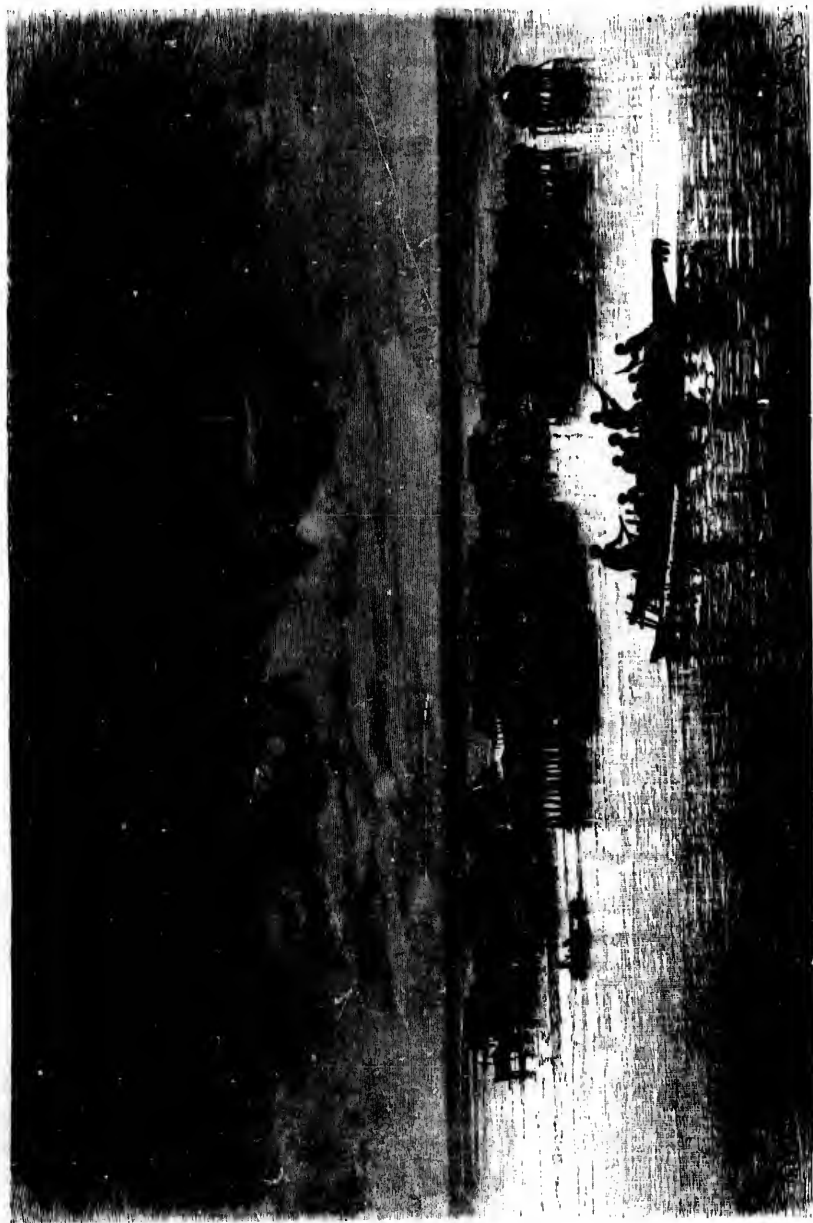


Fig. 180.—LACUSTRINE VILLAGE OF TUFUSELEI, MOTU TERRITORY, NEW GUINEA.

During the interval, various parts of the seaboard had been coasted by other

mariners, such as William Jansz, who, in 1606, reached the Aru Archipelago and the south-west side of New Guinea. Ten years later, Le Maire and Schouten discovered the Schouten Islands, north of Geelvink Bay, and in 1623 Carstensen advanced as far as Valsche Kaap at the extremity of the island of Frederik Hendrik. Other seafarers, amongst whom Tasman, also visited the north and south coasts: yet, at the close of the seventeenth century, Papuasia was still so little known that its western end was quite wrongly described by Rumphius, who even extends it to the north of the equator.

Attention was again attracted to the great island by the fear that the English might succeed in founding settlements on the seaboard and deprive the Dutch Company of their monopoly of the spice trade. Dampier had, in fact, already coasted the north side, and determined the independent insular character of the New Britain and New Ireland Archipelagoes. Hence Wijland was despatched to the same waters, and the northern seaboard was traced to its eastern extremity, and even beyond it to the Massim or Louisiade Archipelago, which was at that time supposed to form part of the mainland. Yet old Spanish charts studied by E. T. Hamy and carefully compared with the Dutch documents, show that Torres and his precursors in the sixteenth century had already determined, in a general way, the form of the eastern section of New Guinea.

The era of modern exploration in these regions begins with Cook's expedition. Before the close of the eighteenth century, Forrest, MacCluer, and d'Entrecasteaux surveyed long stretches of the seaboard. But the Napoleonic wars interrupted these peaceful operations, which were not resumed till the general pacification. Duperrey, Dumont d'Urville, and Belcher were amongst the first navigators who then found their way to the New Guinea waters. Kolff sailed through the strait between the island of Frederik Hendrik supposing it to be a river, and in 1828, this explorer founded on Triton Bay, over against the Aru Archipelago, the first military station occupied by Europeans on the Papuan seaboard. Fort Bus, afterwards abandoned owing to the insalubrity of the district, was thus the commencement of the work of annexation, which has since been prosecuted slowly but irresistibly. In the same year, 1828, the Dutch Government officially announced the formal possession of the great island as far as  $141^{\circ}$  east longitude, substituting throughout that region the sovereignty of Holland for that of her vassal, the sultan of Tidore.

Meanwhile the greater part of the interior remains still unexplored. Learned naturalists, such as Jukes, Wallace, Cerruti, Beccari, d'Albertis, Bernstein, Meyer, Raffray, and Forbes, have already penetrated at different points considerable distances inland. But despite these isolated efforts, the physical features of the land, with its populations, products, and natural resources, still remain almost less known than those of any other region of the globe. Long journeys are rendered extremely difficult, and often impossible by the malarious climate of the coastlands, the total absence of stations on the breezy plateaux of the interior, and the often too well grounded hostility of the natives, who justly distrust the white strangers coming with a revolver in one hand and a bottle of brandy in the other. To complete

the work of discovery without friction, explorers are needed, such as Miklukho Maklay, whose rule of conduct was to be ever discreet, forbearing, truthful in his dealings with the aborigines, and who, in the midst of imminent perils, always remained faithful to his resolutions. But such heroes are rare, and there are few who have "demonstrated by experience that in every part of the world man is still human, that is to say, a sociable being, possessed of good qualities, with whom it is right and possible to enter into relations on a footing of mutual justice and kindness."—(*Letter of Tolstoi to Miklukho Maklay.*)

## PHYSICAL FEATURES OF NEW GUINEA.

New Guinea has nothing of the massive form characterising the Australian continent, which it separates from the equatorial waters. It has been compared to a gigantic bird whose head is represented by the north-west peninsula, the neck by the narrow isthmus between Geelvink Bay and Etna Bay, the tail by the south-eastern prolongation fringed by numerous little parallel peninsulas resembling the plumage. The surrounding waters are so shallow on the south side that a sudden subsidence of some fifty fathoms would suffice to connect Papuasias with Australia; while the Louisiade Archipelago would form a continuation of the mainland towards the south-east. But in other directions its shores are encircled by profound chasms of over one thousand fathoms, such as the Nares Trough on the north side, and the Carpenter Trough (1,320 fathoms) between the Louisiades and the great Barrier Reef of East Australia. Even the narrow channel separating New Britain from the north-east coast is over 500 fathoms deep.

At the north-west extremity some islands of considerable size, such as Mysol, Salwaty, Batanta, and Waigiu, indicate the beginning of the relief which on the mainland rises to great elevations. The Arfak hills, which skirt the north side of the Berau Peninsula, terminate at the entrance of Geelvink Bay in a precipitous headland, 9,520 feet high. The Gulf of Berau, better known as MacCluer Inlet from the navigator who explored it at the end of the last century, penetrates over 120 miles inland, almost completely separating the north-western peninsula from the rest of the great island. The two regions are connected only by a narrow range of hills, and even these were recently supposed by Strachan to be pierced at one point by a channel flowing between Geelvink Bay and MacCluer Inlet. But the naturalist, A. B. Meyer, who had crossed from sea to sea, had already demonstrated the non-existence of any such communication. According to the missionary Geiseler, who resided, in 1867, in a village on the isthmus, boats may cross from coast to coast by utilising two streams flowing in opposite directions between the rocky water-parting, which is, at one point, only "a quarter of a mile" broad. It is uncertain, however, whether the "mile" in question is German or English.

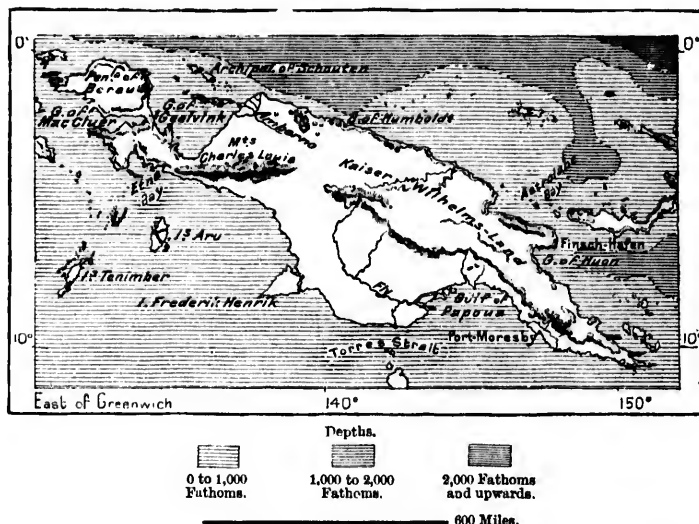
South of MacCluer Inlet the seaboard is indented by the deep Arguni Bay, a long, narrow, fjord-like formation winding between the steep escarpments of the surrounding hills. The Onin Peninsula enclosed between these two inlets stands at

a considerable mean elevation, though still lower than the Berau uplands, with but few summits exceeding 3,500 feet. Farther east rise the superb crests of Genoffo (4,915 feet), at the entrance of Arguni Bay, and Lamansieri (2,450 feet), at the foot of which are the ruins of Fort Bus.

Beyond this point the coast-range is again interrupted by other inlets, such as Triton and Etna bays; but farther east it merges in the loftiest mountain range not only in New Guinea, but in the whole oceanic world. This system, which is still very imperfectly explored, begins at Cape Buru with the Lakahai headland (4,560 feet), after which follow eastwards a succession of crests continually increasing in altitude and rising even above the snow line, one of the glittering peaks having an elevation of 16,750 feet. These snowy summits, to which has been given the

Fig. 131.—MOUNTAINS OF NEW GUINEA.

Scale 1 : 24,000,000.



name of Charles Louis in ignorance of their native appellation, are probably continued eastwards to the crests seen by d'Albertis to the north of the Fly River basin, and are doubtless connected either by lofty plateaux or by other highlands with the ranges skirting the north coast. Here Mount Gantier or Tabi attains an altitude of 6,500 feet; Mount Cyclops, farther east, is nearly as high, while the system terminates opposite New Britain in the mountains, 11,500 feet high, to which the French navigators have given the name of Finisterre. The last headlands present in many places the aspect of regular fortifications, the step-like ramparts being formed of old coral beaches successively upheaved at various geological epochs. Earthquakes are of most frequent occurrence in this region of the mainland, which lies nearest to the volcanoes of Melanesia.

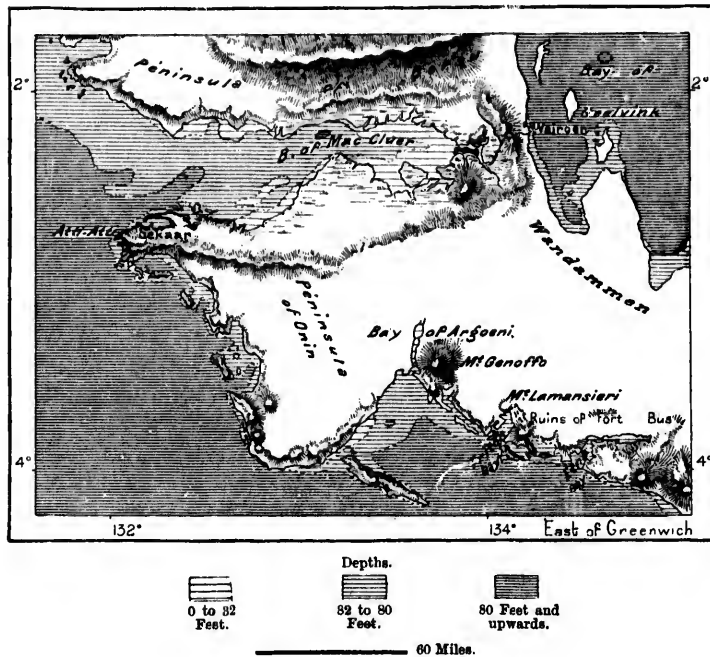
The orography of the south-eastern peninsula has been more extensively sur-

veyed, thanks partly to the proximity of Australia, and partly to the more contracted form of this region, rendering it accessible to explorers penetrating inland from both coasts. Here the highlands lying within the territory annexed to the British colonial possessions have received English names. The north-west chain, under the same meridian as the Finisterre highlands, begins with the Albert range, followed south-eastwards by Mounts Yule (10,000 feet) and Owen Stanley (13,200 feet). This twin-crested mountain, which dominates the whole peninsular system, was first ascended in 1888 by the Australian explorer, Martin.

Eastwards, the range gradually diminishes in height, and then branches off

Fig. 132.—MACCLUER INLET AND ONIN PENINSULA.

Scale 1 : 4,000,000.



into two ridges forming the extreme south-eastern fork of New Guinea, and reappearing at intervals in the Moresby and Massim (Louisiade) archipelagoes. The channel here separating the mainland from Hayter and the other eastern islands has received from Moresby the name of China Strait, because it offers a direct route for vessels plying between Australia and China. The shores of this channel present some of the most enchanting scenery in the whole of Melanesia. Owen Stanley was the first to determine, in 1848, the completely insular character of the eastern archipelago.

East of the China Strait, the south-east extremity of New Guinea is continued

seawards by a chain of reefs and islets which terminate 300 miles farther on in the Louisiade group. All these lands are disposed from west-north-west to east-south-east in a line with the main axis of New Guinea itself. South-east Island, the largest member of the Louisiades, is surrounded by reefs also disposed in the same direction. In the north the Calvados rocks run parallel with South-east Island towards Rossel Island, whilst Saint-Aignan is similarly disposed in the north-west.

The Entrecasteaux group, lying north of the terminal peninsula of the mainland, has the same conformation, and serves as the base to a semicircle of reefs which encloses one of the largest lagoons in the tropical seas, often known by the name of the Lusençay Lagoon, from one of its reefs. Above this reef rise the Trobriand, Grandière, and other clusters of islets, all of which lands probably at one time formed part of the mainland. The peninsula now terminating at the eastern headland of the Finisterre range no doubt formerly extended through the intervening reefs eastwards to the island of Muyu or Woodlark.

#### RIVERS AND ISLANDS OF NEW GUINEA.

Although lying so near the somewhat arid Australian continent, New Guinea being situated in the equatorial zone and traversed by lofty ranges, which intercept the moisture-bearing clouds brought by both monsoons, receives a rainfall sufficient to feed several large rivers. Of these the most copious appear to be the Amberno, or Mamberan, and the Fly. The former, to which the Dutch have also given the name of Rochussen, drains the snowy Charles Louis range, and reaches the coast east of Geelvink Bay, where it develops a vast delta with numerous branches fringed by the nipa palm and casuarina. For a long distance seawards the water is white or greenish, and the mouths of the Amberno are avoided by shipping through fear of the surrounding shallows.

On the southern slope the chief artery is the Fly river, discovered by Blackwood in 1845, and named after his vessel. This voluminous stream has been visited by Jukes, MacFarlane, and d'Albertis, the last of whom ascended it for a distance of about 500 miles to a point within sight of the lofty highlands where it has its origin. All the branches of its delta have not yet been explored, and it is still doubtful whether the numerous channels flowing south of the Fly exactly opposite the York peninsula, Australia, are independent streams or only branches of the delta.

Islands of alluvial formation project seawards at the mouths of the rivers, but in many places the coast is fringed by coral islands, for the most part clothed with vegetation. Many of these being eroded by the waves look at a distance like masses of verdure suspended in mid air. Off the seaboard are also several large islands, which should be regarded as forming part of the mainland. Such are Korrido, Biak, and Jobie in Geelvink Bay, and on the south side Frederik Hendrik (Frederick Henry), which is little more than an island in appearance. It is separated from the Klapper-Kust ("Cocoa-nut Coast") merely by a narrow

winding canal, which might easily be blocked by a snag or a sandbank. Several islets, especially in Torres Strait, are disposed in such a way as to form natural harbours, a fortunate provision for shipping in the vicinity of a rock-bound coast with but few inlets, and for hundreds of miles destitute of a single sheltering creek.

According to Wallace the Aru Archipelago must also be considered, like Frederik Hendrik, as a part of New Guinea, separated from the mainland only by shallow waters. The river-like channels by which it is intersected and disposed in regular blocks like the quarters of a city seem to indicate that this archipelago was formerly a marshy plain, whose channels represent the branches of the rivers by which it was traversed before its separation from the mainland by a slight subsidence of about 300 feet. "When the intervening land sank down we must suppose the land that now constitutes Aru to have remained nearly stationary, a not very improbable supposition, when we consider the great extent of the shallow sea, and the very small amount of depression the land need have undergone to produce it."\*

## CLIMATE—FLORA—FAUNA.

Thanks to its geographical position, under the same mean latitude as Sumatra, Papuasias is essentially a hot and moist region, without great oscillations of temperature, without excessively prolonged rains or droughts. This region has neither the cold nor the sultry heats of Australia, and observers have recorded no temperatures higher than 89° Fahr. or lower than 68° Fahr.†

As in the eastern archipelago, the alternation of the seasons is regulated by the trade winds, which, for a portion of the year, set regularly from south-east to north-west, and at other times veer round to different quarters according to the various centres of attraction. The lofty ranges by which the island is divided into two precipitous areas of drainage also cause a sharp contrast between the succession of the seasons on either side. During the winter of the northern hemisphere, from November to April, when the vapours of the Pacific are brought by the north-east trade wind, the slopes facing northwards receive an abundant rainfall, while droughts, varied by a few occasional showers, prevail on the opposite side turned towards Australia. During the other half of the year the south-east trades, which are always accompanied by rains, blow steadily on the south-east seaboard, that is, on all that part of the island which is not sheltered by the Australian continent. West of Torres Strait this continent again modifies the direction of the normal currents which come from the south-west and west, and which also bring a considerable quantity of moisture from the Indian Ocean. During this

\* A. R. Wallace, *The Malay Archipelago*, chap. xxxiii.

† Observations made by Miklukho Maklay at Hermitage Point (5° 23' S. lat; 145° 46' E. long):—

Highest Temperature . . . . .	88° F.
Lowest " . . . . .	70° F.
Mean " . . . . .	80° F.
Rainy Days . . . . .	150
Rainfall . . . . .	94 inches.



period the phenomena are reversed on the northern slopes, the lofty Owen Stanley range completely intercepting the south-east trade, and producing calms or variable breezes in the sheltered waters north of Papuasias.

Half Australian in some of its aspects, New Guinea presents a less varied flora than Indonesia, although the western peninsula seems to belong to the same zone as the Moluccas. Here are found the nutmeg and other Malayan plants, while the acacias and eucalyptus of the eastern regions recall the neighbouring continent of Australia. In general the two floras may be said to overlap each other in New Guinea, alternating with the dryness or moisture of the contrasting slopes. Where the slopes are exposed to droughts the prevailing forest trees are the eucalyptus and other Australian species, and here occur vast savannahs of the so-called "kangaroo grass," while the streams are fringed with the bread-fruit tree, the mango, pandanus, areca, and cocoa-nut palms. But there are also a large number of indigenous forms, and Beccari enumerated no less than fifty varieties of the palm peculiar to the great island. Amongst the more valuable local species is the *sassafras goheianum*, the bark of which yields the precious *massoi* oil, so highly prized as a febrifuge in the Malay Archipelago.

Notwithstanding the great diversity in their relief, climates, and general physical aspects, New Guinea and Australia present remarkable resemblances in their respective faunas. On the one hand lofty mountains, rain-bearing winds, well-watered valleys, large rivers, vast ever-green woodlands; on the other, boundless plains, where waterless and stony tracts are varied by thorny scrub. Yet the mammalian fauna belongs to a common centre of dispersion, a fact which can be explained only by assuming a former continuity of land between both regions. The present Torres Strait by which they are now separated is evidently a comparatively recent event in the history of the planet.

The animals, however, have had to modify their habits in order to adapt themselves to their different environments. Thus one of the New Guinea kangaroos, formerly a jumper, is now a climber. His tail has become smaller and covered with hair, his paws have been furnished with claws, and he moves from branch to branch with short springs. Instead of grazing he feeds on the rich foliage of the trees, but he is still rather awkward at climbing, and would soon be exterminated were the local forests infested by rapacious beasts.

The whole mammalian fauna is limited to a pig, some bats, mice, and monotremes, with over thirty species of the characteristic marsupials, one of which is no bigger than a rat. The dingo, or wild dog, which everywhere accompanies the natives, came with them at some remote age from foreign lands; like the Australian dingo it never barks, it lives almost exclusively on fruits and vegetables, and its flesh is said to be excellent.

In its avifauna New Guinea partakes both of the Australian and Malaysian regions. In the north-west peninsula and neighbouring islands alone Wallace and other naturalists have enumerated at least two hundred and fifty species of land birds belonging to one hundred and eight genera, of which sixty-four are peculiar to the zone of Papuasias, the Moluccas, and North Australia. Some of

these are remarkable for their beauty, original forms, and brilliant colours. Such are the *goura coronata*, loveliest of the pigeon family; the large black cockatoo and the nasiterna, the "giant and dwarf" of this tribe; lastly, the marvellous birds of paradise, called by the Malays the "birds of God," and formerly supposed to live always on the wing, ever-soaring heavenwards. They were also believed to have no feet, because the skins prepared for the Moluccan markets had the legs amputated, and even Linnæus gave the name of *paradisea apoda* to the large variety. The cassowary is also found in New Guinea, but birds of prey are almost completely absent, and to this circumstance is due the development of so many other species with gorgeous plumage. Amongst the numerous reptiles occurs the curious *chondropython pulcher*, which forms the transition between the American boas and the pythons of Asia. Although the exploration of New Guinea is still far from complete thousands of insects have been discovered, fully as remarkable as the birds for their surprising wealth of forms and genera.

## INHABITANTS OF NEW GUINEA.

The population of New Guinea, variously estimated at from half a million to two millions, comprises a very large number of groups differing greatly from each other in stature, complexion, shape of the skull and other physical features, as well as in their usages and mental qualities. Several tribes approach the Indonesian type, as found in Borneo and Celebes, while others resemble the Malays, and are described by travellers as belonging to this race. Wallace, Virchow, Hamy, d'Albentis, and other ethnologists also believe that the Negritoes are represented in New Guinea as a distinct race, and not merely as degenerate Papuans, as supposed by A. B. Meyer and Miklukho Maklay. Communities of Polynesian origin are also numerous, especially in the south-eastern districts, and endless interminglings have taken place between contiguous groups.

But, although there is no ethnical uniformity, as seemed probable from the reports of the early explorers, the Papuan element, whence the great island takes the name of Papua, certainly predominates over all others. This element is found almost unmixed on some parts of the north coast, and according to several authorities it even occurs in all parts of the Oceanic world. Formerly it reached as far as Hawaii and New Zealand, where it has been replaced by the Polynesian stock.

This term Papua, said by Crawford to be derived from the Malay expression *pua-pua*, that is, "black, black," is by most writers explained to mean "frizzly," from the natural texture of the hair, the trait by which most strangers are arrested. The natives give themselves no collective name, and the special appellations by which the various tribes are known are usually found to be of topographical origin. The languages, as numerous as the tribal groups, are sufficiently distinct in many places to prevent the natives of neighbouring villages from understanding each other. According to Lawes no less than twenty-five idioms are current along the section of the southern seaboard stretching for about 300 miles to the east of Torres

Strait. The best-known native dialect is the Nofur (Nufor), of Dorey and the adjacent islands in Geelvink Bay. Some of those that have been hitherto studied, as, for instance, the Metu of the south-east coast, belong undoubtedly to the great Malayo-Polynesian linguistic family; but it would be premature to assert that all the New Guinea languages are members of that widespread oceanic group.

On the whole the Papuans are somewhat shorter than the Polynesians, the average height being about 62 to 64 inches. They are well-proportioned, lithe, and active, and display surprising skill both in climbing trees and in using the feet for prehensile purposes. Most Papuans have a very dark skin, but never of that shiny black peculiar to the Shilluks of the White Nile, the Wolofs of Senegal, and some other African peoples. The eyebrows are well marked, the eyes large and animated, the mouth large but not pouting, the jaw massive. Amongst the north-western Papuans, regarded by Wallace as representing the type in its purity, the nose is long, arched, and tipped downwards at the extremity, and this is a trait which the native artists never fail to reproduce in the human effigies with which they decorate their houses and boats. Another distinctive characteristic of numerous tribes is their so-called mop-heads, formed by superb masses of frizzly hair, no less abundant than that of the Brazilian Cafusos, and, as in their case, possibly indicating racial interminglings. But this feature is not constant any more than is the dolichocephalous, or narrow shape of the skull, although both are very general. In Mabiak and some other islands of Torres Strait the heads of the children are lengthened by artificial means almost to a point, and the young women of many tribes on the mainland carry loads supported by a strap round the forehead, which has the contrary effect of compressing the skull to a circular form.

Some Papuans still go naked, but the majority wear at least a sort of bark loin-cloth or skirt of vegetable fibre, or else a rattan cane to which is suspended a shell or some foliage. Tattooing is not universal, nor do the Papuans, properly so-called, ever decorate themselves with designs and arabesques like the Polynesians. The tattooing is, moreover, generally effected by burns or incisions, and not by the pricking operation common amongst the mixed populations of the south-eastern districts. Bamboo combs are worn in the hair, little bits of stick or bone are passed through the cartilage of the nose, the body is also painted and ornamented with earrings, bracelets, and pendants of bone, shells, polished pebbles, the vertebræ of fish, and even human teeth. In sign of mourning they daub themselves in white, yellow, or black, according to the tribes, and the women of Katau, near the Fly delta, express their grief by covering themselves from face to knees with a network of little strings.

Certain tribes on the shores of Astrolabe Bay studied by Miklukho Maklay are amongst the least civilised in Papuasias. Till recently they were unacquainted with metals, still using stone, shell, or wooden implements exclusively; they were even incapable of producing fire, so that when the embers died out it had to be borrowed from the next-door neighbour. The old men assured the Russian traveller that till within a recent epoch fire was altogether unknown, and flesh was eaten raw, which caused scorbutic affections to prevail. Such is also probably

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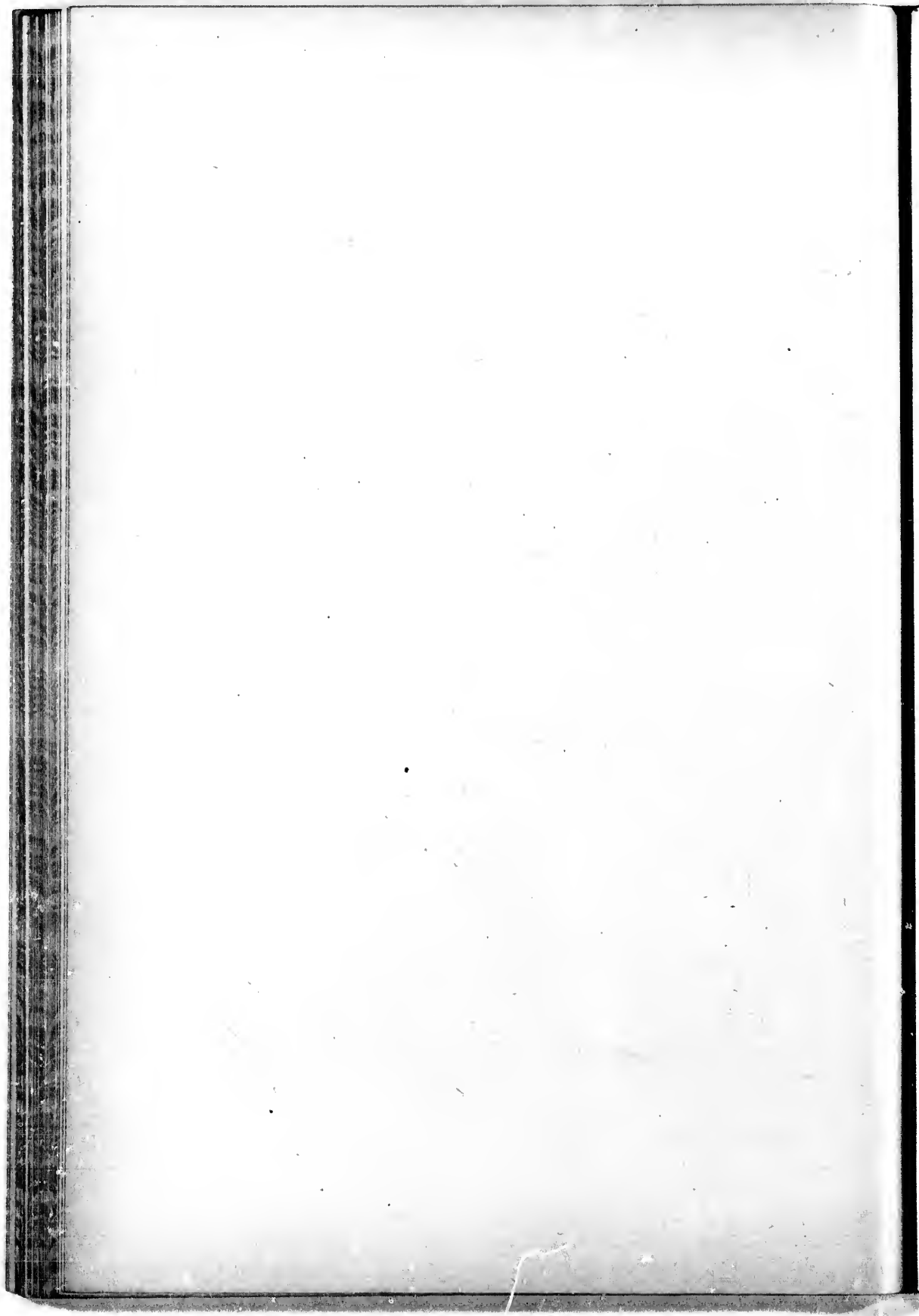
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GROUP OF KOYARI CHIEFS, SOUTH-EAST NEW GUINEA.



still the state of culture amongst the inland tribes cut off from all relations with the outer world; but most of the populations dwelling on the seaboard, and visited by Malays, Bugis, or European and American seafarers, have long enjoyed a much higher degree of civilisation. Some tribes are still exclusively hunters or fishers, whereas others till the land, making extensive clearings in the forests, where they plant the sago tree, surround their huts with bananas, sow maize, taro and tobacco, and even export their agricultural produce in exchange for European goods, especially arms and hardware. Till lately they used no weapons except stone-headed or poisoned darts and arrows, bamboo knives, bone daggers, wooden spears and clubs. Some of the natives also possess musical instruments of primitive form, such as flutes, drums, and trumpets.

However backward they may be in other respects most of the Papuans are endowed with a highly developed artistic feeling, and as carvers and sculptors they are far superior to most of the Malayan peoples. Having at their disposition nothing but bamboos, bone, banana leaves, bark and wood, they usually design and carve with the grain, that is, in straight lines. Nevertheless, with these primitive materials they succeed in producing extremely elegant and highly original decorative work, and even sculpture colossal statues representing celebrated chiefs and ancestors. Thanks to this talent they are able to reproduce vast historic scenes, and thus record contemporary events. Numerous tribes have their annals either designed on foliage or depicted on rocks in symbolic writing. The skulls of the enemies slain in battle, which are carefully preserved to decorate the houses, are themselves often embellished with designs traced on masks made of wax and resin. On the banks of the Fly river these skulls are also used as musical instruments.

All Papuan dwellings, even those of inland districts, are erected on rows of piles on the model of those insular villages which are surrounded by water at every tide and inaccessible except by boats. These clusters of habitations, which from a distance look like upraised reefs of eccentric form, present a perfect picture of what the European lacustrine towns must have been some three or four thousand years ago. Stakes of unequal length sunk deep into the muddy bed of the shallow bays serve to support a flooring of planks interlaced with lianas and more or less polished with stone implements; in the centre is the hearth formed by a bed of glazed earth, and in front runs a little verandah, serving as a playground for the children and a workshop for the fishermen. The houses are connected together by means of slight wooden galleries, along which the natives with their prehensile feet pass fearlessly, while underneath the crocodiles swim sluggishly about, attracted by the refuse of the kitchens. Now also European craft, and even small steamers, thread the mazes of these floating villages, casting anchor before the large building which serves at once as temple, hotel, exchange and market. In the interior the Papuans have preserved the same type of structure as on the seaboard.

But the ingenuity of the natives is displayed above all in the construction of their boats. At the approach of bad weather they lash two, three, and even four of these praus in a single floating mass, which rises and falls with the waves with-

out ever foundering. Some of the *lutakoi*, or trading craft, carry as many as six rectangular sails or large mats made with the bark of the sago palm, each supported by two vertical masts springing from the gunwales of the praus. Other boats hoist only a single sail double the height of the mast, oval and hollowed out at top so as to leave two points, which at a distance resemble the horns of some prodigious animal gliding through the water. The natives also contrive to make simple canoes quite seaworthy by means of a platform which is attached at its two extremities to a pointed boom or spar serving the purpose of an outrigger.

Although formerly much dreaded by passing seafarers, most of the New Guinea peoples are of mild disposition and habits. The women are respected and the children treated with extreme kindness. The slaves, also, in the few districts where they exist, enjoy the same food and wear the same clothes as the free men. Homage is paid to the dead with flowers, songs, and ceremonies, but the funeral rites differ greatly in the different tribes. Some bury the deceased immediately after the "obsequies," others wait till the body has been dried by fire or the weather, while elsewhere the bones are distributed amongst the relatives, the son wearing his father's maxillary as an armet.

A very common practice is to sculpture the so-called *karvars*, that is, little figures representing the deceased, or rather the life that has escaped from them. At the son's death the karvar is planted on his grave, with his arms; he is thus followed to the other world by his father's image, while he leaves his own to his children. The houses and boats, which serve as temples, are also decked with the effigies of their ancestors, the worship of whom, combined with that of the good and evil spirits dwelling in the trees, the rocks, the winds, and storms, constitutes the religion of all the aborigines. Mohammedanism, however, has already invaded the small archipelagoes off the west coast and even some parts of the mainland. Christian missionaries have also established stations at various points of the seaboard, which are at least becoming so many centres of civilising influences.

#### TOPOGRAPHY OF NEW GUINEA.

The Dutch, as heirs of the Sultan of Tidor, who retains the nominal suzerainty without the right of levying tribute, are the official masters of west New Guinea as far as 141° E. longitude. But on this vast domain they do not possess a single town, whence their direct authority might be gradually extended over the interior. There are, however, a few ports of call visited at more or less frequent intervals by their ships of war to protect the commercial operations of the few European traders, and especially to show their flag and maintain their authority in the eyes of the natives.

At the north-west extremity of New Guinea the island of *Waigeu*, that is, "Land of Water," seems to be admirably situated to serve one day as a centre of trade for the insular populations of this region. The deep inlets indenting the south coast might afford shelter for whole fleets, while a magnificent roadstead is formed by the coralline islet of Gemien lying near the shore. Unfortunately

Waigeu, although fertile and thickly peopled, produces nothing for exportation. The natives, of mixed Malay and Papuan descent, are indolent, like all other islanders for whom the sago tree yields a superabundance of food with little effort

Fig. 133.—WAIGEU, BATANTA, AND SALWATI.

Scale 1 : 1,500,000.



36 Miles.

on their part. In the interior there are no independent Alfuru tribes, and all the inhabitants recognise the rajah, who resides at *Samsam*, at the head of the inlet by which the island is nearly divided into two parts. The isthmus of Fak-Fak connecting the two nearly equal sections is scarcely 200 feet high. But the most

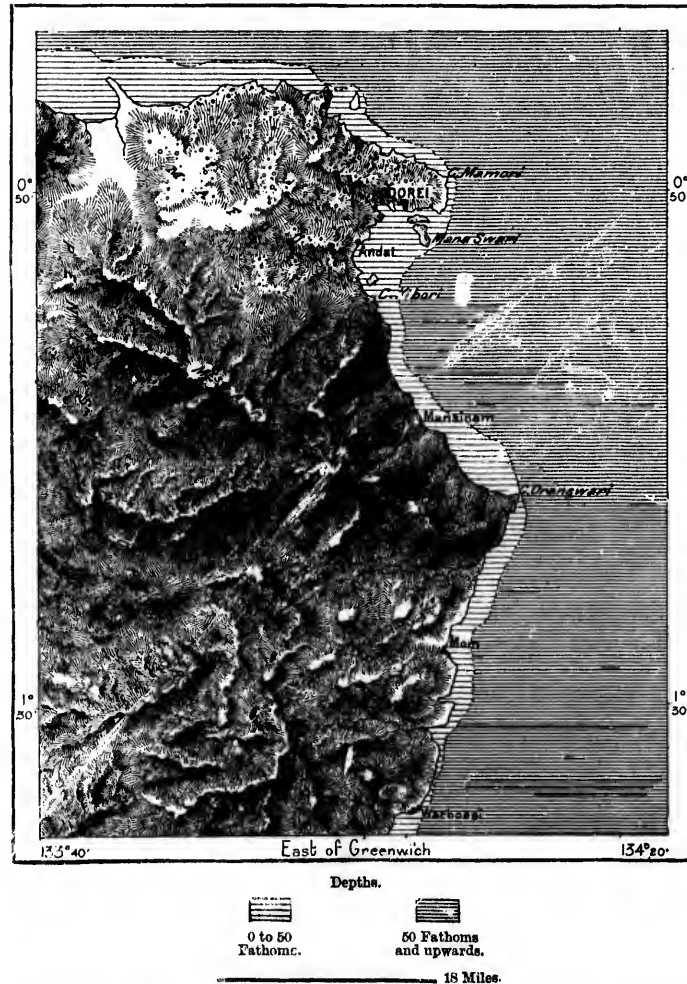


frequented market in this western archipelago of New Guinea is *Samaté*, at the north-east point of the island of Salwaty.

On the Dutch mainland the best-known and busiest station is *Dorei*, at the foot of the Arfak hills, at the entrance of Geelvink Bay. Close to the coast are three

Fig. 134.—DORREI.

Scale 1 : 900,000.



pile villages sheltered on the north side by a wooded headland, and visited by a few Malay and European traders. Here is also a long-established missionary station; but although well received by the natives, the preachers of the gospel have hitherto failed to form a small congregation of neophytes.

The Papuans of Dorei are known by the name of Mafur or Nofur, a term supposed by some to have the same origin as the word Alfuru, which in Portuguese would have the meaning of "outsiders," or "savages." But Van Hasselt interprets it in the sense of "discoverers of fire," and these natives are justly proud of the sublime invention attributed by other peoples to the gods. The neighbouring highlands are occupied by the Arfak people, much dreaded head-hunters, who have nevertheless given a friendly welcome to those travellers who ventured to visit them.

West of Dorei on the north coast lies the station *Amberbaken* (*Amberbaki*), that is, "Amber Land," which is inhabited by Papuans of the same stock as the Mafurs, and like them peaceful and friendly and even more skilful agriculturists. Their villages consist of very high cabins perched on the interlaced stems of the bamboo. The territory west of them is occupied by the Karons, one of the few New Guinea peoples who have not been unjustly accused of cannibalism. They eat the bodies of their enemies slain in battle; but they are probably not of Papuan race. Although averaging about 5 feet 4 inches in height, they would appear to belong to the same stock as the Negritos of the Philippine Islands; and according to the naturalist Raffray are characterised by robust, thick-set frames and limbs, large round head, very prominent superciliary arches, thick lips, broad flat features. They dress their frizzly hair in long tresses, which hang loosely over the temples and forehead, and practise a kind of tattooing with large raised welts.

According to the Malays who have visited them, the Karons do not eat sago like the coastlanders, but feed on the sprouts of another palm that grows in a dry soil, and also devour all kinds of reptiles and insects. They are accused, though not on direct evidence, of eating their own offspring when all the slaves and captives have been consumed, leaving only two children to each family. Further south and more inland dwell the Gebars, who, like the peoples living on the shores of MacCluer Inlet, are also reputed cannibals.

South of Dorei one of the most important coast villages is *Wairur*, lying not far from the narrowest part of the isthmus, across which a portage might easily be established between the Geelvink and MacCluer Gulfs. This place is visited by Malay traders, who purchase the nutmegs here growing wild. Other stations follow round Geelvink Bay, such as *Wandammen* on the south and *Aropen* (*Waropen*) on the east side. Then beyond the Amberno delta occur a few ports of call occasionally visited by Dutch skippers. But here the population is very scattered, and foreign trade has fallen off since the middle of the century. The dealers, following the usual plan of making advances to the natives in order to secure their produce beforehand at nominal prices, run the risk of being murdered by their debtors, and in some places do not venture even to land, but wait off the coast the arrival of the native craft laden with local produce.

Humboldt Bay (Telokh Lintju), the easternmost inlet within Dutch territory, is inhabited by some of the rudest coast tribes in New Guinea. Such is their ignorance that they are even unable to extract the oil from the cocoanuts that fringe all the western parts of the bay.

Along the whole of this seaboard the mainland is less frequented than the adjacent islands. Those of Geelvink bay have each some busy markets, the most important of which is *Ansus*, on the south side of Jobi or Jappen. The inhabitants of the station greatly resemble the Mafurs of Dorei; but the interior of the island is occupied by much-dreaded savages, who are accused, rightly or wrongly, of cannibalism.

On the Dutch territory facing the Moluccas the most frequented station is *Sekaar*, which stands on a small bay at the southern entrance of MacCluer Inlet. The traders from Ceram penetrate in this direction as far as the port of *Bintuni* in search of sago and nutmegs; but they never venture to approach the northern shores of the gulf, whose inhabitants are dreaded as pirates and man-eaters. Here the most powerful "rajah" is the prince of *Atti-Atti*, an insular group of some twenty houses lying west of *Sekaar*, and occupied by a motley population of nominal Mohammedans. The rajah of this place is the representative of the Sultan of Tidor in these waters, and the tribute of the villages along the coast is collected by him. Thanks to his intervention the Tidor suzerain and the Dutch Government itself have ceased to be myths for the natives of these districts; in the Karas archipelago, in the Island of Adi, and as far as *Namatotte* and *Aiduma*, near the bay where formerly stood *Fort Bus*, the authority of the Netherlands is fully recognised; but farther eastwards the power of the "Company" is no longer anything more than a name. The Papuans of these regions are said by travellers to approach the African Negro type more than any others; formerly they carried on a trade in slaves, and according to the early explorers at times even sold their own children into bondage.

The Aru, that is, "Mother-of-Pearl," Archipelago, lying about 90 miles south of the New Guinea coast, enjoys far greater commercial importance than the trading places on the mainland. *Dobbo*, the commercial centre of the group, commands a well-sheltered channel in the islet of *Wamma*, one of the coralline rocks in the north-west of the archipelago. During the season from March to May whole fleets of praus assemble here from Ceram and the surrounding islands, from the Kei Archipelago and even from Macassar. According to Wallace the exports of *Dobbo*, chiefly mother-of-pearl, tortoise-shell, holothuræ, birds of paradise and edible birds'-nests, have a mean annual value of £18,000. During the busy period the houses are unable to afford accommodation to the numerous traders flocking hither from all parts of Western Indonesia; but after the fair the place is completely deserted.

The Aru Archipelago depends on the Amboyna Residence, and usually once a year a Dutch commissioner comes round from the capital to make his general inspection and deliver judgment on pending cases. His intervention, however, is little needed, for during his absence the people administer their own affairs fairly well, having neither murders nor thefts to punish. According to von Rosenberg, some groups of Negritoes dwell near the fisheries in the eastern part of the archipelago. The *Alivurus* (*Alfurus*) of the Aru Islands claim descent from an ancestral tree, and are regarded by Riedel as of the same stock as the Australians

of North Queensland; others think they came from Timor and Tenimber, while Wallace considers that they belong to the pure Papuan type. They eat the flesh of the dog, supposing that this diet will always keep them brave and strong; but with their sago cakes they also take a few slices from the bodies of deceased relatives. The foreign religions, whether Christian or Mohammedan, have hitherto made scarcely any progress amongst these islanders.

## BRITISH NEW GUINEA.

Even before they became the official rulers of southern Papuaasia, the English had already extended their jurisdiction over all the inhabited islands of Torres Strait to within sight of the great island. Hence the Australian colonists had only very narrow waters to cross in order to take possession of their new domain. The proximity of the Australian continent in fact gives quite an exceptional importance to this British territory. It is accordingly the best known, or rather the least unexplored region in the whole of New Guinea; here the itineraries of travellers reach farthest inland, and here attempts at colonisation have been essayed on the largest scale. Australian speculators are already demanding the concession of vast tracts to be converted into plantations and cultivated by native labour. Meantime the Government, fully alive to its responsibilities, has issued salutary measures tending to protect the aborigines from extermination or from the evils usually resulting even from peaceful contact with the white. The sale of fire-arms, or alcoholic drinks and of opium to the local tribes is absolutely forbidden, as is also the indiscriminate recruiting of the natives for the labour markets elsewhere.

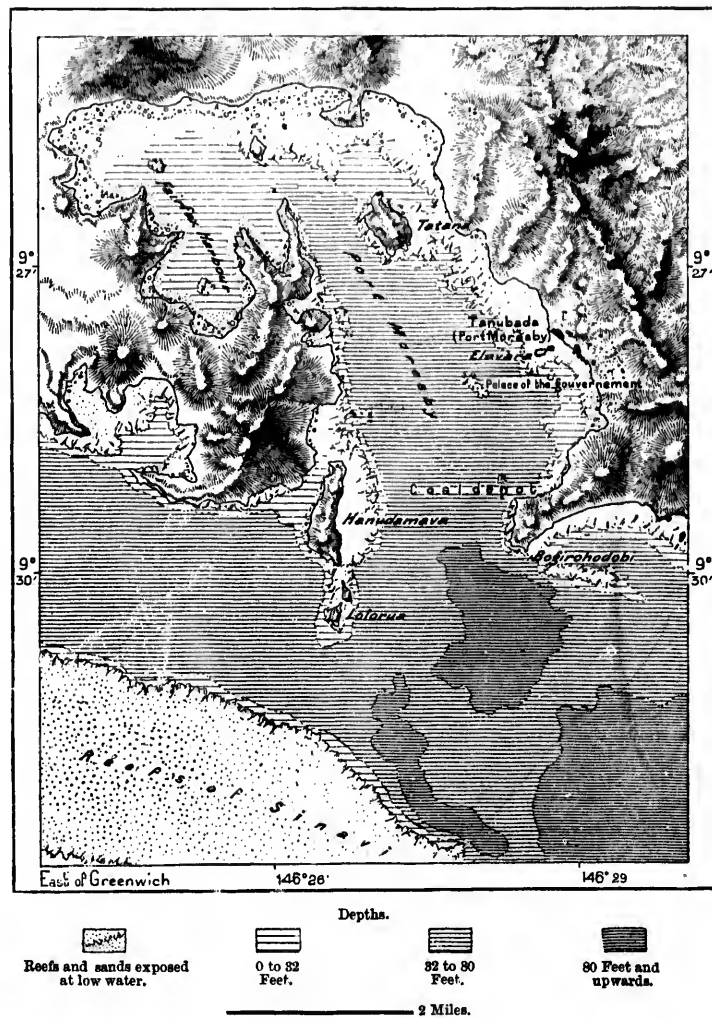
The portion of British territory conterminous with Dutch New Guinea seems to hold out the brightest prospects for future settlement and material progress. Here are the rich alluvial lands watered by the numerous navigable branches of the Fly River, and at the same time lying nearest to the Australian mainland. The intervening shallow and island-studded waters of Torres Strait are only about 100 miles wide, reckoning from the mouth of the Baxter River to Cape York at the northern extremity of the York Peninsula. Nevertheless the vast and fertile delta region is still entirely held by Papuan wild tribes, and the nearest station of white traders and missionaries lies, not on the mainland but on the reef-fringed islet of *Saibai*, off the coast to the east of the mouth of the Mai Kasa.

When the syndicate of the Australian colonies sent an expedition in 1885 to establish British authority over the officially annexed territory, the site of the future capital was fixed at *Port-Moresby*, an inlet opening to the south-west of the superb Owen Stanley highlands, and sheltered by a chain of reefs from the fury of the surf during stormy weather. At this point white coralline cliffs take the place of the muddy mangrove-covered shores which skirt the mainland to the north-west. The basin of the roadstead, which is approached by a wide entrance, has a depth of from 24 to 40 feet almost close inshore. Here also is one of the largest and most salubrious native villages on the whole seaboard. Even at the

time of the discovery in 1873, its double row of huts, shaded by cocoanut palm-groves, had as many as eight hundred industrious inhabitants occupied with agriculture, trade, and pottery, and doing a large traffic with the villages along

Fig. 135.—PORT-MORESBY.

Scale 1 : 100,000.



the north-west coast, which took the excellent Port-Moresby earthenware in exchange for sago.

Since that time the native town has considerably increased in size, while the

European quarter, which in 1885 had only a group of houses belonging to the

Fig. 136.—Koyari Dwelling, near Port-Moresby, New Guinea.



missionaries and the depôts of a British trader, now boasts of its Government

"palace," barracks, court-house, prison, and other structures symbolising European administration. Port-Moresby is the only haven in British New Guinea where foreign skippers are authorised to land their wares; nor can any colonists settle in the place without special permission. It is already connected by a submarine cable with the Australian continent.

In 1887 not more than about twenty whites, officials, traders, and missionaries, were resident on the mainland of the British territory. Most of the dealers carried on their operations with the natives from their ships without ever landing. The explorer and naturalist, O. H. Forbes, had founded a small settlement at *Sogere*, in the interior, about 50 miles north-east of Port-Moresby, and it was from this point that he organised his expeditions to the surrounding highlands. Gold miners, hitherto attended with but little success, have also established a few camping grounds at some distance inland, and a white traveller may now wander alone without danger throughout most of the southern regions in British territory east of the Fly River.

But it is chiefly through the action of native teachers trained by the missionaries that European influence is slowly making itself felt amongst the highland populations. The Protestant seminary at Port-Moresby sends every year a certain number of young educated natives to the villages along the seaboard and in the islands, and thanks to them the languages current in this region are already well known. These teachers have been most successful especially as gardeners, and the enclosures of the villages are already in many places well stocked with vegetables and fruit trees till recently unknown in the country.

Beyond Port-Moresby no European houses are anywhere to be seen except on the Hula headland some 60 miles south-east of the capital, and in a few islets near the coast. The Government, however, has acquired South Cape and Stacey Island, at the south-east extremity of New Guinea, in anticipation of a future strategical and commercial establishment in this region. Plantations have been recently begun in South-east Island, the chief member of the Louisiade Archipelago. Here the Island of Varé, or Testé, has already become a station much frequented by skippers engaged in the coasting trade.

On the whole the British is much more thickly peopled than the Dutch section of New Guinea. In some districts, and especially on the shores of Papua Gulf between the Fly Delta and Yule Island, the population is very dense, large villages following in succession from creek to creek. The Aroma country, south-east of Port-Moresby, is also well peopled, while the Louisiade and Entrecasteaux Islands are fringed with hamlets round their periphery. The natives of these archipelagoes, however, are much dreaded, and seafarers shipwrecked on their shores have often been devoured by them. They have the reputation of being all powerful magicians, of whom it is related that they can tear out the eyes, the tongue, the heart and entrails of their enemies without the victims' knowledge.

Some of the tribes are of Papuan origin, and closely resemble those of western New Guinea. These are for the most part agriculturists, while those engaged in trade and navigation appear to be half-castes, the Polynesian type predominating

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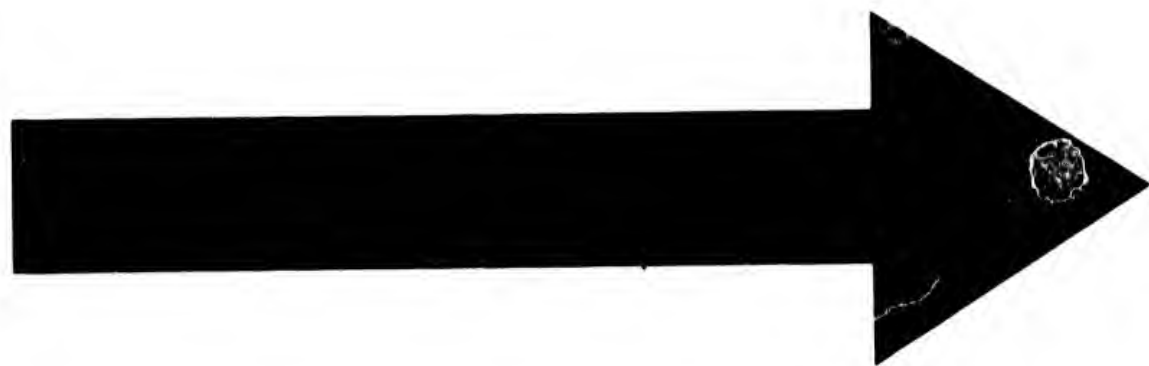
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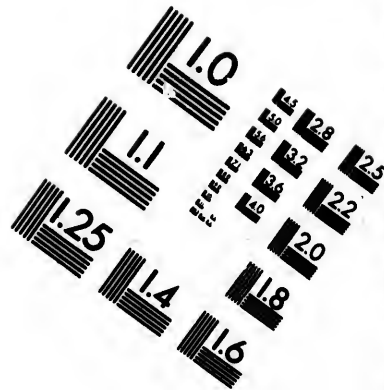
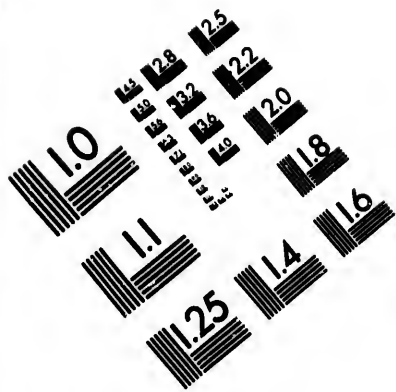
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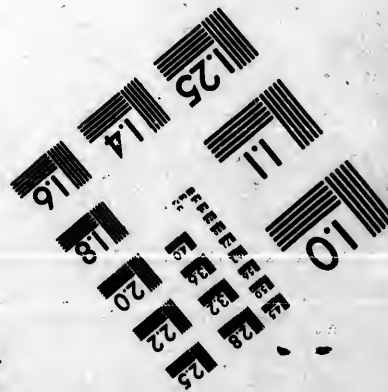
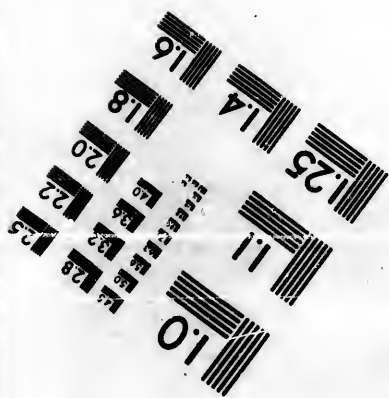
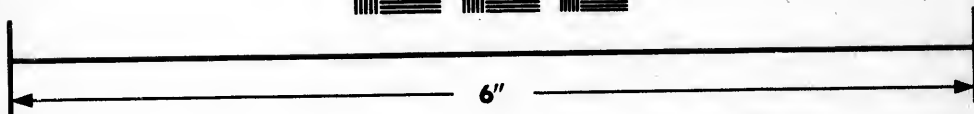
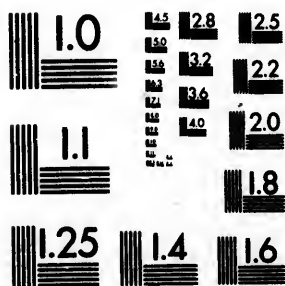
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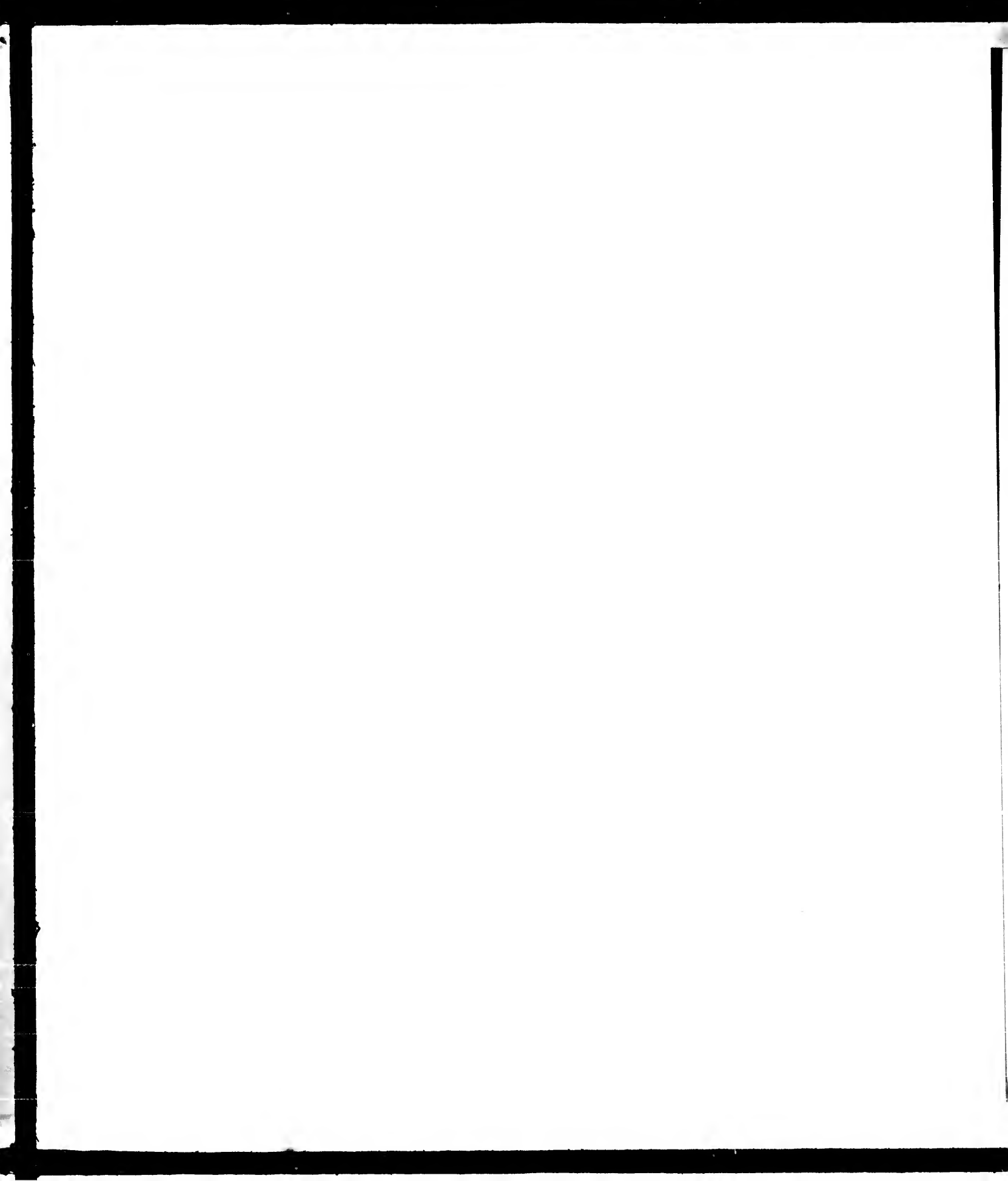
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amongst many of them. To this mixed race belong the Motus of Port-Moresby, who manufacture and export vast quantities of earthenware, and whose language has become the lingua franca of the traders along a large part of the seaboard. Their complexion is relatively fair, not unlike that of the Tahitians, and in their attitude, physiognomy, and usages they also recall the eastern Polynesians. Of all the New Guinea peoples they practise tattooing to the greatest extent. The designs, with which they cover a great part of the body, bear a surprising resemblance to Greek and Latin characters. At the sight of these fine torsos, which seem clothed with inscriptions, one feels involuntarily tempted to decipher the writing, as if it contained the personal history of the bearers.

The Koyari, who occupy the first slopes of the mountains back of Port-Moresby, have near their villages little *dobos*, or houses, perched on the tree tops, where they take refuge in case of danger, and whence they hurl stones on their assailants. It was perhaps these *dobos* that gave rise to the legend of certain Papuan peoples living in the trees, and springing from branch to branch like monkeys. The Koyari and the neighbouring Koitapu of kindred stock have a much darker complexion than the Motus.

The aborigines of the British territory must be included amongst those populations, who have developed no distinct form of government, all the male adults being practically equal. Doubtless each village has its so-called "chiefs," who owe this title either to age or to personal valour in warfare, or else to their superior skill and potency as magicians. But this moral ascendancy gives them no authority over the tribe, and the consequence is that the British Government is unable to utilise them as officials in the way it would wish. All its efforts aim at giving the tribes a monarchical constitution, by appointing some distinguished member of the community to be henceforth a paid functionary, and at the same time the representative of his fellow-tribesmen, and responsible for their conduct. The general administration of British New Guinea has meantime been delegated by the home Government to the Australian colony of Queensland.

#### THE GERMAN POSSESSIONS IN NEW GUINEA.

The German territory, officially designated by the name of Kaiser Wilhelmsland, is not administered as a state colony by officials from Berlin. Its management is simply left in the hands of a trading company, which, under the protection and control of the Government, endeavours to make money by laying out plantations, establishing trading stations, and exporting local produce. Men-of-war visit these waters to give the German traders the necessary prestige, and, when required, to lend them active assistance.

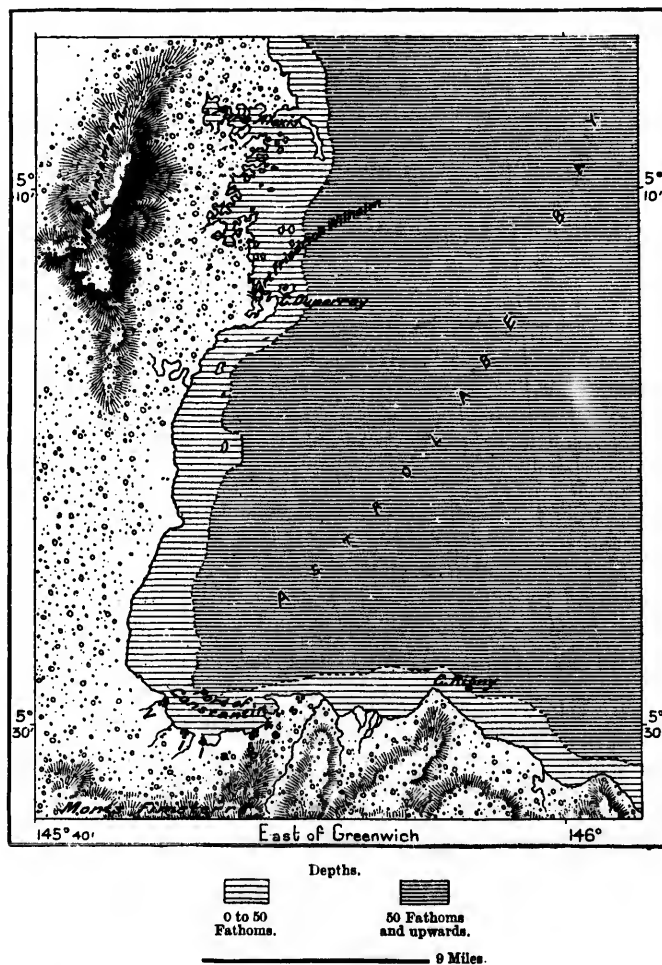
Numerous expeditions have revealed the form of the coastline in all its details, but the old French, English, and Russian names of the prominent headlands and other geographical features have been gradually replaced by German appellations. Very little of the nomenclature given to this region by the first explorers now remains on the maps, and the natives no longer salute strangers by the title of

"Monsieur," as they had learned to do from Dumont d'Urville and other French navigators.

The capital of the German possessions in New Guinea is *Finsch-hafen*, so named in honour of the German explorer Finsch, who has surveyed most of the country

Fig. 137.—ASTROLABE BAY.

Scale 1 : 425,000.



and best described the land and its inhabitants. *Finsch-hafen* lies near the extremity of the peninsula, which projects to the north of Huon Bay; at this point the coast is deeply indented by a winding inlet, where large vessels can ride at anchor in 60 or 70 feet of water completely sheltered from all winds.

The first houses of the settlement were erected towards the end of the year 1885 on a round island, which has been connected by an embankment with the mainland. Cisterns have also been constructed to husband the rain-water, there being a total absence of springs in the coralline limestones of the island and surrounding shores.

At the first arrival of the Germans the district was comparatively well-peopled, but most of the natives have since emigrated in order to avoid being obliged to work on the plantations of the whites. A Protestant mission has been established in the vicinity, and communication with the civilised world is maintained by a steamer plying between this station and the Australian settlement of Cooktown on the east coast of Queensland.

In the Appendix will be found a table of the islands which may be regarded as geographical dependencies of New Guinea. The German islands off the north coast form part of the Melanesian Archipelagoes, while those of Torres Strait on the opposite side of the great island are attributed to Australia.



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## CHAPTER VII.

### MELANESIA.



ALL the islands lying north-east of New Guinea as far as the equator have been declared German possessions by the treaty of partition with Great Britain. Towards the west the German waters are limited by the meridian of  $141^{\circ}$  east longitude, but eastwards the Pacific Ocean is left open for future annexations. Till 1885 the limit was indicated by  $154^{\circ}$  east longitude, but that limit was effaced the next year when the north-western members of the Solomon group, Bougainville, Choiseul, Yzabel, and all the neighbouring lands to the north of  $8^{\circ}$  south latitude, were proclaimed German territory. The islands thus officially annexed to the empire have an estimated superficial area of over 30,000 square miles, with a population of probably about three hundred and fifty thousand. Like the New Guinea possessions, these insular groups are assigned to a trading company, which at the same time exercises political functions.

According to the terms of the treaty the southern section of the Solomon Archipelago falls within the sphere of British influence.

#### I.—NORTH MELANESIA: ADMIRALTY, BISMARCK AND SOLOMON ISLANDS.

These oceanic lands are amongst those that have longest remained unnoticed. In 1567 Mendana, guided by the pilot Hernando Gallego, landed on Yzabel, one of the large islands to which he gave the collective name of the Solomon Archipelago, doubtless with the hope or pretension of having here discovered that auriferous "land of Ophir" whence the King of Judæa imported the gold for the Temple of Jerusalem.

Mendana spent six months in exploring the islands, which he was at last obliged to leave through lack of provisions and water, after quarrelling with the natives whom he had come "to convert to the true faith." Later he returned to colonise the archipelago which he had discovered, but died before reaching it. The route to the Solomon Islands was thus lost, and remained unknown for two hundred years afterwards. Its position had been too vaguely indicated to be followed with any certainty, while Gallego's report had been kept secret, lest he should direct the mariners of other nations to these islands henceforth claimed by Spain. The record of this route has only recently been discovered in the Spanish archives, and translated into English by H. B. Guppy.

Two hundred years after Mendana's voyage, Carteret, in 1767, followed the next year by Bougainville, and in 1769 by Surville, again sailed through the straits and channels discovered by the Spanish navigator, but without identifying them; in fact, they fancied they had discovered new lands and accordingly gave them new names. It was reserved for Buache and Fleurieu, by patient investigation and comparative studies of the early itineraries, to restore to the Spanish mariners the glory of having first explored these Melanesian regions.

But while navigators were in vain seeking the lost route to the Solomon group, they visited other lands lying nearer to New Guinea. In 1616 the Dutch sailors, Le Maire and Schouten, surveyed the "Twenty-five Islands," since Carteret's time known as the Admiralty Archipelago; they also discovered Birara or New Britain, which, however, they mistook for the northern seaboard of New Guinea fringed with numerous islets. Tasman, who also visited these lands in 1643, fell into the same error, which was not corrected till the year 1700, when Dampier, passing southwards, penetrated into the strait that bears his name, and thus determined the insular character of the Admiralty group; but much still remained to be done, and the systematic survey of these waters, begun in the last century by Carteret, Bougainville, and d'Entrecasteaux, and continued in 1827 by Dumont d'Urville, is only now being gradually completed.

For the inland exploration of the islands little has hitherto been done. Missionaries, traders, adventurers, naturalists, such as Miklukho-Maklay, Finsch, Guppy, have visited various parts of the Melanesian groups and published the results of their studies; but no methodical survey of the whole region was begun till the year 1884, when New Britain and New Ireland were occupied by the German Government. Unfortunately, one of the first official acts of that power was to change the geographical nomenclature, in which names of English and French origin prevailed. Doubtless, some of these arbitrary terms might with advantage have been suppressed, and replaced by those current amongst the natives themselves. But the maps have been modified in the spirit of a mistaken or aggressive patriotism, without considering whether the new terminology could be justified by the physical aspect of the islands, the nature of the soil, population, or comparative geography.

The chief insular group has thus become the Bismarck Archipelago; Tombara, or New Ireland, is henceforth to be known as New Mecklenburg; York Island has taken the name of New Lanenburg, and Birara, or New Britain, that of New Pomerania. Most of the mountains and ports have been similarly "re-baptised," with a cynical defiance of international etiquette and indifference to the fitness of things.

#### PHYSICAL FEATURES OF NORTH MELANESIA.

The North Melanesian lands are disposed in the form of two transverse curves. The northern, beginning with Tiger Island, about 100 miles north of the New Guinea seaboard, stretches eastwards through the groups of Ninigo or Exchequer, the



Hermit and Admiralty to New Hanover, which is followed by the elongated island of Tombara, disposed in the direction from north-west to south-east, in common with all the members of the Solomon Archipelago. The southern curve runs at first parallel with the New Guinea coast, where the extreme limit of the chain is marked by Vulcan Island within ten miles of the mainland. The system is then continued at intervals by Dampier (Kar-Kar), Long and Rook, beyond which the curve, ceasing to follow the New Guinea coast south-eastwards, sweeps round through Birara (New Britain) east and north-east transversely to Tombara. Both curves thus converge and somewhat overlap about York Island in St. George's Channel.

Like most other insular chains disposed in the form of arcs of a circle, these two ranges of the North Melanesian islands consist in a great measure of volcanic lands. Vulcan, at the western extremity of the southern curve, forms a superb peak from which wreaths of smoke constantly issue. Its shores are festooned with a garland of plantations and its slopes clothed with forest growths to a height of over 3,000 feet, beyond which nothing is seen except a scanty herbaceous vegetation as far as the summit, 5,000 feet above the sea.

Aris, near this smoking cone, is a long extinct breached crater; but Lesson, lying farther west, is still active. These waters have often been the scene of violent commotions, and when Dampier penetrated through the strait bearing his name, the atmosphere was charged with vapours and ashes; flames were reflected from the clouds, and the sea was covered far and wide by floating pumice; but at present all the numerous igneous cones dotted over this maritime region are quiescent.

Birara, largest member of all the Melanesian groups, is too little known in its central parts to determine the character of the rocks concealed beneath the uniform mantle of verdure clothing all the mountain slopes. But Cape Gloucester, at the extreme point overlooking Dampier Strait, is known to be a still active volcano, while round about rise numerous eruptive cones with an average height of about 6,500 feet. A low reef in the cluster of the French Islands scattered to the north of Birara is also an upheaved igneous mass, one of whose springs forms a geyser. Farther east a promontory on the mainland, 3,940 feet high, constitutes, with two less elevated crests, the group of still-burning mountains known as the "Father" and his two "Sons." Lastly, Blanche or White Bay, at the northern extremity of Birara, appears to be itself a ruined crater encircled by an amphitheatre of hills. In the midst of the waters, which present an almost lacustrine aspect, stands a steep circular eminence, while the peninsula enclosing the bay on the east is surmounted by another triplet of volcanoes, known as the "Mother" (2,100 feet) and her two "Daughters." In the neighbouring seas the water has often been seen to boil up, and some of the islets have even been partly blown away.

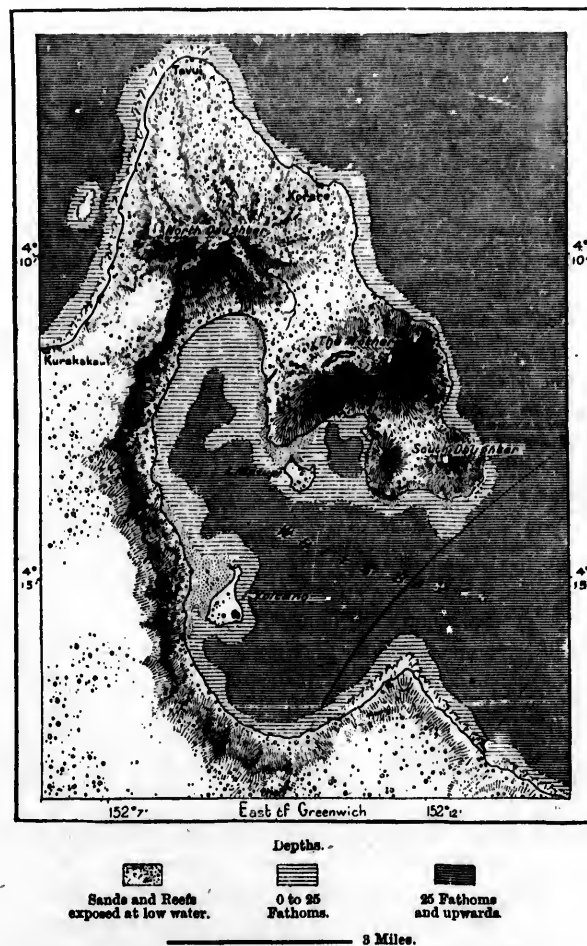
Igneous energy seems to be less active in the western section of the northern curve forming the chief insular chain of North Melanesia. The Exchequer and Hermit groups are vast atolls resting on a rocky bed whose true character has not

yet been determined. The Admiralty Archipelago consists mainly of coralline rocks, and here a mass, 2,970 feet high, occupying the centre of the large island of Taui, is alone said to be of plutonic origin.

Among the less elevated hills in New Hanover, Tombara (New Ireland), and

Fig. 138.—WHITE BAY.

Scale 1 : 170,000.



neighbouring islets no igneous cones have yet been discovered, but the volcanic system again reappears in the Solomon Archipelago. Here, the large island of Bougainville consists from one extremity to the other of a continuous igneous range describing a regular curve whose concave side faces north-eastwards; Balbi, its culminating peak, has an altitude of 10,170 feet; but Bagana, situated in the

central part of the island, is the only cone which still ejects vapours and ashes. The upraised cones scattered over Bougainville Strait are also composed of lavas, but appear to have long been extinct.

Choiseul, which forms the south-eastern continuation of Bougainville, and which rests on the same submarine bank, presents a greater expanse of lowlands, former marine and coralline beds.

Yzabel and Malaita (Malanta), in the northern division of the Solomon group, also consist of igneous ranges whose culminating crests rise respectively to altitudes of 3,900 and 4,270 feet. But the eruptive masses in both islands are of very ancient date, and have been modified to great depths by weathering. Up to a height of 500 feet the hills are encircled by calcareous terraces slowly deposited by the surrounding marine waters.

The southern chain of the Solomons, running parallel with the northern, begins with Treasury (Mono) Island, lying some 60 miles south of Bougainville. Guppy describes this island as an anciently submerged volcanic peak covered by several hundred feet of deposits, then encrusted with coral reefs, and finally elevated above the sea to a height of nearly 1,200 feet. At one time it appears to have subsided to a depth of about 1,800 fathoms, so that, adding its present height, there must have been a subsequent upheaval of no less than 12,000 feet.\*

The group of islands stretching from Treasury in a south-easterly direction contains some not yet entirely extinct cones. Vela la Velha (Vella Lavella), 3,000 feet high, has some fumeroles and a solfatara. Narovo, or Eddystone, is also furrowed by crevices whence escape sulphurous vapours. But on New Georgia, largest member of this cluster, nothing occurs except a range of quiescent or extinct crests. When the Spaniards first reached these waters, the islet of Savo. (Sesarga) at the north end of Guadalcanar, was in full eruption. Guadalcanar, largest of the southern Solomons, is covered with superb cloud-capped mountains rising to heights of from 6,000 to 8,000 feet.

San Cristobal (4,100 feet) is also of volcanic origin; but all traces of activity have disappeared, and the coast is now fringed by coralline headlands. Santa-Ana, at the southernmost point of the Archipelago, is, like Treasury, an ancient volcano, which, after subsiding some 1,500 or 2,000 fathoms below the surface, was again upheaved with a calcareous deposit encrusting its primitive eruptive rocks.

Atolls and low islets are scattered over the Pacific to the east of the Solomons, forming an irregular chain of extensive surf-beaten reefs. Here the atoll of Ongtong-Java or Candelaria, called also Lord Howe or Leueneuwa, is especially dreaded by mariners, its oval circuit of reefs having a periphery of at least 120 miles. The Solomons are also fringed in many places by barrier reefs, which rise above the surface in deep waters. East of Yzabel one of these coralline ramparts is reported to be considerably over 100 miles long; New Georgia, Bougainville and Choiseul are similarly fringed with reefs, which render more than half of their seaboard inaccessible to shipping. The straits flowing between

\* *The Solomon Islands*, p. 102.

these barriers and the islands have an average depth of from 350 to 400 fathoms. But the greatest cavity yet revealed in the Melanesian waters occurs towards the centre of the semi-circle formed by the Bismarck Archipelago between New Britain and New Ireland, where the sounding line plunged into an abyss of 780 fathoms.

## CLIMATE, FLORA AND FAUNA OF NORTH MELANESIA.

The North Melanesian lands are comprised entirely within the zone of the south-east trade winds. For more than half the year, from May to September, or even from April to November or December, the wind sets steadily in the normal direction; then it yields to the west or north-west monsoon, a variable and shifting current, but still humid, like the trade wind, for it also traverses a wide expanse of water before reaching the islands. Hence there is at least one rainy day in three, at times one in two, throughout the year, and both the Bismarck and Solomon Archipelagoes have a mean annual rainfall of not less than 150 inches in the immediate vicinity of the seaboard,\* and far more on the higher slopes where the moisture-bearing clouds are first intercepted. According to Guppy, the discharge averages from 440 to 480 inches at heights of 6,000 to 7,000 feet in the upland valleys of Guadalcanar facing towards the south-east trades. These mountain slopes appear to be the most copiously watered of any oceanic lands, and are elsewhere surpassed in this respect only by the escarpments of the Khasi Hills in the Brahmaputra basin. During a single downpour of ten hours Guppy recorded over 11 inches of rain in the neighbourhood of the coast. The least healthy season is that of the variable winds accompanying the west monsoon.

Thanks to the abundant rainfall, the North Melanesian flora, which greatly resembles that of New Guinea, is both rich and varied. Even the low coral banks disappear in many places under the large trees, the seeds of which have been brought by the winds, the marine currents, and the birds. On the hillsides the forests extend in a continuous, impenetrable mass, their leafy canopies rising here and there over 150 feet above the ground. One of the most widespread of these foreign growths is the banyan fig, with its thousand pendent tendrils twining round and at last choking other species. This incessant struggle between the banyan and the other giants of the woodlands forms a familiar theme of many local legends.

One of the most remarkable products of the cryptogamic flora in the Solomon group is a mass of vegetable matter which resembles the yam, but which is found resting upon the ground without roots or any connecting stems. Guppy dwells with admiration on the surprising knowledge displayed by the natives in botanical matters. They clearly distinguish between species almost identical in appearance, and in this respect show themselves far better naturalists than any educated Europeans except specialists.

The North Melanesian fauna also greatly resembles that of New Guinea, but

\* Rainfall at Santa-Ana off south-east coast of San Cristobal in 1883, 126 inches; at Ugi, east of San Cristobal, 146.24 inches.—(Guppy).

Polynesian are intermingled with Papuan forms in the Solomon Islands, which lie on the borders of the two zoological domains. According to native report anthropoid apes still survive in the large islands of Malaita, Guadalcanar and San Cristobal; but they have never been seen by any European zoologists, who have met no indigenous mammals except the pig, the dog, and a small species of rat. Of birds the pigeon is the most common and the chief agent in the dispersion of plants. Powell asserts that in the volcanic islands the megapodius (brush turkey) often lays its eggs in the fissures of the rocks emitting hot vapours.

The reptiles, so poorly represented in most oceanic islands, are somewhat numerous in the Solomons, and several species are even peculiar to the Melanesian Archipelagoes. Specially noteworthy are the enormous toads, which were formerly worshipped with snakes in the island of Yzabel. Crocodiles, still venerated by the islanders, abound on the coastlands, and live both in salt and fresh water. They are little dreaded, and according to the local legend are dangerous only to unfaithful wives. The Solomon Archipelago marks the easternmost limit in the range of these saurians, which are not met again till the American continent is reached.

#### INHABITANTS OF NORTH MELANESIA.

The Melanesians belong undoubtedly to the same stock as the New Guinea Papuans, although representatives also occur amongst them both of the Malay and Polynesian types. A Micronesian enclave is also found in the little Exchequer group, consisting of some fifty isles and islets. San Cristobal, in the Solomon Archipelago, is probably the land pointed to as the cradle of their race in the legends of the South-Sea Islanders. This land of Puro, which was indicated to the pilot Queiros as the original home of the Oceanic tribes, and which Hale sought to identify with the island of Buru in the Moluccas, would seem much more probably to have been Baura, that is, the island whose name the Spaniards afterwards changed to San Cristobal.

But however this be, the prevailing features amongst the inhabitants of the seaboard in the Admiralty, Bismarck, and Solomon groups are those of the Melanesian or Papuan type. The tribes of the interior, often spoken of as bushmen, are very little known; but certain indications would seem to imply that the Negrito element is largely represented amongst them. The legend of tailed men said to live in the interior of New Britain is widespread. A great variety of idioms prevails throughout the archipelagoes, although, so far as is known, all would appear to be derived from a common source.

The North Melanesians are for the most part of mean height and well-proportioned, with a deep brown or blackish complexion and abundant frizzly or crisp hair. The finest group are those of Bougainville, who surpass all the others in stature and strength, but who are also of a darker colour and distinguished by their brachycephalic or round heads. The same form of the skull, however, prevails amongst many other Melanesians, a fact first placed beyond doubt by Miklukho

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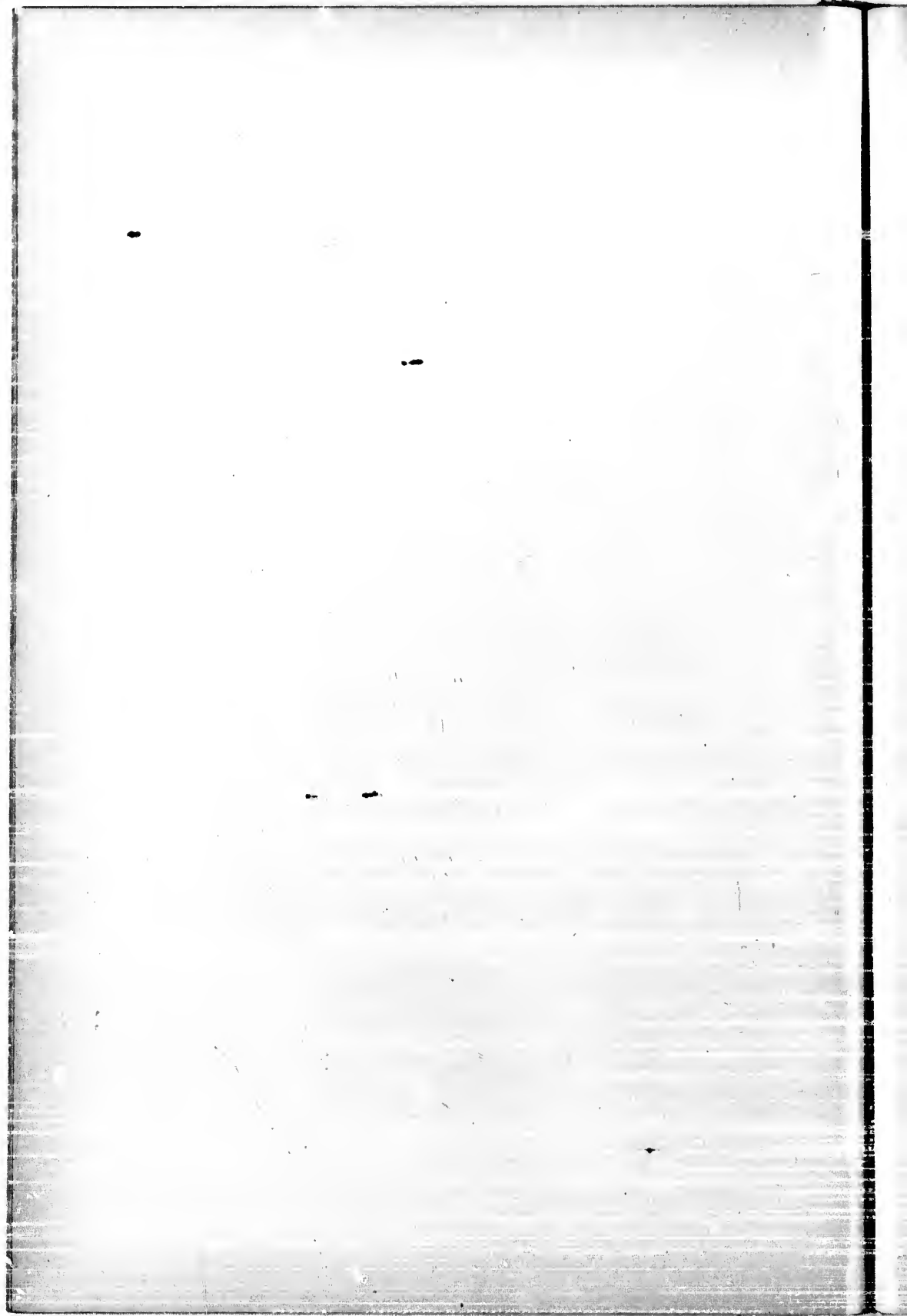
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TAMBU AND GROUP OF SANTA-ANA NATIVES, SOLOMON ARCHIPELAGO.

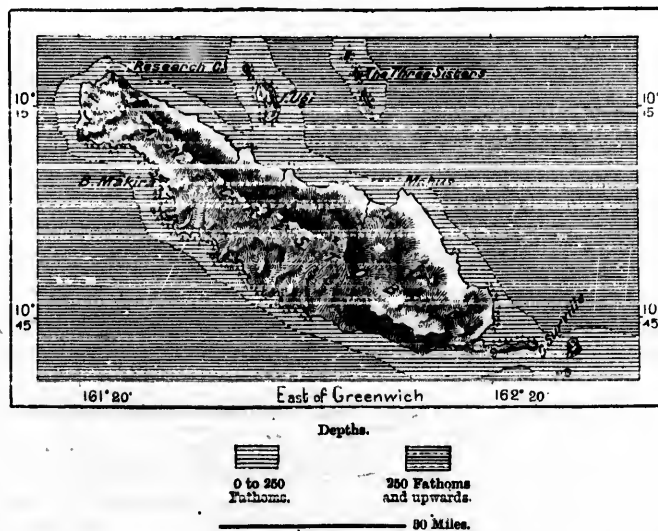


Maklay to the surprise of most ethnologists, who regarded the dolichocephalic or long shape of the head as specially characteristic of this Oceanic group.

A large number of Melanesians, especially in the Admiralty Islands, have long teeth projecting beyond the mouth, a feature which imparts to the physiognomy a somewhat ferocious and even bestial expression. But this feature is less conspicuous amongst the men, whose teeth are covered with a dark varnish from the habit of betel-chewing, than amongst the women and children, whose teeth are white. Some natives, especially of New Britain, are also met, the toes of whose feet are all connected together by a common membrane.\* Ulcers under the soles are very general, and in the Solomon Archipelago at least two-fifths of

Fig. 139.—SAN CRISTOBAL.

Scale 1 : 1,700,000.



the inhabitants are afflicted with large sores caused by a parasite (*tinea circinata tropica*); in some islands nearly the whole population has to entertain these troublesome guests.

Skin diseases, also, are not less prevalent than amongst the Caroline islanders, while the baneful habit of eating argillaceous clay is common in the Admiralty group. Most of the old people are carried off by pulmonary affections, and when the mortality becomes excessive in a village, the inhabitants migrate to some other place declared by the magicians to be more propitious. As a rule the Melanesians are less affected than the Polynesians by the morbid influences caused by contact with the whites; but on the other hand certain islands are being gradually depopulated by the universal practice of infanticide. In Ugi, off the east coast of

\* Romilly, *The Western Pacific and New Guinea*.



San Cristobal, nearly all the children of both sexes are killed by their parents, and the population is recruited by the purchase of young slaves on the neighbouring island; on reaching the adult age these slaves become free.

The Melanesians do not practise circumcision, and the prevalence of this rite in any community is a sure proof of Polynesian descent. Tattooing is the rule, performed, however, by incisions with sharp stones, not by pricking, as amongst the South-Sea Islanders. In Santa-Ana, at the southern extremity of the Solomon group, the youths do not acquire the privileges of manhood until they have submitted to this rite, and during the operation they are obliged to dwell apart and live on the blood of a sacred fish. In Bougainville, on the contrary, tattooing is interdicted to the young; but after marriage both sexes embellish the person with rows of knobs in the form of peas, the number and disposition of which indicate the rank of the individual.

Like most savages the Melanesians pay great attention to their toilet; they daily spend hours in the water, rubbing the body and painting it red, except in time of mourning, when bathing is forbidden. The hair is dressed in various ways, either as an enormous globe, or tower-shaped, or else fashioned by means of clay and ochre into a compact red mass. Such is the labour required to keep the hair properly dressed that in Treasury Island some of the old women shave it off altogether in order to find time for their household duties.

Instead of clothes some of the more savage tribes load themselves with ornaments of all kinds, necklaces, bracelets, fantastic trinkets, tufts of foliage and the like. The cartilage of the nose is generally pierced for the insertion of small boars' tusks, or else strings of shells, while bits of stick, bone, and other objects are introduced into the pierced lobe of the ear. Warriors distinguished for their prowess in the battlefield wear festoons of human teeth, vertebrae or finger joints, a thigh bone suspended on the breast completing their military decorations. In Matupi and many other islands the currency still consists of strings of shells, replaced elsewhere by dogs' teeth, and in the cannibal districts by necklets of human teeth; empty bottles serve the like purpose in the Admiralty group.

Incessant warfare prevails in certain islands not only between the seaboard and inland tribes, but also between the coastlanders themselves. This is due to the necessity of procuring heads to decorate the chief's house and the war canoes; captives are also needed, to be slaughtered on certain solemn feasts, so that their souls may protect the plantations or bring success to the fishermen. Further victims are required to grace the funeral obsequies of the chiefs. The body is placed erect in the grave, then buried up to the neck, after which a fire is kindled to consume the flesh, the skull being then carried off and set up in the canoe, serving the purpose of a temple. But the grave has still to be filled in with the youngest wife, a child, and the most valued treasures of the departed, together with the offerings of his friends. Then the miscellaneous contents are crushed, broken to pieces and covered with stones, while the assembled multitude utter cries of grief; occasionally the very palm groves are felled, so that the owner's trees may share in the universal mourning, or else accompany him to the other world.

As a rule the slaves owned by the chiefs are well treated ; but the terrible prospect constantly stares them in the face of being at any moment clubbed and eaten in honour of some tribal victory, the launching of a canoe or other festive occasion. According to Romilly one of the most appreciated dishes of the New Ireland cuisine is a mixture of sago, cocoanut and human brains. Cannibalism is probably nowhere more rampant than in Arossi (San Cristobal), where as many as twenty people are at times cooked and consumed in a single day. A chief visited by Brown had a cocoanut palm on which seventy-six notches indicated the number of human beings devoured up to that time (1883).

Anthropophagy regarded as a religious rite is still almost universally practised in the Melanesian Archipelagoes ; in Santa-Ana, however, it has fallen into abeyance ever since it was tabooed by the chief after an epidemic. In some other islands, also, the influence of the whites has caused it to disappear, and the natives who still indulge are at least so far ashamed of doing so that they deny it in the presence of strangers. Human remains are also being gradually replaced in many places by the bones of swine in the decoration of houses and war canoes.

The Melanesian villages, mostly composed of two rows of huts built stoutly enough to stand the climate for five or six years, present every type of construction prevalent in the oceanic world. Isolated groups raised on piles are characteristic of one district, dwellings standing on the ground of another, while elsewhere, notably in Yzabel, the people live in fortified trees accessible only by ladders or notched beams. Every village has its *tambu*, a sort of "town-hall," built with the greatest care, embellished with curious wood-carvings, and set apart for public assemblies, for the reception and entertainment of strangers, and for housing the chief's war canoes. In New Britain this mansion is at times decorated with statues sculptured in a chalky stone, which is said to be cast ashore by the tidal and earthquake waves.

Of all the large Melanesian islands New Ireland appears to be the most densely peopled, especially on the west side. Coasting along the seaboard, seafarers everywhere observe the smoke rising from human habitations, and in some places the shore is thickly fringed by cocoanut palms, which supply the staple of food. The population may be roughly estimated by the number of these trees, twenty of which represent on an average one person. The cabin of every native is considered as a sacred place by his neighbours, who dare not enter it except at the risk of their lives.

Like some of the Micronesian islanders, the Melanesians construct admirable and highly decorated boats, most of which carry a square instead of a pointed sail as in Polynesia. They are daring and skilful navigators, as well as intelligent husbandmen. In the forest clearings, generally at some distance from the villages, the fields planted with yams, sweet potatoes, taro, bananas, and sugar-cane are well tilled by the women. The produce of these plantations is supplemented by other alimentary plants, such as the sago, cocoanut palm, and bread-fruit tree. The women also weave the matting with pandanus leaves, and make the earthenware, while the men manufacture the agricultural implements, clubs, spears, bows

and arrows, and other weapons, which vary considerably in the different islands English is everywhere the language of commercial intercourse.

Notwithstanding the murder of many whites, afterwards served up at the public banquets, both Catholic and Protestant missionaries have penetrated into many parts of the Melanesian Archipelagoes. A mission founded in San Cristobal having brought about a general massacre had to be removed to Woodlark Island; but the priests were driven from this place also, and have now taken refuge in Rook Island, near Dampier Strait, at the south-west extremity of New Ireland.

The influence of the missionaries, more or less neutralised by that of unprincipled traders and mariners, has hitherto been little felt. The Melanesians still continue to worship their good and evil spirits, as well as the grand phenomena of nature. They also venerate those animals that they fear, in one place the shark, in another the crocodile. Little care is taken of the sick, who, in most of the islands, are even abandoned to their fate when all hope of recovery is lost—they are taken to the dead-house, a cocoanut is placed on their mat, and they are left to die alone.

The political systems differ greatly in the various insular groups. In the Admiralty and Bismarck Archipelagoes the tribes have no chiefs, or rather those bearing this title owe it to the foreign traders. Here no one presumes to dictate to his neighbour; all the members of the community are equal, and deliberate without the control of superiors on the common interests. On the other hand the power of the hereditary chiefs has been firmly established in most of the Solomon Islands. Although, as a rule, there are as many states as villages, some of the more powerful chiefs rule over whole clusters of islets and even over extensive tracts on the larger islands. Thus the "King" of Shortland in Bougainville Strait holds sway over all the islanders in that channel, as well as over the neighbouring tribes in Bougainville and Choiseul. The more powerful dynasties are generally constituted by the rulers of the smaller islands, whose inhabitants are more restless and daring than the settled agricultural populations of the large islands. The policy of the German Government is at present directed towards consolidating the power of the more influential chiefs, and gradually transforming them to paid officials.

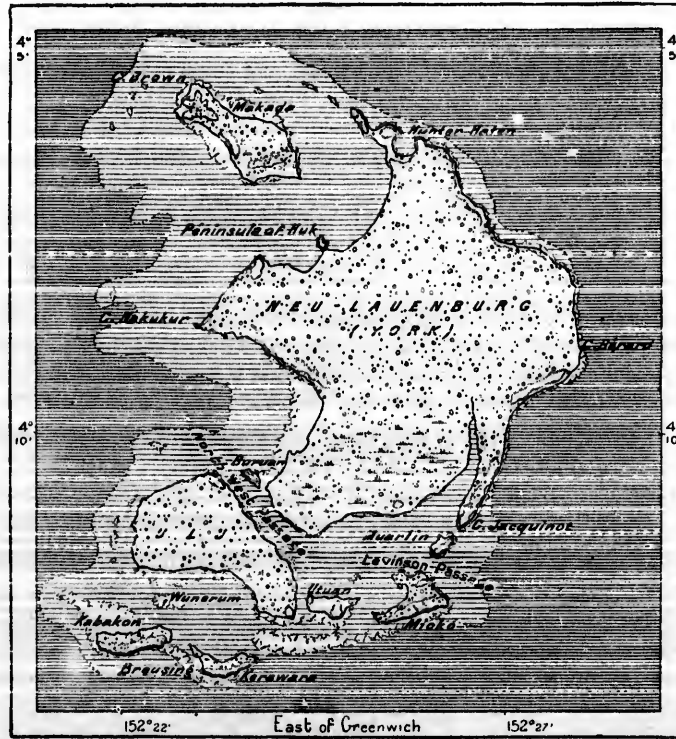
There are no towns in German Melanesia. The "colony" of *Port-Breton*, founded in 1879 on the south coast of Tombara, in the most arid part of the island, has been completely abandoned by its French immigrants, to whom such golden promises had been held out, but who found nothing but famine and sickness in "New France." Nothing remains of the settlement except a few sheds sheltering some merchandise from the weather.

The political and commercial capital of the German Melanesian possessions occupies a perfectly central position between New Guinea and the Bismarck Archipelago. The first station was *Mioko*, in the still waters stretching south of York Island (New Lauenburg); but this port was abandoned in consequence of the fetid odours emitted by the neighbouring shoals which are exposed at low water. Choice was then made of the thickly peopled island of *Matupi*, which lies farther

west, and which is nothing but an upraised crater in the older crater of Blanche Harbour. But the village having been half destroyed by a volcanic eruption, the centre of the administration was again shifted, this time to the islet of *Kerawara*, which is situated south-west of Mioko, and which has the advantage of a roadstead accessible to the largest vessels. Not more than a thousand tons of copra are annually exported from this place.

Fig. 140.—NEU-LAUENBURG (YORK) ISLAND.

Scale 1 : 170,000.



The officials of the trading company which represents the German power in these waters have hitherto been mainly occupied in superintending the emigration, or rather the transportation, of the natives carried off to work on the plantations of the whites. The slave markets have certainly been replaced by markets of "free labour;" but the difference between the operations of all these labour vessels is

little more than nominal, and thousands of natives "engaged" to work in remote places have perished of despair and hardships. Some German writers have advocated the establishment of a convict settlement in Melanesia. The islands in Dampier Strait, occupying a central position between the New Guinea coast and the northern archipelagoes, have been mentioned as the most convenient locality for this purpose.

A table of the chief North Melanesian islands, with their extent and estimated population, is given in the Appendix.

## II.—SOUTH MELANESIA: SANTA-CRUZ AND NEW HEBRIDES.

These two insular chains, although evidently belonging to the same geological system as the Solomons, are not disposed quite in the same direction, their longitudinal axis running north-north-west and south-south-east. The two clusters comprise some fifty isles and islets, besides countless reefs, and a few groups scattered over the eastern waters on the highways leading to Fiji and Samoa. Altogether Santa-Cruz and the New Hebrides, with the more remote Tikopia and Anuda, have a collective area estimated at from 5,000 to 5,500 square miles, with a total population approximately computed at about seventy thousand souls.

The Santa-Cruz Archipelago was discovered in 1595 by Alonzo de Mendana, during the unsuccessful expedition undertaken to rediscover the Solomon group visited by him twenty-eight years previously. His companion, Queiros, when exploring the same waters in 1606, was the first to sight the New Hebrides. Casting anchor in a bay on the coast of Espiritu-Santo, he supposed he had reached the Australian continent, and accordingly gave to this "mother of so many islands" the name of Australia. It was in this island of Merena, or Espiritu-Santo, that he founded the "New Jerusalem," the city whence the true faith was to be spread over all the scattered lands of the Pacific Ocean. But Queiros never returned to this region, which remained unvisited for a hundred and fifty years till the time of Bougainville. But the very name of the "Great Cyclades," given to the New Hebrides by this navigator, shows that he made no systematic survey of this archipelago, which is disposed not in circles but in chains.

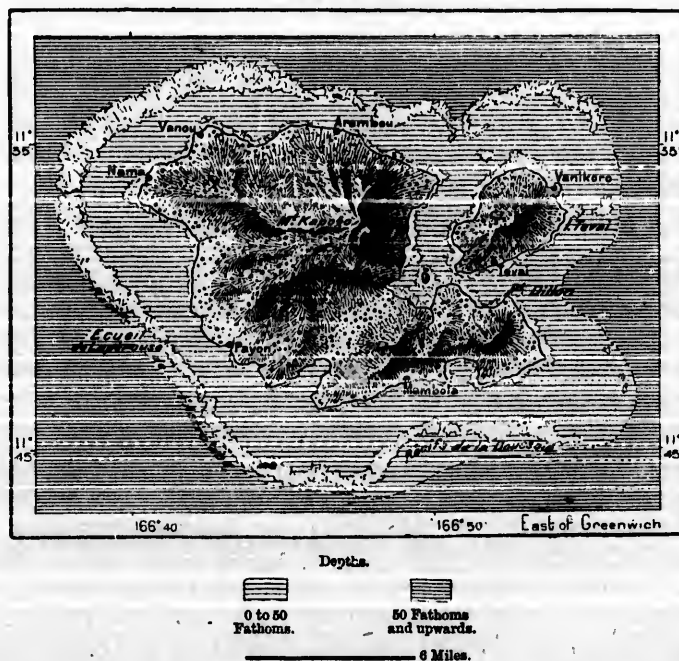
In 1774, six years after Bougainville, Cook visited the same group, which he studied more in detail, and to which he gave the name of the Scotch Islands, which has since been maintained in geographical nomenclature. After Cook's visit the coasts of the central islands still remained to be surveyed, and some more remote groups to be discovered. In 1789, Bligh, driven from his ship by the mutineers of the *Bounty*, and compelled to make his way across more than half of the Pacific, had the good fortune to come upon the Banks Islands, lying to the north of the New Hebrides. The previous year Lapérouse had navigated the same parts of the ocean; but he never returned to announce his discoveries. His vessel was wrecked on a shoal off Vanikoro, the southernmost member of the Santa-Cruz group, though the scene of the disaster remained unknown until

discovered thirty-nine years afterwards by Dillon. The fatal rock lies to the west of the island in one of the channels piercing the circuit of fringing reefs.

Although now well known to mariners in the South Seas, and frequently visited by labour vessels and missionaries, neither the Santa-Cruz group nor the New Hebrides have yet been annexed by any European power. The former come, no doubt, within the sphere assigned to British influence by the treaty concluded with Germany; but the New Hebrides, which also seemed destined to become an English possession, have been disputed by France, and some of the islands have even been temporarily occupied by small French garrisons. Protes-

Fig. 141.—VANIKORO.

Scale 1 : 875,000.



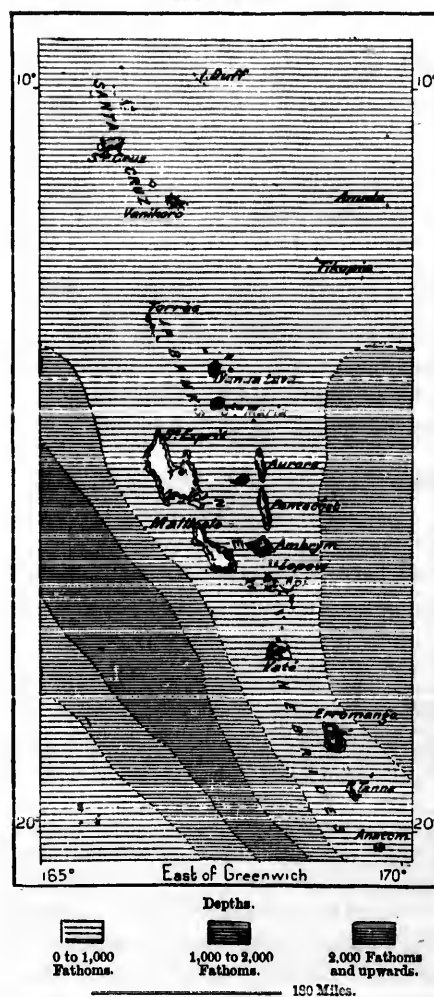
tant and Catholic missionaries, inspired by religious rivalries, New Caledonian and Fijian speculators in search of labourers for their plantations, clamoured for the intervention of their respective governments in favour of their particular interests, and for some years the political fate of the archipelago remained in suspense. This uncertain situation has even been indefinitely prolonged by a recent treaty which places the group under joint British and French protection, a state of things which may probably, sooner or later, result in the partition of the archipelago between the two rival powers.

Like the other insular chains in the Western Pacific, both archipelagoes are of

volcanic origin, as is evident from the regular cones strewn with ashes and lavas, which occur in nearly all these Melanesian lands. According to Dana, the almost total absence of coralline reefs must be attributed to the activity of the igneous forces;

Fig. 142.—NEW HEBRIDES.

Scale 1 : 9,500,000.



although lying between New Caledonia and Fiji, so rich in corals, neither Santa-Cruz nor the New Hebrides have a single atoll, and the only complete fringing reef is that which encircles the island of Vanikoro. Tinakoro, a northern member of the Santa-Cruz group, is in a constant state of eruption, while a volcano 1,870 feet high, in the islet of Urepara, Banks Archipelago, shows a breached crater facing north-eastwards and now flooded by the sea. Copious thermal springs well up on the shores of Vanna-Lava, in the same neighbourhood; both the island of Ambrym (3,590 feet), in the centre of the New Hebrides, and the precipitous Mount Lopevi (5,000 feet), culminating point of that group, are active volcanoes, as is also the wooded Mount Yasova, in Tanna (Tanna Aiperi), near the southern extremity of the chain. Vapours, ashes, and lumps of lava are ejected from this crater at intervals of six or eight minutes, especially in the months of January, February, and March. Port Resolution, an excellent harbour in Tanna, was filled up by an earthquake in 1878.

Submarine disturbances are of frequent occurrence in these waters, where vessels have occasionally to

force their way through dense masses of floating pumice. Besides the still restless craters a number of other insular cones were formerly the scene of igneous convulsions. Many places show indications of comparatively recent upheaval, and Ormières speaks of mangrove roots encrusted with shells lying some 40 feet above the present sea-level.

## CLIMATE—FLORA—FAUNA.

The climate varies considerably in the different insular groups, which are scattered over a space of more than  $12^{\circ}$  of latitude ( $10^{\circ}$  to  $22^{\circ}$  south latitude). Hence the mean temperature varies from  $3^{\circ}$  to  $4^{\circ}$  or  $5^{\circ}$  Fahr. between the two extremities of the archipelagoes. Nevertheless the movement of winds and rains is everywhere the same in these waters. The southern trade wind blows regularly during the summer of the northern hemisphere, from May to October, while variable breezes alternate with the trades throughout the rest of the year. Heavy rains, storms, and even cyclones visit the archipelagoes during the prevalence of the western gales.

Owing to the abundant moisture the vegetation is dense and the mountains mostly forest-clad. For Europeans, the climate of the New Hebrides, and especially of the west or more humid side, is extremely insalubrious; the same region appears to have also become less healthy for the natives themselves, who are now decimated by consumption.

Thanks to the great fertility of the soil, the flora of these archipelagoes comprises a large number of forms not occurring elsewhere. Such are a species of myrtle, which gives a pungent odour and grows to a height of over 40 feet, and a variety of cedar, with olive-like foliage, which grows much higher and which might supply masts for large vessels. Nearly all the New Hebrides trees are highly resinous, and the white, transparent substance oozing from them is much valued by the few European manufacturers acquainted with its properties. In the New Hebrides sandalwood is mainly in demand for the export trade.

In these archipelagoes the alimentary plants are chiefly of western origin. Although the Indian vegetable world is here still represented by a number of forms, the New Hebrides also belong to the New Zealand domain, as shown by the dammara, the araucaria and about a hundred varieties of ferns. With few exceptions, the fruit trees, such as the cocoanut, sago, bread-fruit tree and banana, are the same as those found in the other oceanic lands. But of all plants the most important is the yam, which constitutes the staple of food for the natives. The years are reckoned by the yam harvests, and for the hands carried off to work on the Queensland, Fiji, or New Caledonian plantations, the period of contract service is estimated not by years but by yams.

The indigenous fauna is extremely poor in mammals, the only primitive species being rats and bats. The pig has been imported, and even quite recently the natives of Tanna and Mallicolo beheld with surprise the first dogs introduced from the Society Islands. The nutmeg pigeon is found also in Tanna.

## INHABITANTS.

Santa-Cruz and the New Hebrides occupy a transitional zone between the Melanesian and Polynesian worlds, and their populations consequently present a great variety of types according to the extent of intermixture or the juxtaposition of the two races. Every island offers some contrast with its neighbours, and even



on the same land the tribal groups often differ greatly in appearance, customs

Fig. 143.—GROUP OF NEW HEBRIDES NATIVES.



and language. As in the Solomon and Bismarek Archipelagoes, the coast and

inland populations form well-marked divisions, generally designated, in the "Pigeon English" of these waters, by the names of *Man-saltwater* and *Man-bush*. But according to Otto Finsch, the Melanesian is on the whole the dominant type even in the southern islands of Vati, Erromango and Tanna.

Navigators have noticed that the natives of these southern islands are as a rule stronger, taller and better built than those of the northern section. But judged by our normal standard of beauty they cannot be considered handsome. The forehead is low and retreating, the face broad, with two prominent cheekbones, the nose flat and the lips thick. In several islands the head of the children is deformed by means of boards, which have the effect of lengthening the skull from back to front, while at the same time contracting and lowering it. To this artificial deformation is perhaps due the fact that, according to Professor Flower, the Vanikoro and Mallicolo islanders are the most dolichocephalous or long-headed of any known race.

Hair and beard are woolly, or frizzly, and the complexion almost black in the New Hebrides, where the people embellish themselves by piercing the lobes of the ears and the cartilage of the nose, by gashing arms and breast, decking the head with shells, foliage, or tufts of grass, and embellishing the body with paintings in red ochre, lime, and diverse pigments. But tattooing in the strict sense of the term is somewhat rare, and in the southern islands absolutely unknown. Many use wood ashes to impart a fine golden tint to the hair, which in Tanna the height of the fashion requires to be arranged in a multitude of small tresses tied at the roots with vegetable fibre. To complete this part of the toilet of a gay warrior is said to take no less than three or four years.

At the time of the discovery the natives went naked, or wore nothing beyond a strip of pounded bark, leaves, or cocoonut fibre. Some of the islanders described by Cook fastened the waist so tightly with a girdle of cordage as to look like large ants. At present most of the New Hebrides people have adopted European materials for all or part of their apparel. Their dwellings are not raised on piles like those of the Papuans and western Melanesians, but consist, for the most part, of simple roofs of palm-leaves suspended on four stakes.

While the bulk of the population in both archipelagoes is evidently of Melanesian stock, the fine Polynesian race is in almost exclusive possession of the more easterly islets of Anuda (Cherry Island) and Tikopia (Barwell). They are easily recognised by their tall stature, robust frame, long hair and bright countenance. The people of Futuna and Aniwa, the "Madeira" of the New Hebrides, towards the southern extremity of the group, are also Polynesians; the very names they have given to their new homes are taken from the lands in the vicinity of the Tonga Islands. Judging from the description given of them by Quoiros, it is highly probable that the natives of the Taumaco or Duff Islets, north-east of Santa-Cruz, also belong to the same family. Those of Nukapu, a chief member of the Santa-Cruz cluster, are the issue of a crossing between the two oceanic elements, for their language is essentially Polynesian, closely related to the Maori, while their usages connect them with the Melanesians.

In the New Hebrides the women are as a rule very harshly treated. Many things permitted to the husband are declared "taboo" for the wife by the chiefs and priests. The latter are potent wizards, who control wind and rain, conjure or expel the spirits and ailments, hold converse with the ancestry, the gods of the tribe, and communicate their pleasure to the living. They formerly presided at the cannibal banquets, for anthropophagy, till recently more prevalent in eastern Melanesia than in any other oceanic region, had assumed a religious character. Prisoners of war and the enemy slain in battle were devoured, in order to acquire their strength and courage; but the taste for human flesh had also introduced the custom of eating their own dead, or else exchanging them for those of friendly tribes.

These practices could not fail to earn for the Santa-Cruz and New Hebrides natives a reputation for ferocity and wickedness. Nevertheless there can be no doubt that in the mutual relations between Melanosiens and whites the latter have been far more treacherous and cruel than the former. If Bishop Patteson was killed in the island of Nukapu in 1871, he fell by the hand of a man who had just been robbed of his children. According to Markham, the natives of Erromango who murdered the missionary Williams make use of firearms only against the whites, whom they regard as kidnappers. In their local wars between kindred tribes they would consider it disgraceful to employ the new weapons.

Cannibalism survives only in a small number of islands; in the southern groups, the most frequented by Europeans, it has become a mere tradition. In point of fact, several of the New Hebrides, although not officially annexed by any European power, belong none the less to the whites, who govern the people and make them work on the plantations, thus gradually reducing them to the condition of the proletariat classes in Europe.

Anatom (Aneitium), lying nearest to New Caledonia, is exclusively inhabited by Christian converts who can both read and write. In some other islands, also, the Christian congregations already outnumber the pagan element. But Espiritu Santo, largest of the New Hebrides, despite the brilliant future predicted for it by its discoverer, Queiros, is one of those that have been least visited by Europeans, and that still possess but slight economic value. Its vast and perfectly sheltered "port" of *Vera Cruz*, where "four thousand vessels might easily find room," has remained almost deserted; nor has any planter yet settled on the banks of the "Jordan."

In 1828 the discovery of sandalwood in Erromango gave rise to a nefarious traffic with China, which gradually ceased with the disappearance of the forests. The traders added to the traffic in sandalwood that of "living ebony," and especially of women.

The commercial centre of the New Hebrides is the island of Vate, or Efat, better known by its English name of Sandwich. Some European settlers have established themselves near *Port Havannah* and in other parts of the island, where they cultivate maize, rice, cotton, tobacco and coffee; in 1882 the coffee plantations alone comprised one hundred thousand shrubs. But Sandwich, although

remarkably fertile, is one of the most insalubrious islands in the whole archipelago. The New Hebrides planters forward corn, fruits, pigs and poultry to Noumea, capital of New Caledonia, and a large part of the archipelago is owned by a New Caledonian company.

In the Appendix will be found a table of the Santa Cruz and New Hebrides groups, with their areas and populations.

### III.—FRENCH MELANESIA: NEW CALEDONIA AND THE LOYALTY ISLANDS.

New Caledonia, one of the largest oceanic islands east of Australia, has an area of nearly 7,000 square miles, and about 8,000 including the adjacent islets and the Loyalty group. It also enjoys exceptional importance from its position on the great highway of navigation between Sydney and San Francisco. But, whatever be its present and future economic value, its notoriety has hitherto been mainly due to the part it has played as a French convict station since 1864, and especially since the fall of the Commune. So small has the earth become that no event can happen without being felt as far as the Antipodes. After having been a place of exile for thousands of Frenchmen involved in political and social storms, this Melanesian land has become the jail of other thousands condemned by the laws of their country, and subjected to experiments in a new order of penal treatment. In fact, New Caledonia is less a colony, as it is conventionally called, than a region affording scope for philanthropy and criminal jurisprudence to test their respective reforming and punitive systems.

The political destiny of New Caledonia presents but few elements of permanent stability. Annexed to the French colonial empire in 1853, owing to a shipwrecked crew having been eaten by the natives, this remote oceanic land has, so to say, no military or commercial basis to facilitate its retention as a French possession. It is over 4,000 miles distant from Cochin China, and nearly 3,000 from Tahiti, the chief French island in the East Pacific, while it is surrounded on all sides by large British colonies or territories—peninsular New Guinea in the north-west, the southern section of the Solomon Archipelago in the north, Fiji in the east, New Zealand in the south-east, and in the west the vast Australian continent, with its thriving and expansive populations. Strictly speaking, New Caledonia is a geographical dependency of Queensland, and the irresistible progress of Australia scarcely leaves a doubt that the natural force of gravity will sooner or later draw it within the political sphere of the neighbouring continent. Already most of its commercial and industrial undertakings are organised by British speculators, and English terms enter largely into the "bichlamar" jargon, which serves as the medium of intercourse between the whites and the natives in their mutual trading and shipping relations.

Owing to its remoteness from the highway followed by the Spanish galleons plying between Mexico and the Philippines, New Caledonia, notwithstanding its extent, was one of the last oceanic lands discovered by explorers. It was first sighted in 1774 near its northern extremity by Cook, who afterwards skirted the

east coast, and discovered, at the south-east end, Kunié, to which he gave the name of the Isle of Pines. Sixteen years later d'Entrecasteaux coasted the west side and surveyed the reef lying over 150 miles farther north.

The Loyalty Islands still remained unknown, and Butler, who discovered them in 1800 or 1803, did little more than announce their existence. The systematic exploration both of this group and of New Caledonia itself was reserved for Dumont d'Urville in 1827. But much remained still to be done before the coast-lines, with their fringing reefs, could be accurately laid down, and New Caledonia had already been declared a French possession before the discovery, in 1854, of the fine roadstead of Noumea, which has become the commercial centre of the colony.

Now, however, New Caledonia is one of the best-known lands in the oceanic world. It evidently forms with the parallel Loyalty group a geographical whole, although the surface rocks are of different geological formation. Disposed exactly in the same direction, from north-west to south-east, they are, in fact, two mountain ranges, one of which, the western, is completely upraised in a continuous mass, while the highest summits of the other still lie below the surface as foundations for the superstructure of insular coralline banks. Reefs and shoals, also resting on submerged primitive or volcanic rocks, continue both ranges seawards, and between the two flows a deep marine trough, where the sounding line has failed to touch the bottom in 350 fathoms of water. Compared with the other oceanic lands, the New Caledonian orographic system harmonises with the general disposition of the upraised chains. It forms a folding in the earth's crust parallel with that which caused the upheaval of the Solomon group.

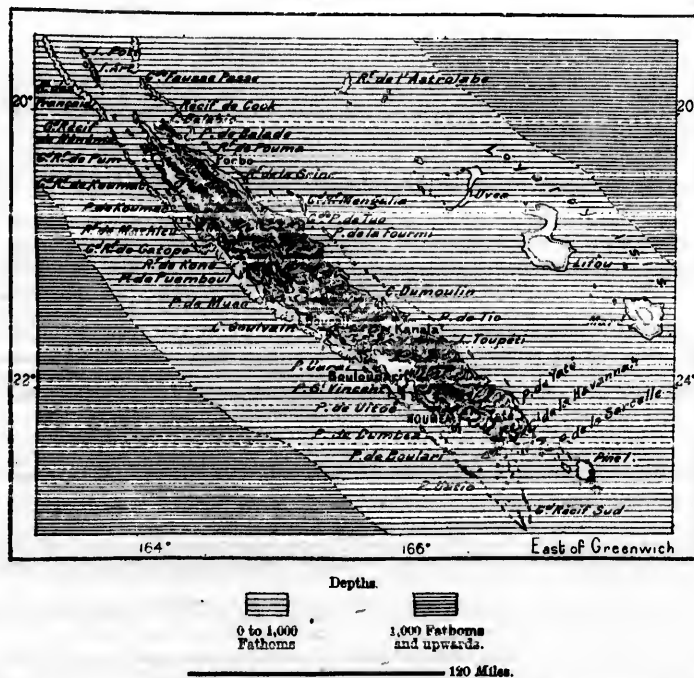
Excluding the reefs and contiguous islets the large island presents the form of a very elongated regular oval, 250 miles long with a mean breadth of not more than 30 miles. Nearly the whole of the surface is covered with hills and mountains of very irregular form and elevation. The south-eastern uplands form isolated masses separated by intervening plains, partly marshy and studded with small lakes, whose overflow is discharged in various directions. These plains are perfectly level, while the escarpments of the surrounding hills rise abruptly as if from deep water. The soil is a hard and ferruginous clay, interspersed with nodules of black and red iron, and for the most part completely arid. In some places are seen scanty tufts of grass, and in a few more favoured spots appear dense thickets rising like green oases in the midst of the barren steppe.

Farther north and near the east coast, which, on the whole, is rather more elevated than the opposite side, the Humboldt Peak attains an elevation of over 5,300 feet, and was long supposed to be the culminating point of the island. Some 12 miles to the west, and near a bay ramifying into several creeks, stands the rival eminence of the Dent de Saint Vincent (4,750 feet). North of these heights the whole breadth of the land is occupied by mountains, which, however, gradually fall in the direction of the north-west, where few summits exceed 3,000 feet. But towards the north-east extremity these uplands assume the aspect more of a coast-range, and here attain their greatest altitude in the Panié Peak (5,385 feet), and in another rounded crest nearly 5,600 feet high.

In New Caledonia the prevailing formations are eyenites, serpentines, diorites, metamorphic schists, and trachites. The very pumice cast up as flotsam by the waves attests the existence of former eruptive centres. The great geological resemblance of these rocks to the East Australian ranges at one time held out expectations of rich auriferous discoveries; but the financial results of the local mining operations have not hitherto been encouraging. The metals which really occur in abundance, and which may yet contribute to the industrial prosperity of New Caledonia, are iron, nickel, cobalt, antimony, and chromium. Copper mines have also been worked, and coalfields, though of little economic value, have been discovered at the foot of the serpentine rocks on the seaboard.

Fig. 144.—NEW CALEDONIA.

Scale 1 : 5,000,000.



New Caledonia is at least doubled in size by the reefs skirting its shores and extending it in the direction of the north-west and south-east. The hydrographic surveys of Chambeyron and other explorers leave no doubt of the existence of these fringing and barrier reefs on the east side, though their presence had been denied by Darwin and Dana. Towards the southern extremity, however, the encircling coralline rocks disappear below the surface, at first a few yards, then from 16 to 20 fathoms, forming, north of the central passage, near the Isle of Pines, a continuous bank, above which rise at intervals chaplets of coral, some

emerging, some still covered by water. In its middle and northern sections Chambeyron's "great barrier reef" everywhere presents a uniform mass from 200 to 1,000 yards broad, interrupted only by a few passes, which give access to a broad and deep sheet of smooth water flowing between the reef and the mainland. This basin is about 6 miles wide and from 25 to 30 fathoms deep towards the centre; but the navigation is endangered by a few hidden shoals occurring near both margins.

Seawards the great reef sinks rapidly, and then at a mean distance of 450 yards plunges abruptly into depths of over 350 fathoms. Nowhere else does Darwin's hypothesis regarding the slow subsidence of fringing coralline reefs appear to be better supported than in these waters. The coral builders work with surprising rapidity on the New Caledonian reefs. North of the mainland the two branches of the fringing barrier do not converge, but, on the contrary, grow wide apart and stretch for a distance of 160 miles before they become reunited north of the Huon, Fabre, Leleizour, and Surprise islets. Between this perfect atoll and the north end of the great island, the lagoon, enclosed by the two barrier reefs, is occupied in its central part by the Belep group, which comprises the islets of Art and Pott.

The Loyalty chain, built up by polypi, presents in a summary form the whole history of coralline islands. The Petrie and Astrolabe reefs in the north are dangerous shoals, awash with the surface and grouped as atolls. Uvea, following southwards, is a semi-circular coral plateau, perfectly horizontal, with a mean height of 50 to 60 feet, and enclosing a lagoon 9 fathoms deep. Lifu, largest member of the archipelago, is also an ancient atoll, which has been upraised at successive epochs to an altitude of 300 feet. The observer easily distinguishes the three terraces marking three consecutive upheavals, and disposed in abrupt scarps like the outer cliff at present washed by the waves. Maré, or Nengoné, some 30 feet higher than Lifu, develops five horizontal terraces, which indicate a corresponding number of changes between the level of land and sea. Having risen above the surface at a more remote period than the other islands, Maré is also more fertile, better wooded, and relatively more densely peopled. To judge from the numerous shells of still surviving species which occur on the upper terraces and which partly retain their colours, the last upward movement must have taken place in recent geological times.

With a mean annual rainfall of about 40 inches, New Caledonia is abundantly watered by numerous streams, one only of which is sufficiently copious to deserve the name of river. This is the Diahot, which rises at the foot of the Panié Peak and flows parallel with the east coast to Harcourt Bay, between the two north-western promontories of the island. Including its windings the Diahot is over 60 miles long, and in its tidal reaches is accessible to craft drawing 8 or 10 feet of water. The Toutouta, which falls into Saint Vincent Bay, north-west of Noumea, as well as several other rivulets, flows for a large part of its course below the surface, and near its source in Mount Humboldt develops a copious cascade at a height of 4,000 feet above the sea. Judging from their high temperature some

brooks appear to be fed by thermal springs. Owing to the absence of hills to intercept the rain-water, none of the Loyalty group have any permanent streams, while the moisture collected in the limestone cavities is so charged with impurities that the natives mostly prefer coconut milk.

## CLIMATE - FLORA—FAUNA.

Lying entirely within the torrid zone, New Caledonia has a mean temperature of over 70° F. But despite the moderating influence of the surrounding waters, the difference is considerable between that of summer and winter. The Austral summer is the season of rains, of variable winds and storms, which at times assume the character of real hurricanes. But they are seldom felt in the northern part of the island, where the trade winds with their regular atmospheric phenomena prevail during the summer months. Although the average rainfall is about 40 inches, some districts, especially in the north, occasionally suffer from long droughts.

One of the most remarkable facts is the surprising salubrity of New Caledonia. While so many other lands under the same equatorial zone are justly dreaded, especially by European settlers, white labourers can here till the soil with impunity, at times even in marshy districts. This privileged climate can be explained neither by the influence of the trades or the sea breezes, nor by the porous nature of the coralline coastlands, for the other oceanic regions within the tropics enjoy the same advantages. The fringing reefs, however, are all "living," not "dead," corals, as in the New Hebrides. But according to the natives and colonists, the true cause of the excellent climate is the *niauli* (*melaleuca leucadendron*), a beneficent plant, which flourishes alike on the arid slopes and in the swampy tracts, and which would appear to be for New Caledonia what the eucalyptus is for Australia. This member of the myrtle family, which in appearance resembles the birch, supplies to perfumery the volatile oil of the cayaput, like the other variety of melaleuca found in Buru, one of the Moluccas.

While presenting great diversity according to the varied nature of the soil, the New Caledonian flora is on the whole extremely rich, regard being had to the small extent of the island. Brongniart enumerates 1,300 species, of which 1,100 are dicotyledons, a fact which lends support to the theory that New Caledonia is but a surviving fragment of a much larger region now submerged. In the volcanic districts, the conifer, myrtle, and casuarina families are represented by several special forms; but in the same districts there is an almost total absence of herbaceous vegetation, so that stock-breeding is here absolutely impossible. Even gardens cannot be laid out on this thankless soil.

The sedimentary formations, which prevail in the northern districts, have a different flora in which both forest and grassy types are represented in great variety; but here the indigenous vegetation has already been modified by conflagrations and clearings, and partly replaced by intruding plants, which are everywhere encroaching on the older forms. Amongst them is the *andropogon allionii*,



a grass whose seeds are harmless for horses and horned cattle, but fatal to sheep. Sandalwood, formerly a chief source of wealth, has nearly disappeared, and the finest forest trees still surviving are the dammara, araucaria, and ebony.

As in most other oceanic lands the fauna is extremely poor, the only indigenous mammals being a rat and a large variety of bat. The only reptile is a snake very

Fig. 145.—NATIVE OF MARÉ, LOYALTY ISLES.



common in the marshy districts, and the only noxious vermin are a centipede, a spider, and a scorpion. Of the 107 species of birds hitherto observed by naturalists several are common to New Zealand, to Australia, and even the Sunda Islands; but some are peculiar to New Caledonia, as, for instance, the Kagu (*rhinochetus jubatus*), which shows certain affinities both to the heron and the stork, but which, like the apteryx and some other local species, is already threatened with extinction.

## INHABITANTS.

The discovery of polished jade hatchets in the quaternary formations of New Caledonia attests the presence of man in these oceanic lands from a very remote epoch; attempts have even been made to discriminate the descendants of the primitive element amongst the present tribal groups. But, however this be, the *kanakas*,\* or "men," belong mainly to the Melanesian family, as shown by

Fig. 146.—NATIVE OF MARÉ, LOYALTY ISLES.



their almost black, or at least deep brown complexion, highly prominent cheekbones, and crisp or frizzly hair, naturally of a black colour, but in many districts still dyed yellow or white with lime. The lobe of the ear is also pierced for the insertion of wood, bone and other ornaments, and the heads of the children of

\* This now familiar Polynesian term denotes no particular race, but is commonly applied by the French in a collective sense to all the inhabitants of New Caledonia and the neighbouring archipelagoes.

both sexes are artificially deformed, the object being to elongate that of the boys and shorten that of the girls. Tattooing has become rare, and is scarcely practised at all except by the women, who puncture arms and chest by a painful process, which leaves an indelible blue pattern. The custom of smearing the body with soot is also falling into abeyance according as clothes take the place of the primitive rudimentary costume.

Patriarchal right prevails among the New Caledonian tribes. All power and

Fig. 147.—NEW CALEDONIAN MAN.

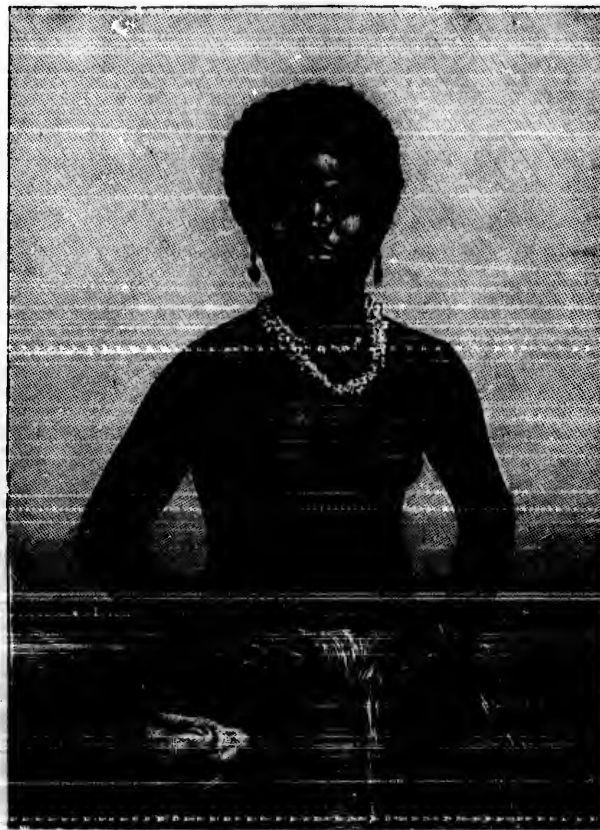


property are inherited by the eldest son whether by birth or adoption; but although the idea of property is thoroughly developed, custom requires all produce to be shared in a brotherly way amongst the members of the community. When provisions abound, all, even the dead, have their portion; the emigrant also presents all his earnings to the chief to be equally distributed throughout the tribe. But amongst the tribes themselves there exists scarcely any political union;

so many clans, so many nations, now allies now enemies, and all speaking different dialects, though of a common stock language.

Nevertheless, the tribes are usually grouped during hostilities in the two confederacies of the Ots and Wawaps. Each group is constituted under a monarchical form, with a chief whose person is sacred, and to whom all owe not only deference, but also forced labour for the plantations, structures, fisheries, and transport of provisions. In the native villages, the chief's house is at once

Fig. 148.—NEW CALEDONIAN WOMAN.



recognised by its size and its pointed cone terminating in little wisps of straw and a few *tillits*, or bark banderols. The dwelling of a great chief is still more ornamented, for the chief is the "sun" of his tribe, and at his death the luminary is said to have "set." He is bound to summon the council of elders on all serious occasions, such as judicial inquiries and sentences, proclamations of war or peace, the organisation of the *pilu-pilu*, or national festivities and banquets.

Every village possesses a supreme *tabu*, a sacred image carved in hard wood, embellished with bat skins and set up on a long pole with its face turned towards the east. According to some authorities the chiefs and nobles are, for the most part, of Polynesian origin, and are distinguished by their physical appearance from their Melanesian subjects. Not only is the complexion said to be lighter, but the forehead would appear to be higher and broader, the nose straighter, the lips thinner, the figure taller, the carriage more haughty. This Polynesian element is naturally most widely represented on the east side facing the oceanic homes of this race.

Like so many other insular populations, the New Caledonian kanakas appear to be dying out. "We are not like our forefathers," said a chief to Brencley, "they were numerous and wise; we are neither." Travellers estimated at about sixty thousand the population towards the middle of the present century, and in 1886 they had already been reduced to twenty-three thousand. At the same time this diminution must be partly attributed to the constant massacres followed by cannibal feasts, for the enemy slain in battle were always devoured. The bodies were fairly divided amongst the warriors, who in their turn distributed the "joints" in equal portions amongst their families. When the European mariners first made their appearance the natives had never seen any other meat except that of their fellow-creatures, and fancied that the beef distributed to the crews was the flesh of gigantic human beings.

The insurrection of 1878 cost the lives of a thousand natives, besides one thousand two hundred transported to the Island of Pines and other places. Nevertheless the losses caused by wars and revolts are trifling compared to the numbers who perish by ailments, such as consumption, introduced by the Europeans. Drink also claims many victims, since the invasion of the dealers in "tafia." Alliances between the white convicts, soldiers or settlers, and the native women are rare, because the kanakas hold in great contempt the *tayo carabous*, or "people of the prison." Hence there is no hope of a half-caste race gradually absorbing the whole native element by fresh unions.

Little success has attended the attempts of the landowners to employ native labour on their plantations. The tribal groups themselves possess reserves, the collective enjoyment of which is guaranteed to them by the state. Hence they naturally prefer to cultivate maize, manioc or taro on their own account, than to toil on the tobacco, sugar, or coffee plantations of the whites. Hence, also, the accusations of the inveterate indolence brought against them, and the efforts to replace them by hands "engaged" in other islands, and held in a sort of slavery by advances difficult to refund under several years of hard work. Over two thousand labourers have thus been introduced, chiefly from the Loyalty and New Hebrides groups.

The political convicts transported in 1872, to the number of about four thousand five hundred, have nearly all left the colony. Some few, who had developed profitable industries in Noumea, have alone declined to take advantage of the free pardon granted to all in 1880. Ordinary convicts number at present about twelve

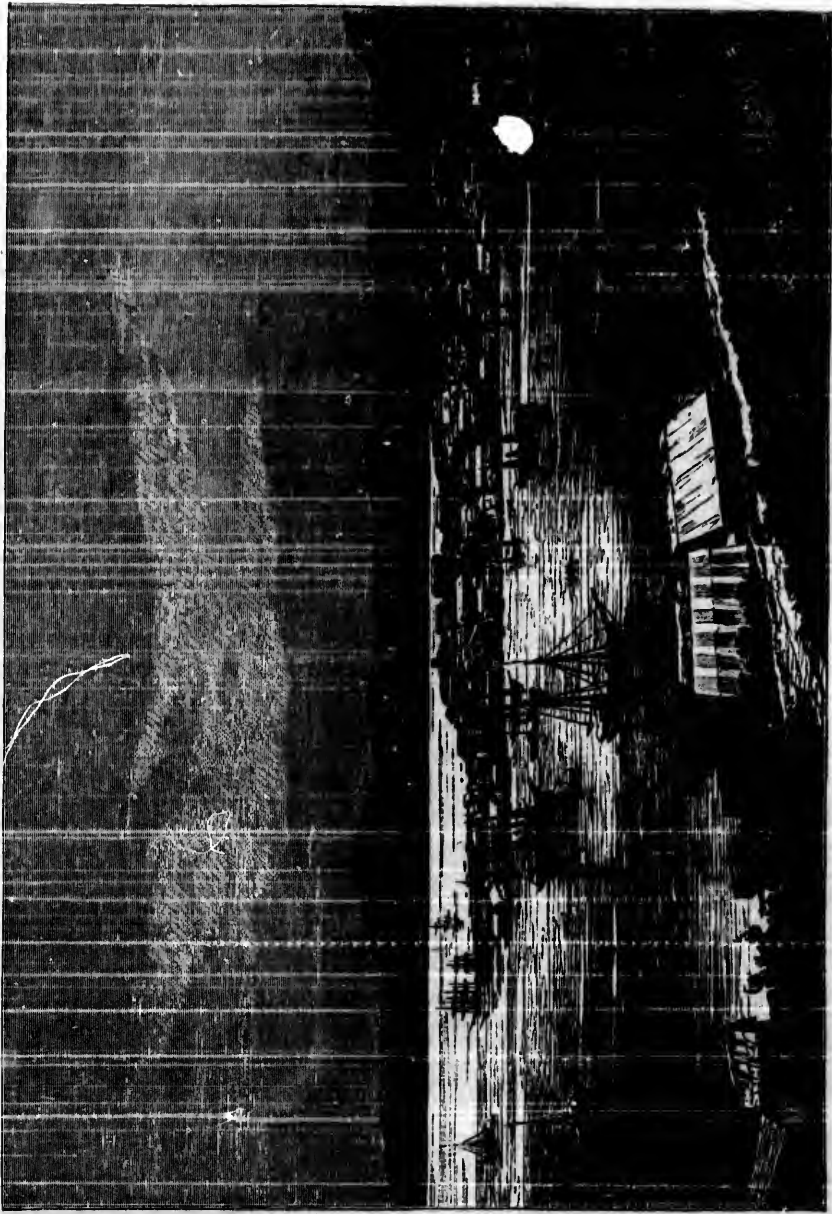
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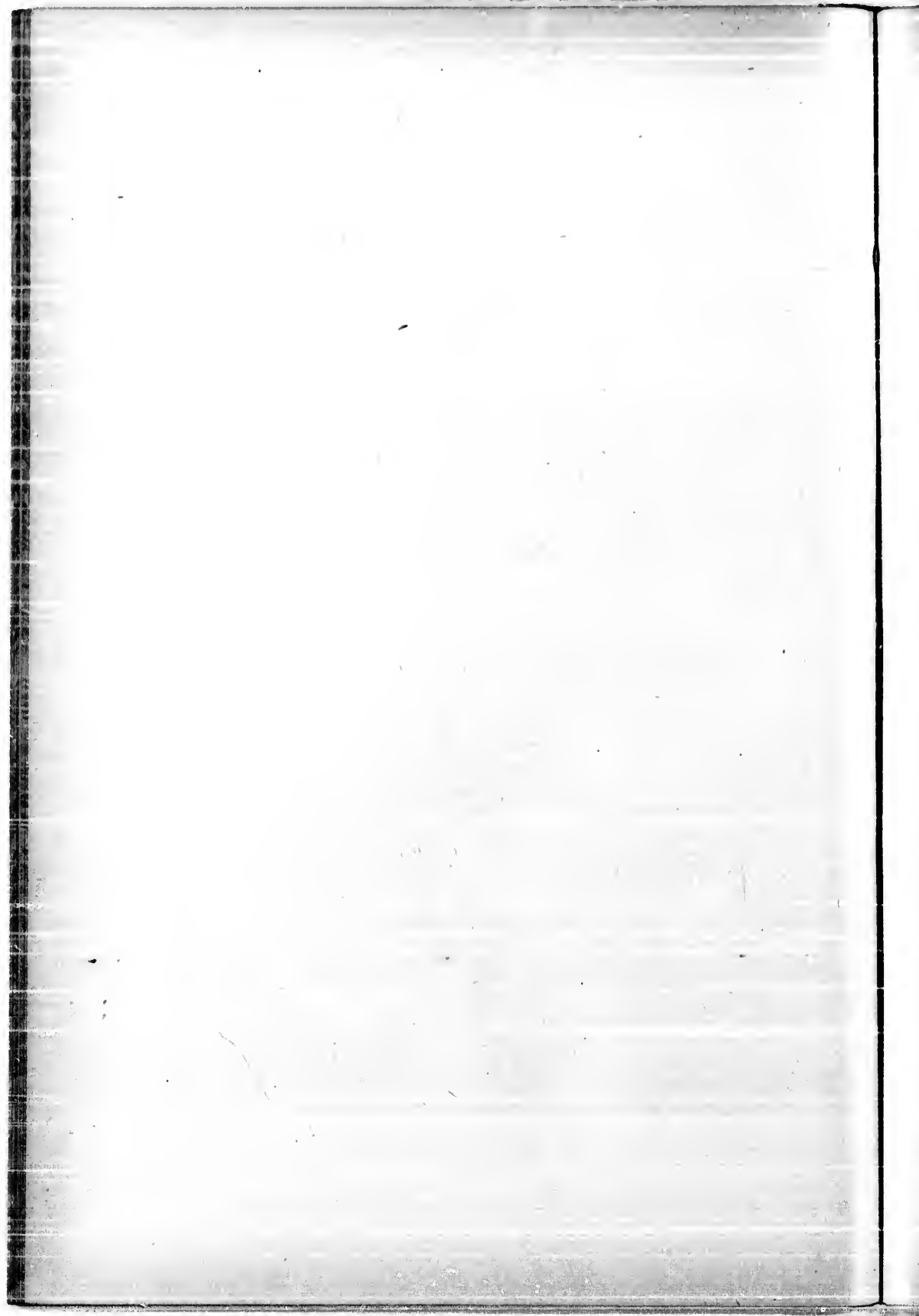
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GENERAL VIEW OF NOUMEA, TAKEN FROM THE ARTILLERY BARRACKS.



thousand, of whom the majority are employed on the public works; as many as twelve hundred have been handed over to mining or industrial companies, and some six hundred enjoy a relative measure of freedom in the agricultural penitentiaries, where they cultivate their own "concessions." The convicts thus gradually merge in the class of the free citizens, who, though still far inferior in numbers to the criminals and their keepers, cannot fail ultimately to predominate, being continually recruited by the descendants of convicts restored to their civil rights. But most of these families must die out, because very few women are transported to New Caledonia; at present they number scarcely one hundred and fifty in the whole island. Nevertheless, some families are perpetuated, and, as happened in Australia, the offspring of these convicts have already begun to protest against a further importation of the criminal classes from Europe.

Free immigration is but slightly developed, and the "colony" still possesses fewer colonists than officials. Doubtless the government offers to all immigrant labourers a free grant of ten acres of arable land and fifty of pasturage, on the condition of residing a few years on the estate and bringing it under cultivation. But the essays at colonisation have hitherto been so disastrous that the unfortunate squatters have had to be restored from time to time to their native land. The competition of penitentiary labour deprives the small holders of all hope of success.

The most numerous and flourishing settlers are the Australians, some hundreds of whom have settled in the agricultural districts, where they devote themselves chiefly to stock-breeding. With their knowledge of the climate, of the natives and the local economic conditions, they are able to face the difficulties of colonisation in its initial stages with more confidence than the ignorant peasantry imported from France.

Large estates have already been created, and so early as 1880 one speculator owned as many as 42,000 acres in a single holding. Yet stock-breeding, the only industry of these extensive landowners, possesses but a slight relative importance. In the whole of New Caledonia there are less than 100,000 head of cattle, scarcely 20,000 sheep, and but a few hundred horses introduced from Norfolk Island. A total area of 50,000 acres is reserved by the state for all the agricultural penitentiaries.

#### TOPOGRAPHY.

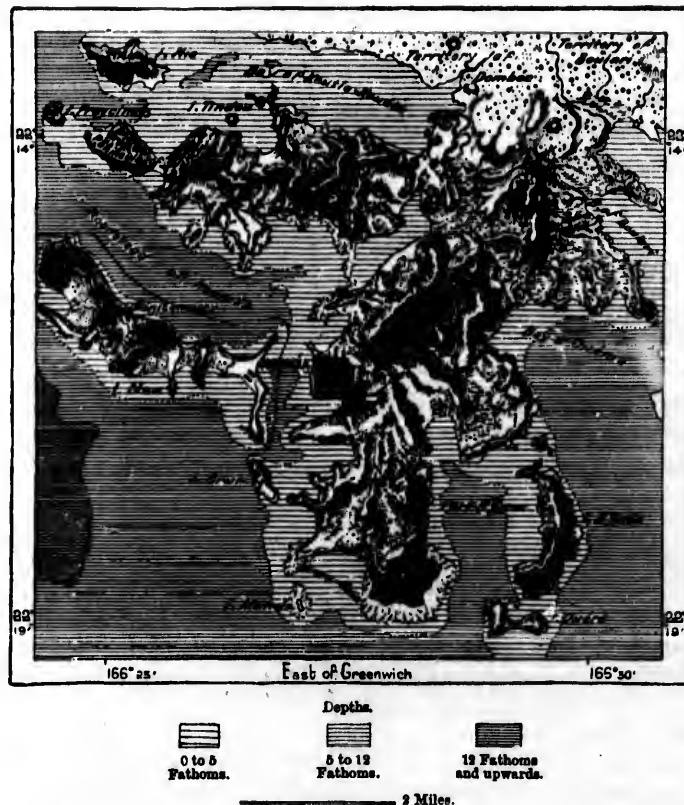
*Noumea*, or *Port-de-France*, as it was called during the first years of the occupation, is the capital, and the only town in New Caledonia and its dependencies. It has a population of four thousand, or about one-half of all the resident civil and military Europeans. Founded in 1854 after the submission of the *Nguea*, or *Numea* tribe, it occupies a favourable commercial position towards the southern extremity of the island on the side facing Australia. Here a wide opening in the outer barrier reef communicates with several roadsteads, all perfectly sheltered by the neighbouring hilly peninsula and adjacent islands. The largest expanse, opening in the north-west between the islet of *Nou* and the *Ducos* peninsula, is spacious enough to receive a whole fleet. The whole trade of



New Caledonia is at present centred in Noumea, which, as a town, is still in its infancy, but for which an abundant supply of water has been brought from a distance of 11 miles. The chief thoroughfares are planted with trees; a fine garden encircles the government palace, and pleasant walks winding up the slopes of the encircling hills lead down to the inlets on the opposite side of the peninsula.

Fig. 140.—NOUMEA.

Scale : 120,000.



Beyond this peninsula the main highway from Noumea ramifies in various directions through the island.

Noumea is surrounded by "penitentiaries," or convict stations, such as those of the island of Nou, with three thousand inmates, of the Ducos peninsula, where eight hundred Communists were detained, and of Montravel, set apart for military criminals. Others are engaged on the public works in and about the capital, while the Marist missionaries employ a large number on their gardens and plantations at *Saint-Louis*, east of Noumea.

Farther north follow along the west coast the military posts and settlements

Fig. 150.—DWELLING OF A NATIVE CHIEF, NEW CALEDONIA.



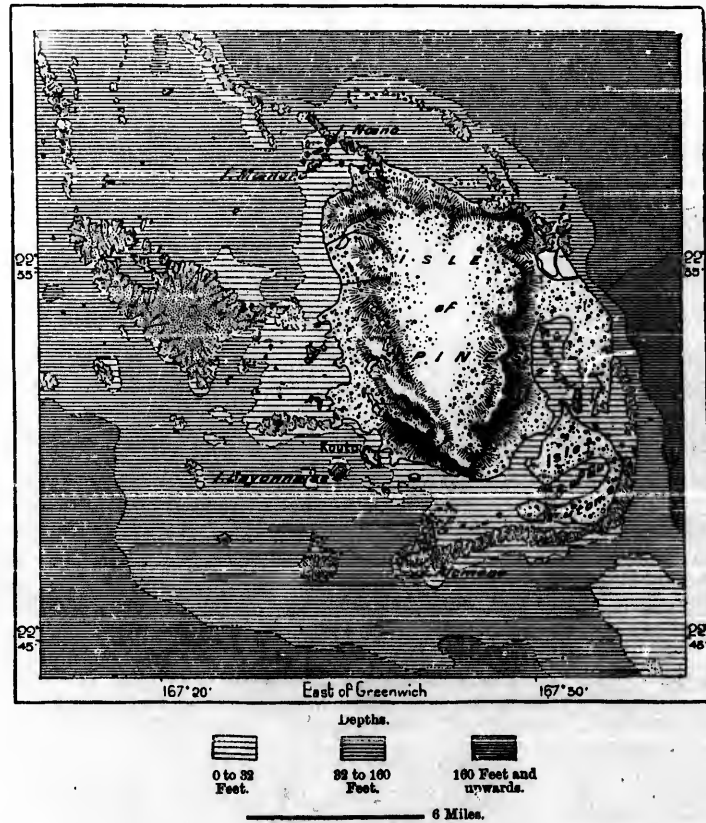
of Bouloupari, near Saint Vincent Bay; Foa and Teremba, or Urai, markets for

the surrounding farmsteads; *Bourail*, the most important agricultural centre in the island, connected by good roads with the rising port of *Gouaro*; *Gomen*, on a spacious and safe roadstead, with a *saladero* for the preparation of tinned beef.

The middle course of the *Diabot*, towards the north-east extremity of the island, is the richest mineral district in French Melanesia. Here the *Balade* mountain is traversed in all directions by metalliferous veins, including gold, copper, pyrites, and nickel. At the time of the discovery in 1872, crowds flocked

Fig. 151.—ISLE OF PINES.

Scale 1 : 350,000.



to the spot from Australia, hamlets sprang up in the midst of the wilderness, mining companies were formed, and the district began to assume the aspect of a Queensland cantonment, when a financial crash brought about the ruin of all these undertakings. Since then a mining association, supported by the government, has made all further competition impossible; the Australians have retired, and the mining population is reduced to a small group at *Ouegoa*, guarded by a mili-

tary post. Most of the ores are shipped at *Cuillou*, on the *Diahot* estuary. The road from this port leads across the mountain down to the historic village of *Balade*, the first sighted by Cook in 1774, and the first occupied by the French in 1853.

*Kanala*, founded in 1859, may be regarded as the capital of the east coast; it lies near a deep inlet, completely sheltered by a hilly peninsula, and is both a mining and agricultural centre. The nickel of *Kanala*, *Houailou* and *Thio*, worked almost exclusively by Australian miners, who spread the English language amongst the natives, is the richest and purest hitherto discovered in any part of the world.

A few short railways traverse the mining districts; but the general communications are still in a backward state, notwithstanding the fact that the government has at its disposal over ten thousand labourers.

The inhabited islands depending on New Caledonia—*Art* and *Pott* in the north, the *Island of Pines* at the southern extremity of the barrier reefs—have neither large villages nor frequented ports. The last mentioned is a penal settlement, where the three thousand Communists, formerly working in the forest clearings, have now been replaced by *Kanaka* exiles, invalid or aged convicts, and others condemned to perpetual banishment.

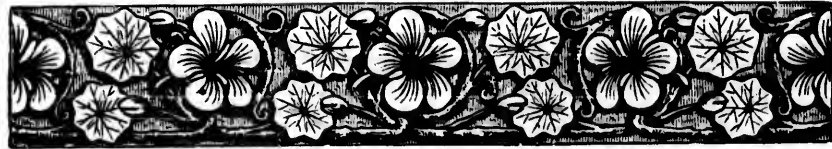
In the Loyalty group the centre of administration is established at *Chépénéhé*, in the island of *Lifu*, a port frequented by traders from *Sydney*.

Some 300 miles west of New Caledonia, a large atoll, comprising the islets of *Chesterfield*, *Bampton* and *Avon*, occupies the centre of the waters flowing between New Caledonia and the Great Barrier Reef south of the Coral Sea. In 1878, France took possession of this group, though it had been discovered by English navigators in 1793, and afterwards surveyed by British exploring expeditions. Great Britain and Australia have accordingly protested against this political annexation. *Chesterfield* and the neighbouring islets, formerly much frequented by whalers, have some guano deposits worked by a few traders.

#### ADMINISTRATION.

Till 1860, New Caledonia was regarded as a dependency of the French Oceanic establishments, of which *Tahiti* was the centre. Now it is administered by a Governor assisted by a Colonial Council, comprising the chief local officials, two notables, and some municipal delegates. *Noumea* is the only commune possessing a municipal council, the colonists in the rest of the island being represented by an elective Colonial Council, and in France by a special delegate to the Colonial Office. The judicial system is the same as in France, the native chiefs acting as magistrates for crimes committed in the tribe. The police, also, are recruited from the natives in *Noumea* and throughout the island.

New Caledonia proper comprises the five circumscriptions of *Noumea*, *Kanala*, *Bourail*, *Oubache* and the North. The yearly budget varies from £80,000 to £120,000, and since the occupation the colony has cost France altogether £8,000,000.



## CHAPTER VIII.

### AUSTRALIA AND TASMANIA.



THE very name of Australia recalls the numerous voyages which, previous to Cook's decisive expedition, were undertaken in search of a vast Austral continent supposed to balance in the south the immensely preponderating extent of upheaved land in the northern hemisphere. But, reduced by the illustrious navigator to its true proportions, this southern region can no longer be considered as a "make-weight" to the continents lying north of the equator. Nevertheless, it is still extensive enough to be regarded as one of the great sections of the globe comparable to the southern divisions of Africa and America. It may thus be considered as one of the three southern continents which are connected with those of the north either by narrow isthmuses, or by continuous chains of islands. The insular lands uniting it with the Asiatic peninsulas belong themselves in great measure to the Australian zone by their climate and natural productions. The Austral mainland is, moreover, considerably increased in extent by a submarine bed fringed with barrier reefs. Its superficial area with that of the adjacent islands scarcely exceeds three-fourths of that of Europe; but with the other lands stretching from New Guinea to New Zealand, the whole area of the upraised land in this part of the South Sea is very nearly equal in extent to the European continent.

#### GENERAL SURVEY.

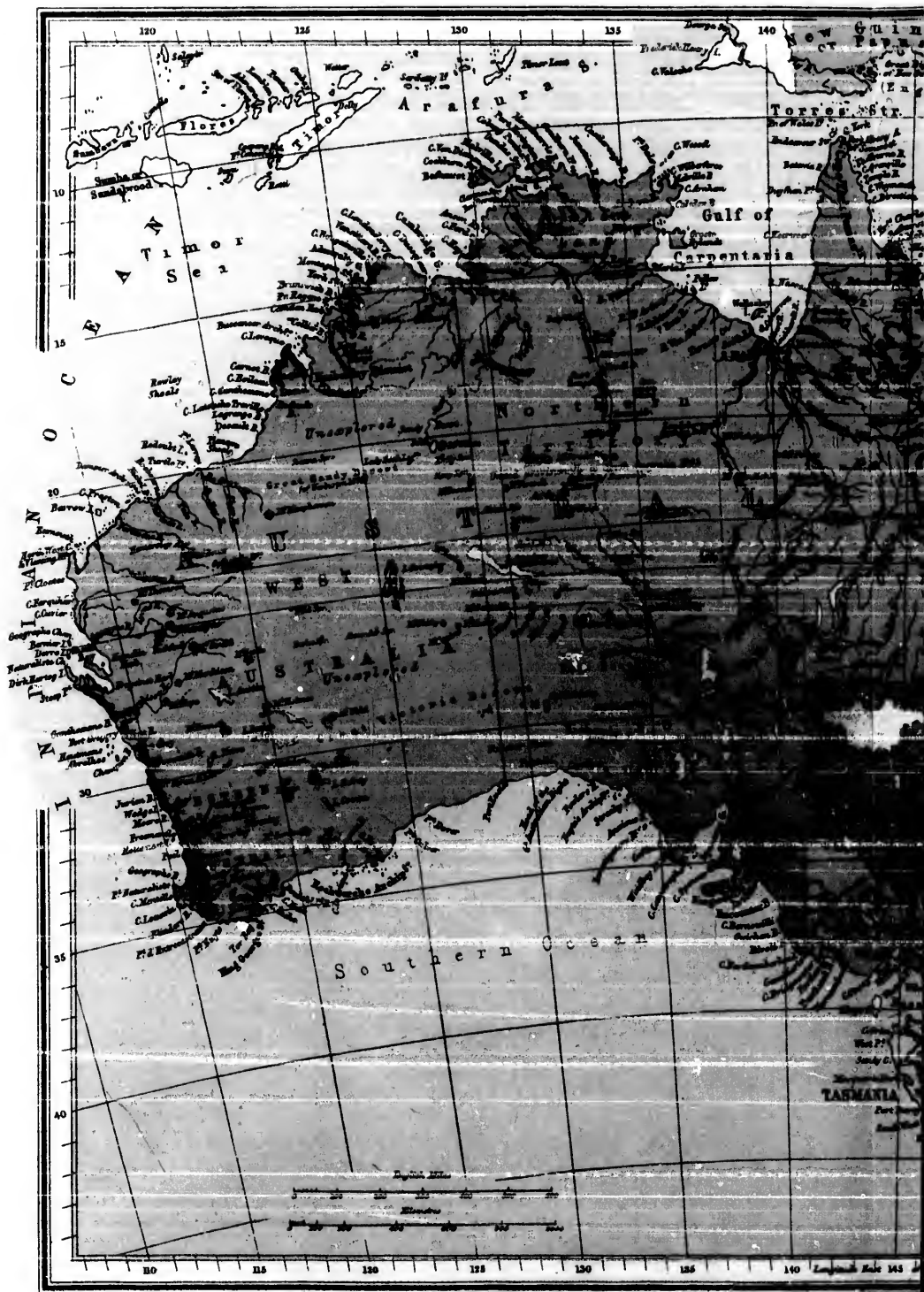
But in other respects what a profound difference between these two antipodean lands! Relatively speaking, the one is the most densely, the other the most sparsely peopled division of the world, the discrepancy between the two being in the proportion of a hundred to one. At the same time it should be remembered that Australia has but entered on the career of its evolution in the common stream of human culture, while its new occupants have already made astounding progress in numbers and influence. Still, this region is far from enjoying the advantages in physical constitution and climatic conditions that have made Europe a privileged section of the globe. Compared with this favoured region, Australia presents the heavy, shapeless outlines of a rough-hewn block, being, for the most part, deficient in lofty mountain ranges, extensive river basins ramifying in all directions, fertile



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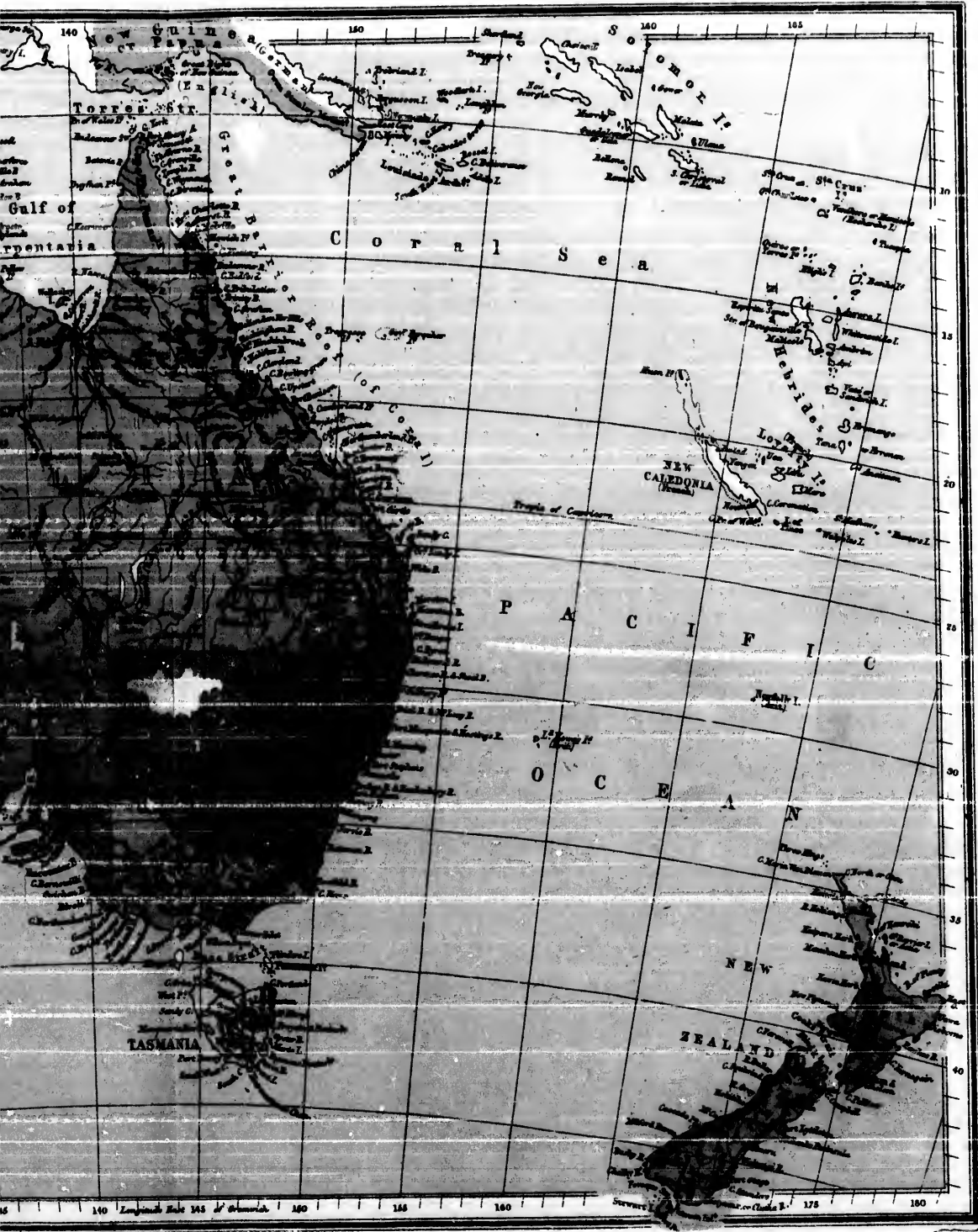
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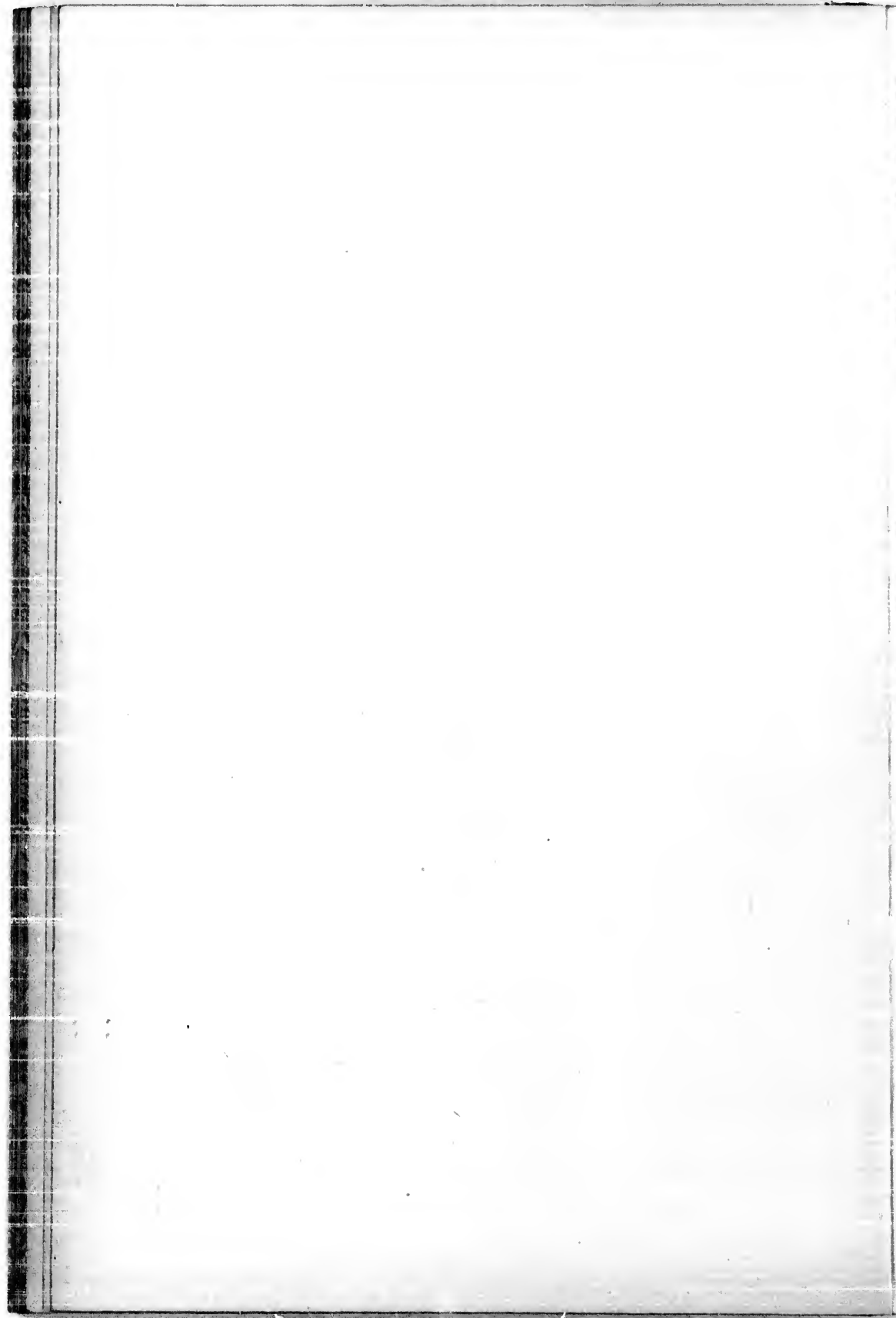


TASMANIA AND NEW ZEALAND.

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alluvial plains, deep marine inlets penetrating far into the interior, and those other diversified features which impart to Europe the aspect of an organised body with proper adjustment of parts.

Nevertheless, civilised man is able by science and industry to make himself more and more independent of his inconvenient surroundings, and to turn their limited resources to the best account. The underground reservoirs of water are brought to the surface by simple mechanical appliances; scrubby tracts are continually brought under cultivation; artificial highways supply the want of navigable routes. Habitable regions are steadily encroaching on the wilderness, and become daily more accessible.

The Australian continent has thus rapidly assumed a position in the commercial world which it could never have acquired before the age of railways and steam navigation. In many respects it has become the first of British colonies, and from the political standpoint, even without fleets and armies, its immense reserve of growing strength contributes greatly to consolidate the vast colonial empire of Great Britain. The great navigable highway connecting England, through the Mediterranean and Red Sea, with her immense Asiatic possessions is continued south-eastwards across the Indian and Pacific Oceans, until, at about an equal distance, it meets the Australian continent, which has for ever become the exclusive appanage of the Anglo-Saxon race. The longer maritime route from London, round the Cape, to Melbourne and Sydney, has also, for intermediate station, the British South-African colonies. Thus, during his long voyage of nearly 16,000 miles across half the circumference of the globe, the *civis Britannicus* touches English territory alone; everywhere he sees his social and political institutions firmly established, everywhere he hears the familiar sounds of his mother tongue; he moves from hemisphere to hemisphere, but scarcely feels that he has quitted his native land.

To appreciate at its full value the influence exercised, if not by England, at least by the English element, in the history of mankind, the United States must be added to Great Britain with its innumerable colonies and boundless possessions. With this large section of the terrestrial surface inhabited by over one hundred millions of his kindred, the Englishman may look forward with full confidence in the destiny of his race. The Russian continental world, embracing half of Europe and of Asia, is more than balanced by the British Oceanic world, which sweeps round the whole periphery of the globe.

#### PROGRESS OF DISCOVERY.

The first voyages of discovery extended by the Portuguese to the Australian Seas remained unknown, or, at most, left nothing behind except vague rumours indelibly traced on a few cartographic documents. That island of "Great Java," already figuring on the maps dating from the first half of the sixteenth century,\* presents such accurate contours as to leave no doubt of the presence of some

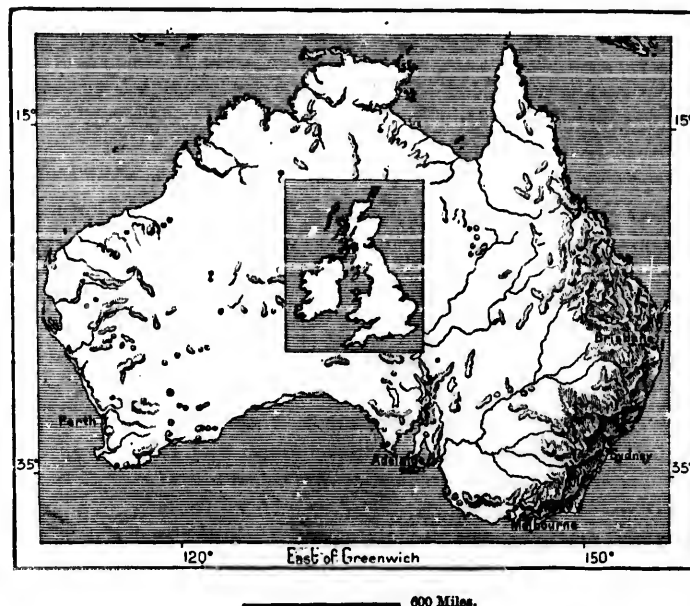
\* B. H. Major: *Early Voyages to Terra Australis, now called Australia.*

unknown Lusitanian mariners in these latitudes. Even Torres' expedition of 1606, through the reef-studded strait separating New Guinea from Australia, was forgotten, and would, perhaps, be still buried in oblivion but for the learned researches of Dalrymple.

To the Dutch navigators is due the accurate knowledge of a great part of the Australian seaboard, and the name of New Holland given by its discoverers to this region has not yet been quite forgotten. Towards the middle of the seventeenth century, while this appellation still prevailed in geographical nomenclature, a considerable section of the coasts had already been explored. In 1606, the *Duyfken*, equipped by the Dutch for a voyage of discovery, had probably touched

Fig. 152.—COMPARATIVE AREAS OF AUSTRALIA AND THE BRITISH ISLES.

Scale 1 : 40,000,000.



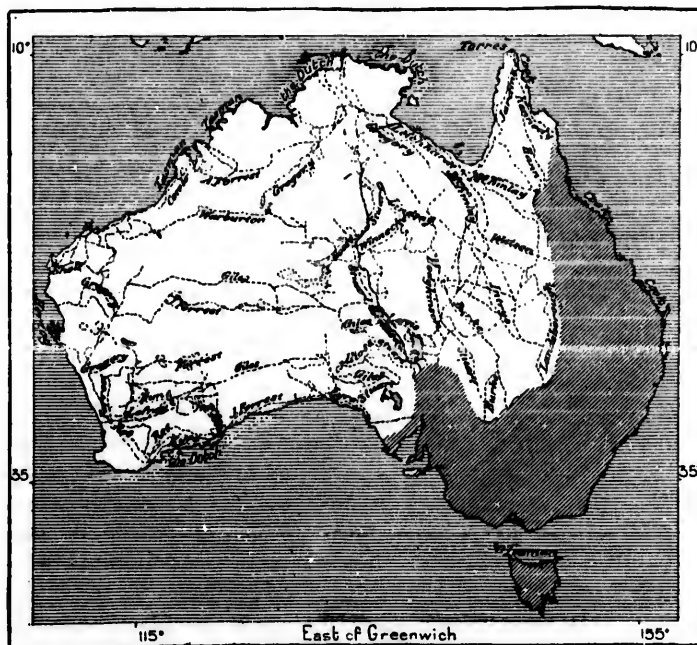
the eastern shores of the Gulf of Carpentaria, and advanced along the coast as far as Cape Keer-weer, or "Return." In 1616, the *Eendracht* skirted the west side of the continent, and till recently the name of this vessel still figured on the maps. Three years later Edel discovered the south-west point of Australia, and he was followed by the captain of the *Leeuwin*, who, with Peter Nuyts, successfully navigated the southern waters, while in the north and north-west, other Dutch mariners sighted lands to which they gave the names of Witt and Arnhem. The discovery of the western half of the continental periphery was completed in 1644 by Abel Tasman, who had, two years previously, sailed round a great part of the

island of Van Diemen's Land, which now bears his name. He had, however, failed to determine its insular character.

It was reserved for Cook to lead the way in the exploration of the east Australian seaboard, and to confirm the anticipations made by Desbrosses on the chart accompanying his historical work on the voyages of discovery in the Austral Seas.\* In 1770, Cook, after discovering Botany Bay, sailed northwards between the mainland and the Great Barrier Reef, and then penetrated into Torres Strait, thus at last placing beyond doubt the insular character both of New Guinea and Australia.

Fig. 153.—CHIEF ROUTES OF AUSTRALIAN EXPLORERS.

Scale 1 : 40,000,000.



But it was still uncertain whether Tasmania was the south-eastern promontory of the Austral mainland, and numerous navigators visited this island and cast anchor in its harbours before the question was decided by Bass, who first sailed through the strait now bearing his name. This event occurred in 1798, ten years after the foundation of the first British colony on the coast of New South Wales. The exploration of the interior had also commenced by short expeditions between the seaboard and the east slopes of the Blue Mountains, but these ramparts were not crossed till the year 1813, when some stockbreeders were driven by a long drought to seek fresh pastures farther inland.

\* *Histoire des Navigations aux Terres Australes.*

Our knowledge of the interior was doubtless greatly enlarged by the search for grassy lands, and after the discovery of gold in 1851, by the sudden rush of miners to the still unknown alluvial plains and rocky valleys of the eastern regions. But far more was accomplished by the disinterested expeditions of travellers who never hesitated to risk their lives in the cause of science and geographical discovery. And, in truth, the work of Australian exploration has cost the lives of many daring pioneers and distinguished naturalists, such as the botanist Cunningham, the learned Leichhardt, Gray, Burke, Wills, who, with numerous comrades, fell victims, either to the spears of the natives or to the hardships, hunger, and thirst of toilsome journeys across inhospitable lands and the trackless wilderness.

And of those more fortunate pioneers, who brought their expeditions to a successful issue, how many proved themselves true heroes, displaying all the energy, resolution, and endurance of which man is capable! For days and weeks together they had to study the soil and scan the horizon in search of some streamlet, mere, or "water-hole." Fellow-travellers had to disperse in the midst of the desert in quest of a little moisture to quench their burning thirst, indicating as their rallying-point some distant rock, from which they might easily be beguiled by a treacherous mirage. Then the weary ploddings across sandhills, over shingly plains, through salt marshes, and thorny scrub; the deviations in search of stray horses; the intolerable heats beneath brazen skies, followed by the dangerous chills of night! Altogether the history of Australian exploration forms a chapter in the records of heroism, which gives the most exalted idea of the greatness of man.

In the series of essays which followed year after year, the decisive journey was that made in 1862, after two failures, by MacDouall Stuart, whose itineraries to the right and the left resemble the movements of the antennæ of puzzled ants. He first succeeded in crossing the Australian continent at its broadest part, from Saint Vincent Gulf to the north coast, opposite Melville Island. Australia was thus severed, as it were, in two by a transverse route, along which stations sprang up at intervals, as so many places of refuge, or starting-points for future explorers. From these headquarters, which reduced by one-half the distance to be traversed, it became possible to penetrate far into the surrounding wilderness, and in 1873 Warburton at last reached the west coast. The network of itineraries was now rapidly extended in all directions, east and west, as well as north and south, and the preliminary rough survey of the continent may be regarded as already accomplished. The inland regions are known in their main features, while the details are being gradually filled up by the partial explorations undertaken in connection with the telegraph service, or in quest of springs and grazing grounds. Nevertheless there still remain vast spaces, especially in the west, where no European has yet succeeded in penetrating, and the blank spaces, even on the latest maps, between the routes of Giles, Forrest, and Warburton represent altogether an area of some 300,000 square miles, or considerably more than double the whole extent of the British Isles.

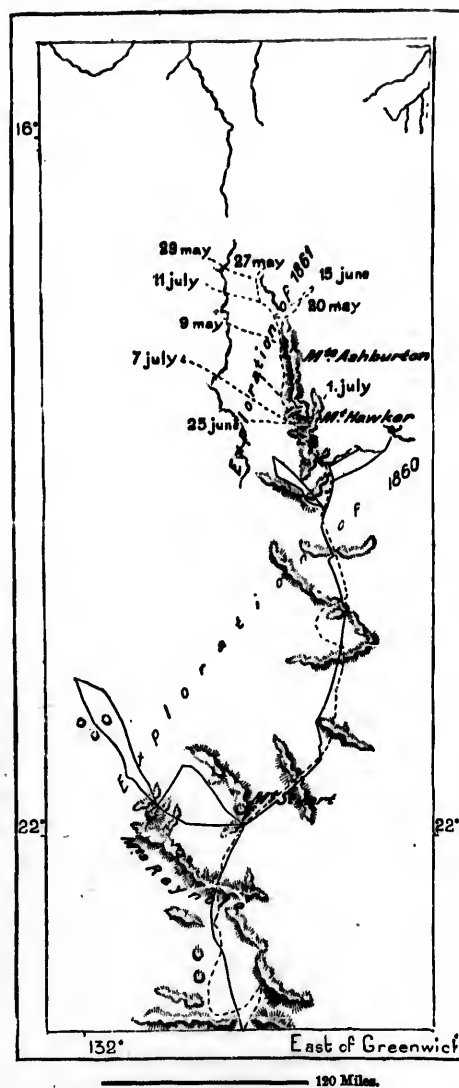
The explorations carried out in recent years by the *Challenger* and other vessels have determined with tolerable accuracy the submarine bed on which Australia stands, and which may be geologically regarded as forming with the mainland a partly upheaved continental mass. In the north New Guinea, with the clusters and chains of adjacent islands, such as the Louisiades and Aru, all rest on the common pedestal, being united with Australia by the reefs dotted over Torres Strait and neighbouring waters. The Gulf of Carpentaria and the north-western seas nearly as far as Timor belong to the same submarine bank, which in the south stretches far seawards, and in the south-east develops a long submerged peninsula, above which rises Tasmania, and which advances over 900 miles into deep water.

On the east side the New South Wales seaboard is washed by abysses of over 2,000 fathoms, while the north-east coast is fringed by the Great Barrier Reef, which is connected by a sill less than 1,000 fathoms deep with Norfolk Island and the north-west peninsula of New Zealand. This connecting line between the continent and its most remote geological dependencies is disposed towards the south-east in the same direction as New Caledonia, the Loyalty, and New Hebrides groups, and other upraised lands in this section of the South Sea.

It is noteworthy that in this vast aggregate of Australasian lands the continent itself presents the least diversity of relief. Even the loftiest Australian ranges are of secondary importance compared with the New Guinea and

Fig. 154.—MACDOUALL'S ITINERARIES.

Scale 1 : 4,000,000.



New Zealand orographic systems, and are surpassed even by the mountains of the Solomon Archipelago. This circumstance strengthens the hypothesis, according to which Australia forms a single geological unit with the lands now scattered to the north and east. New Guinea, Melanesia, and New Zealand would thus be nothing more than the margin of the primitive Austral continent, over half of which now lies submerged beneath the intervening shallow seas. Numerous examples of similar formations occur elsewhere, as in South America, in Africa, and, in a general way, round the great Oceanic basin from the Cape of Good Hope to Cape Horn, where the loftiest crests also rise immediately above profound marine abysses.

#### PHYSICAL FEATURES.—MOUNTAIN SYSTEMS

As in other Australasian regions, the highest mountains on the mainland occur in the neighbourhood of the seaboard and on the side facing the deep Pacific waters. The chief continental crests are disposed in such a way as to form an outer crescent sweeping round from York Peninsula to Wilson's Promontory, over against Tasmania. Beyond this elevated rim the land falls so uniformly as to suggest to the early explorers the existence in the interior of a "Caspian" depression, into which flowed all the surrounding streams. But instead of this imaginary central sea there exists nothing beyond a few small basins without any outflow, while nearly all the important rivers flow directly to the coast. Nevertheless the plains traversed by them stand at a very low level, in consequence of which disposition of the land the seaboard has been excavated far into the interior both on the north and south sides, where have been respectively developed the Gulfs of Carpentaria and Saint Vincent. Between these two indentations, which are the largest on the whole continental periphery, the intervening plains scarcely anywhere exceed an altitude of 500 feet above sea-level. West of this depression the surface again rises, and towards the centre of the continent several of the summits exceed 3,000 feet in elevation.

The chief range, known as the Australian Alps, begins in Victoria, and after presenting its convex side towards the south-east, trends round to the left and is continued by other chains northwards. The Yass, a headstream of the Murray, is regarded as the northern limit of the Australian Alps proper, which have a total length of about 250 miles. These highlands deserve the name of Alps less for their altitude than for the large number of their collective groups, spurs, offshoots, lateral or parallel ridges. They are almost everywhere of easy access, the most rugged escarpments being usually situated about midway between base and summit, while higher up the slopes are more gently inclined, and extensive grassy or sparsely wooded plateaux form the pedestal of domes and crests which may be ascended even on horseback. The culminating peak, Mount Townshend, in the Kosciusko group, New South Wales, attains a height of 7,350 feet.

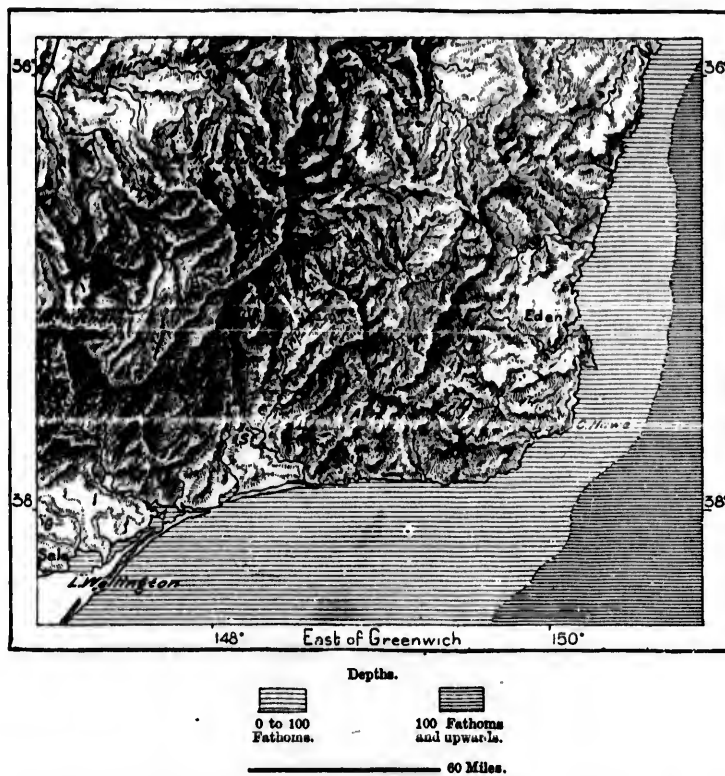
In many of these upland valleys the snows never melt, and in winter from May to November even the plateaux remain shrouded in a white mantle. A few *névés* are found in the higher ravines of the Kosciusko Mountains, and traces of ancient glaciers in various parts of the range. In the Bogong Hills (6,630 feet),

which lie west of the farthest sources of the Murray, a frontal moraine dams up a little fluvial valley at an elevation of 2,950 feet.

In the Australian Alps the prevailing formations are of great age, consisting of granites and Silurian masses interspersed with porphyries, diorites, and basalts. Here and there tertiary rocks overlie the valleys, but are always disposed horizontally, whereas the surrounding strata have been diversely folded and dislocated.

Fig. 155.—AUSTRALIAN ALPS.

Scale 1 : 8,250,000.



Notwithstanding the intervening depressions the same general features reappear farther west in the Victoria highlands, and even in Tasmania, which belongs in great measure to the same geological epoch. The Pyrenees, which run parallel with the coast north-west of Melbourne, and the Grampians, whose irregular forms stretch farther west, are also of Silurian formation, though less elevated than the Alps, Mount William, the culminating point in the Grampians, being scarcely 5,600 feet high.

But nowhere in Australia have igneous formations been more developed than



in this region of West Victoria, where volcanic cones are reckoned by the hundred—some simple eruptive craters, others real mountains 2,000 feet high—belonging to every successive period between paleozoic and tertiary times. Several of the craters are perfectly circular basins now flooded by lakes of great depth, such as the Blue Lake, which occupies the upper cavity of a volcano belonging to the Gambier group in South Australia, and which is no less than 675 feet deep. Others, which formerly discharged lava streams covering vast expanses, are now mere grassy or wooded cirques. All the older volcanoes are on the mainland except Tower Hill, near Warrnambool, which rises above the surface of the neighbouring waters.

Like the Australian Alps the Tasmanian mountains are formed of granites and Silurian deposits. But geologists have hitherto failed to determine the presence of volcanoes properly so-called, although in many places eruptive rocks have formed transverse barriers over which the running waters fall in cascades down to the plains. Nearly the whole island is covered with irregular mountain masses, which attain their greatest elevation in the north-west, here culminating in Cradle Mountain (5,065 feet). Several other peaks exceed 4,600 feet, but the land falls towards the south-east, where the seaboard is penetrated by deep fjords.

Viewed as a whole Tasmania presents the outlines of half an oval, eroded on the north side facing Australia in the form of a regular concave curve. Here the intervening waters of Bass Strait were at some former epoch undoubtedly replaced by an isthmus connecting both regions, and of which nothing now survives except a few granite islets. But immediately east of the strait the marine abysses plunge into depths of over 2,500 fathoms. From the geological standpoint Wilson's Promontory, the southernmost point of the Australian continent, is an island like those scattered over the shallow waters of the strait. Were the mainland to subside some 300 feet the two inlets to the west and east of the headland would be connected by a second marine channel.

North of the Australian Alps the highlands skirting the seaboard ramify into several parallel chains, the main range running at a mean distance of 45 or 50 miles from the Pacific. Each chain and each transverse ridge has its separate name, while the whole system is sometimes designated by the common appellation of the Blue Mountains, a term more specially applicable to the mountains lying to the west of Sydney, and long regarded by the early settlers as an unsurmountable rampart towards the interior of the continent. Although the highest peaks, such as Sea-view, west of Port Macquarie towards the north of New South Wales, scarcely exceed 6,000 feet, while most of them fall below 5,000 feet, they have in many places been carved by erosive action into rocky cirques with vertical walls of an imposing aspect.

The ranges fall precipitously seaward, while on the opposite side they frequently present the appearance rather of a gently inclined tableland, the ground sloping somewhat uniformly in the direction of the plains watered by the Murray. Extensive cavities, where the rivulets now escape through breaches in the periphery, appear to have formerly been lacustrine basins. Such amongst others on the

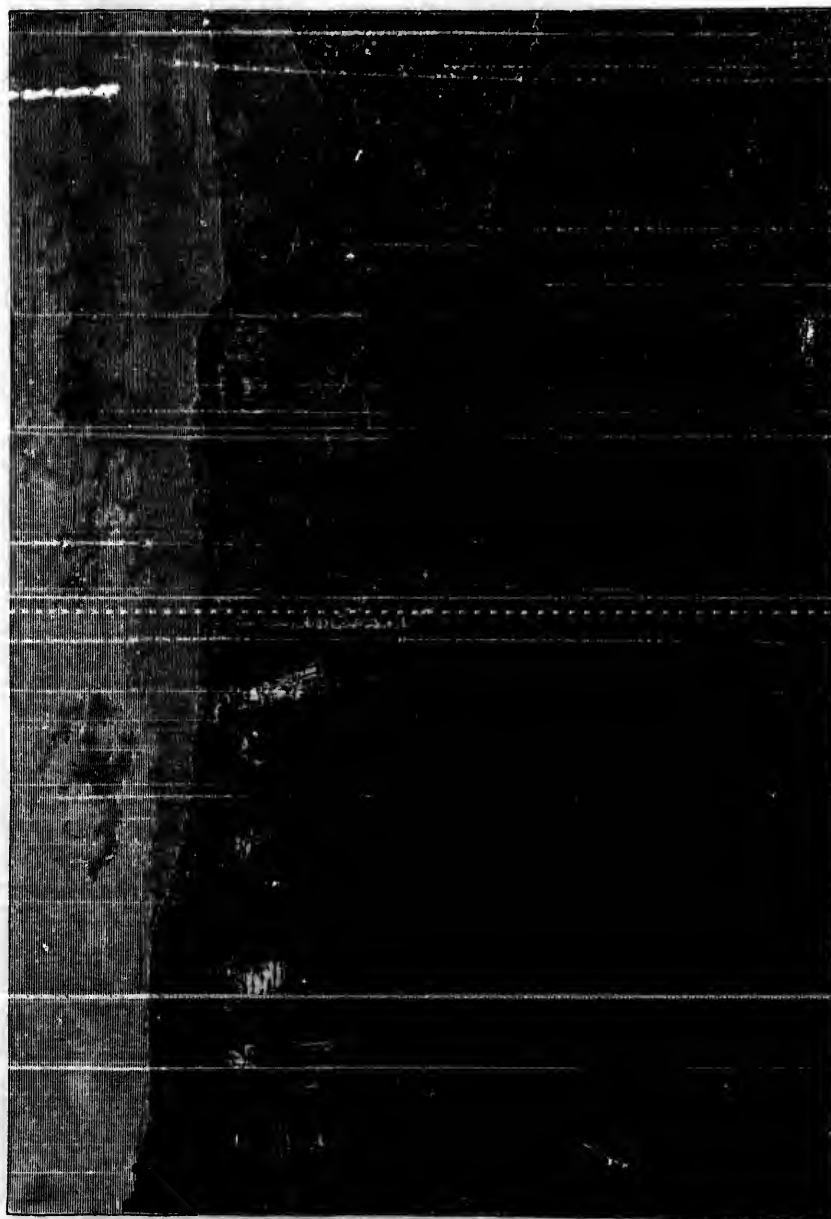
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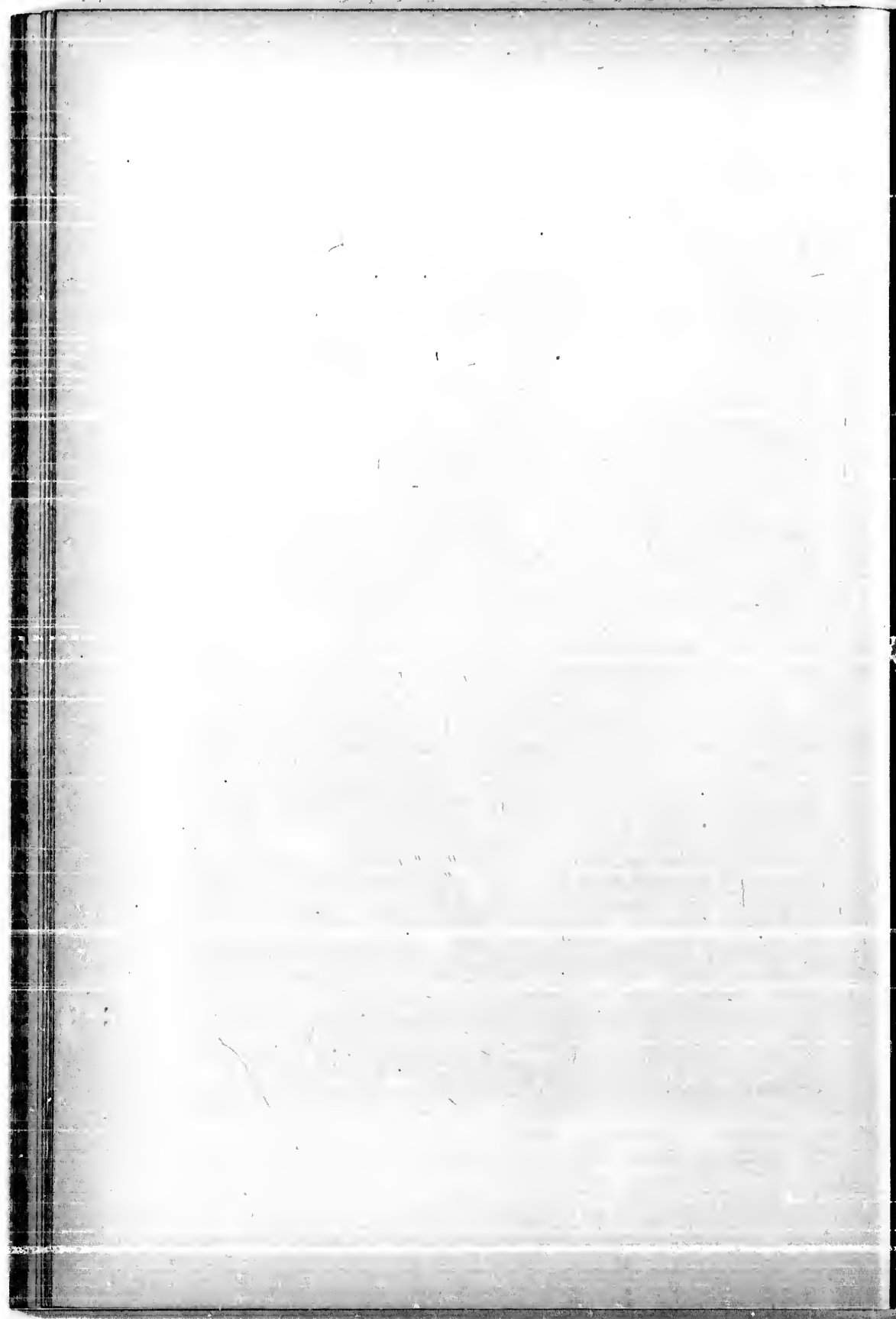
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VIEW TAKEN IN THE BLUE MOUNTAINS, AUSTRALIA.



western slope of the mountains are the Liverpool Plains, which are dotted over with isolated basalt rocks. Like the regions in the north of Europe, Australia also had evidently its glacial epoch followed by a lacustrine period.

In the northern section of New South Wales the water-parting gradually falls in the direction of the colony of Queensland, where few summits attain an elevation of 2,000 feet. In some districts the mountain system is even completely interrupted, the parting line between the two slopes being formed by scarcely perceptible undulations. But eminences exceeding 3,000 feet reappear north of the tropic of Capricorn, where a granite ridge skirting the seaboard runs north-westwards to the neck of York Peninsula, here merging in a small water-parting of moderate elevation.

Between the Australian Alps and the granites of North Queensland the prevailing formations are carboniferous of various ages, some dating from paleozoic, others from mesozoic times. Here also occur some granites and porphyries, and on the western slopes a few volcanoes and lava fields. It is in this section of the Australian highlands and on the northern slopes of the Victoria Mountains that are scattered those auriferous deposits that have so greatly stimulated the development of Australia. All belong to different periods of the tertiary epoch and rest on a rocky bed of the Silurian system. Most of the deposits fill old fluvial channels, the so-called "gutters," and in some districts they attain a thickness of over 300 and even 600 feet.

West of the "backbone" of the continent the depression comprised between the Gulf of Carpentaria and the Murray estuary is largely occupied with cretaceous formations. From these mesozoic strata and the vast plains of tertiary origin it is evident that Australia, formerly considered as the "old" continent in a pre-eminent sense, has also had its revolutions, its alternating upheavals and subsidences, like other great divisions of the globe.

Beyond the chalk zone begin the little-known regions intersected at long intervals by the itineraries of a few daring explorers. We know, however, that granites and primitive rocks occur in South Australia on both sides of Spencer Gulf, as well as round the margins of the saline basins in the interior. The northern peninsulas facing Melville Island have also their granites and metamorphic formations. Lastly, the south-western regions are to a great extent constituted of slightly elevated granite plateaux traversed here and there by a mountain range from 1,800 to 2,000 feet high. All these chains and ridges are named after the early explorers or statesmen distinguished in contemporary politics. The MacDouall group, lying east of the overland telegraph line, abounds in precious stones, some of which have been doubtfully or wrongly described as "rubies."

The "desert sandstone," comprising over one-third of Australia, is probably of more recent origin than any of the continental mountain systems. But owing to the general absence of fossils its age cannot be accurately determined, although the upheaval of the plateaux, hills, and plains in this arid wilderness is by most geologists referred to pliocene times. In North Queensland it overlies cretaceous formations. Its numerous depressions have been produced by meteoric agencies,

heat and cold, wind and rain, and in several places the surface has been excavated many tens and even hundreds of yards, leaving here and there masses of harder rocks, which indicate the original level of the now vanished formations. In north-west Australia lies the region to which Gray has given the name of "Pillar Land," from the myriads of sandstone columns rising above the surrounding plains which have been irregularly excavated. This region is carpeted with flowering plants and festooned with belts of verdure, while the work of erosion is still continued by running waters partly flowing below the surface.

About the very centre of the continent stands another of these geological witnesses, which is known as "Chambers's Pillar," and which rises 150 feet above an eminence itself about 100 feet higher than the surrounding plain. This column, one of the most regular formations of the kind on the surface of the globe, forms a conspicuous landmark much utilised by the early explorers as a rallying point, and convenient site for a *cache* or storehouse of provisions. It is about ten feet by twenty in cross section, of nearly equal compass from top to bottom, and formed of a soft white sandstone like the hill on which it stands. The upper part of the pillar is of a red tint, and its preservation is perhaps due to the greater hardness and durability of this topmost layer (Wallace).

Like the Sahara, the Australian desert has its region of dunes stretching west of the overland telegraph on the north-west continental slope. Here the chains of sandhills follow each other with perfect regularity, rolling away like the waves of the sea for a distance of about 350 miles in the direction from east to west. Consisting entirely of red particles, without a blade of grass to relieve their fierce glare, these dunes are described by Sturt as producing a "terrible" effect, and no traveller ventures to traverse them without a sense of awe. Beyond this dreaded region a few verdant and flowery oases are seen here and there in the dreary wilderness. The aspect, however, of the Australian desert changes with the dry and wet seasons, so that the descriptions of the same district by different explorers often present great discrepancies.

The observations made by geologists on the main features of the continental periphery lend much probability to the hypothesis of a general upheaval of the Australian seaboard. Its shores, after having been submerged under the waters, which at one time covered about half of the surface, were again gradually upraised above the level of the surrounding seas. The coasts are fringed by upheaved beaches, in which are embedded banks of shells similar to those still surviving in the neighbouring waters. Numerous lakes, which were, till recently, marine inlets, have preserved their oceanic fauna, while others have been gradually changed to freshwater basins, or have even been completely evaporated. Shoals and reefs formerly concealed below the surface now show their black rocks above the level of the sea.

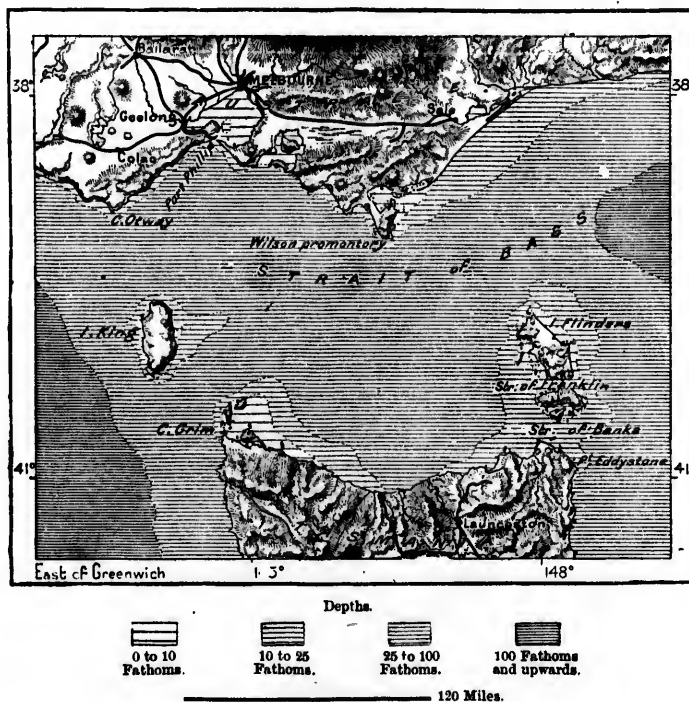
A careful study of the whole region stretching to the north of Spencer Gulf leaves no doubt that this tract of dry land at one time formed an archipelago with numerous islands separated from each other by shallow straits. Bass Strait itself, which forms the southern limit of Australia proper, would be changed to dry land

by a general upheaval of less than twenty-five fathoms, and Tasmania, which was long supposed to form part of the neighbouring continent, really belongs to it from the geological point of view. The presence of glaciers probably contributed to preserve the primitive form of the Tasmanian seaboard, all the south side of which is carved into creeks and inlets, evidently ancient fjords which have maintained their original depth and outlines.

A close resemblance to the sea which formerly flooded South Australia, is presented by the channel at present separating this continent from New Guinea. Between Cape York and Mount Cornwallis at the narrowest part of Torres Strait

Fig. 156.—BASS STRAIT.

Scale 1 : 5,555,000.



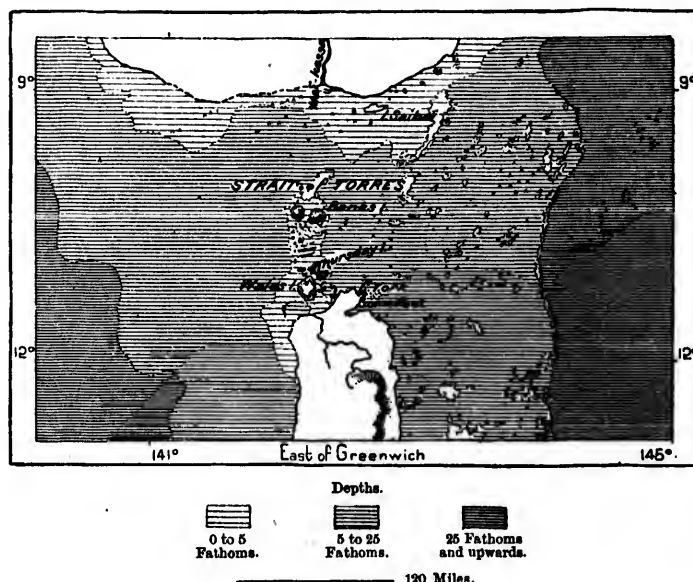
the water is nowhere more than eleven or twelve, while the average scarcely exceeds seven fathoms. It was shown by the accurate surveys of the *Fly* and *Bramble* (1842—1847) that, even by keeping to the windings of the deepest channel, a vessel drawing over 30 feet could only pass through in perfectly smooth water. The rocky islets in this strait, whether isolated or grouped in clusters, consist exclusively of porphyries or syenites, like the rocks in the northern peninsula of Queensland, of which they evidently form a seaward extension.

East of these reef-fringed islets, between which flow channels perfectly free

from shoals, begins the true "Coral Sea," which is studded, not with rocky heights, but only with a dangerous labyrinth of coralline masses, and which taken as a whole may be compared to a long submarine bank gradually falling eastwards to a mean depth of 20 fathoms. Here is the true coastline of the Australian continent, and as happens on so many other upraised or submerged seabords, the parting line between the continental plateau and the abyssal depths of the Pacific Ocean is marked by an igneous chain. The volcanoes, however, of the Coral Sea have all become extinct during the present geological epoch, and none of them are of any considerable size, the largest being Murray Island, which lies within the zone of the Great Barrier Reef. Although so near the Australian mainland

Fig. 157.—TORRES STRAIT.

Scale 1 : 7,750,000.



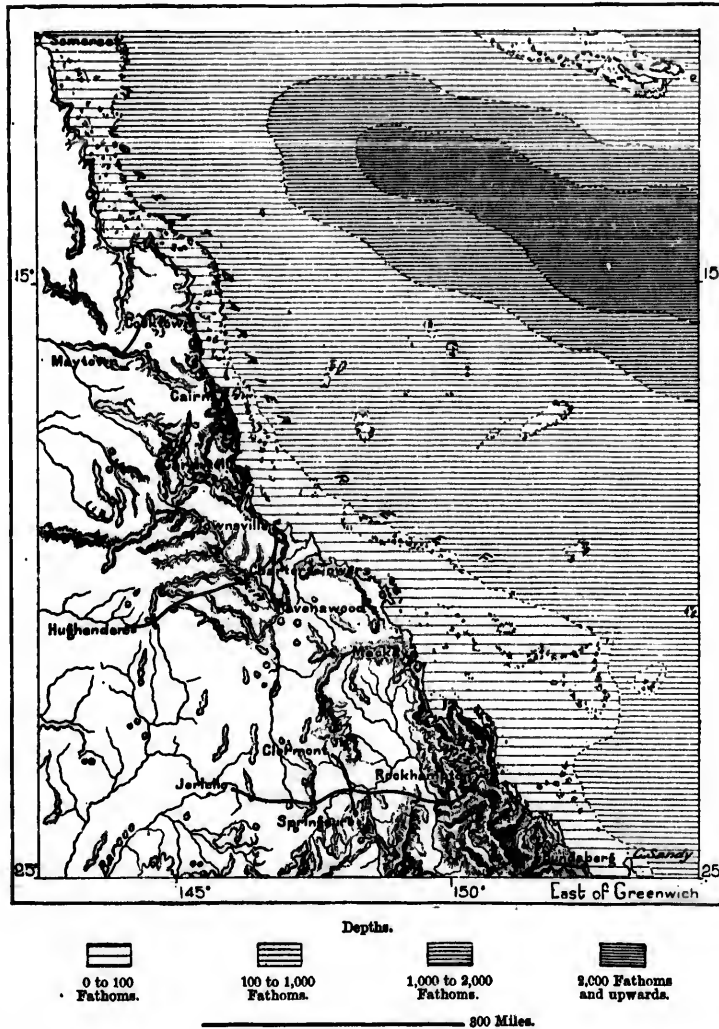
of which it is a geological dependence, this island is distinguished from it by its vegetation. The beach and even the lower slopes of the hills, which rise to a height of 600 or 700 feet, are clothed with a continuous forest of cocoanut palms, trees which all travellers assure us were not found in Australia before the arrival of the European immigrants.

The rampart of reefs forming the outer coastline of Queensland and connecting Australia with New Guinea has a total development of no less than 1,500 miles, without counting minor indentations. It begins at Cape Sandy, where the mainland projects seawards off the convex curve of the east coast, and is at first interrupted by broad straits; but the rocks and shoals soon press closer together, and at last merge in a continuous barrier presenting but few openings accessible to

ships. The early explorers anxiously skirted the long line of breakers during the day, and at dusk veered off to a safe distance from their everlasting roar; yet shipwrecks were of frequent occurrence. Now, however, all the accessible passes

Fig. 158.—THE GREAT BARRIER REEF.

Scale 1 : 11,800,000.



are known, and vessels freely navigate the inner waters under shelter from the fury of the ocean waves.

Before the introduction of steam navigation, the channels of the Great Barrier,



notwithstanding their dangerous reefs, presented, with Torres Strait, the only route for vessels passing from the Pacific to the Indian Ocean. Here the south-east trades set regularly throughout nearly the whole year, whereas off the south coast of Australia the south and south-west winds blow almost constantly and are often stormy. Within the Great Barrier the surf is seldom dangerous, and here the ordinary roadsteads, sheltered by a rock or an islet, form really safe havens. Seafarers navigating these seas are also aided by the clear atmosphere and the extreme limpidity of the water. At a distance of over a mile the sailor at the mast-head readily detects the existence of shallows 30 feet below the surface, thanks to the contrast presented by their greenish tints with the deep blue of the neighbouring abysses.

#### RIVERS AND LAKES.

Australia is as inferior to the other continents in the extent and abundance of its watercourses as it is in the elevation of its mountain ranges. Of all those reaching the coast the Murray or Goolwa, discovered in 1824 by Hume and Hovell, is the only river draining a large extent of country. This great artery receives all the running waters belonging to the inland watersheds of the Grampians, the Pyrenees of Victoria, the Alps, and the New South Wales coast ranges. From its furthest headstream, the Condamine, rising in Queensland, to its estuary in South Australia, the distance is at least 1,200 miles, and the whole extent of the catchment basin of the Murray exceeds 400,000 square miles. It is thus larger than those of the united Tigris-Euphrates, of the Danube, and the St. Lawrence; but what a difference in its volume!—the mean annual discharge being only about 12,000 cubic feet per second, or less than that of the Seine. The Murray waters are scarcely deep enough for small steamers to ascend its lower course even during the floods. During the ten years between 1877 and 1886 the Darling was accessible to craft of light draught only for fifty-seven months altogether, while none of its affluents are navigable except for small boats.

The fluvial basin itself has been rightly named, not from its longest upper branch, but from the headstream which, thanks to the direction of its course parallel with the main axis of the Victoria mountain ranges, receives the largest quantity of water. The Murray rises in the Australian Alps on the frontiers of Victoria and New South Wales, and during its westerly course is gradually increased in volume by the torrents descending from the Victoria uplands to its left bank. Its northern affluents, the Lachlan-Morrumbidgee, and especially the Darling, have a far longer course, but roll down a much smaller quantity of water. Many of the sub-tributaries even lose themselves in meres and swamps before reaching the banks of the main stream. All these running waters expand over the surface in shallow temporary lakes, and, being destitute of regular sandy or gravelly beds, scarcely deserve the name of rivers.

On the east slope of the New South Wales and Queensland coast-ranges the streams are relatively more copious, thanks to the heavier rainfall and the closer

texture of their rocky beds. But between the hills and the coast they have no space to develop long courses, and most of them are lost in the ocean as soon as they escape from the mountains. On this slope the largest rivers are the Fitzroy and the Burdekin, which, through openings in the coast-ranges, receive some contributions from the opposite side.

On the western watershed of Queensland the Gulf of Carpentaria is encircled by fluvial basins, such as the Mitchell, Norman, Flinders, Leichhardt, Albert and Roper, which usually send down very little water, but whose channels excavated to great depths in the rocks bear witness to the great force formerly exercised by their currents. The more arid north-west seaboard has scarcely any streams that can compare in magnitude even with those of the east coast ranges. Amongst the more important in this region are the Victoria, discharging into Queen's Channel, the Fitzroy, a little farther west, and Qui on the west side of the continent the Grey, the Ashburton, Gascoyne, and Murchison, nearly all of which watercourses are for the greater part of the year mere chains of half dried-up morasses.

Still more arid is the great southern bight, which for a space of 1,200 miles between the south-west corner of the continent and Spencer Gulf, is unbroken by a single fluvial estuary. Throughout this vast and almost waterless tract not one of the few rivulets developed in the interior has sufficient force to reach the coast. Temporary freshets are caused by the heavy downpours in most of the desert regions, and on these occasions the sudden appearance of a real current rushing along in a usually dried-up river bed is hailed with a sort of ecstasy by the few spectators of the rare phenomenon. Long before the arrival of the stream its distant roar is heard as it sweeps down with the shrubs and trees torn from its banks; then the noise grows louder, presently a thread of water is seen winding through the sinuosities of the ravine, as if in search of an outlet, and this is followed with a tremendous crash by the raging torrent which soon fills to overflowing the winding valley.

Amongst the watercourses which run out in the depressions of the interior there is one which, at least for the extent of its basin, may be regarded as a true river. This is the Barcoo, or Cooper's Creek, which also bears other names in the various districts through which it flows, and whose headwaters traverse the Queensland pasturages for a distance of over 350 miles. The upper affluents converge in a common channel, which after running south-westwards parallel with the Darling, wanders in an uncertain course from swamp to swamp, and at last merges in the extensive depression of Lake Eyre together with other watercourses flowing from the solitudes of Central Australia.

The total length of Cooper's Creek cannot be less than 1,200 miles, but it does not flow continuously throughout the year, and its course is often indicated only by meres and morasses. The lacustrine basins themselves vary in extent and form according to the greater or less abundance of the rainfall and intensity of the evaporation. At one season they present the aspect of extensive inland seas with surf-beaten shores, and stretching beyond the horizon without visible shoals or

islands; at another they are mere quagmires reflecting the glittering mirage, or else argillaceous tracts covered with white saline efflorescences. During protracted droughts these so-called lakes may be crossed on horseback, provided the traveller avoid the bays and inlets of the periphery, where the treacherous muds and bogs are longest maintained by the underground waters filtering through from the surrounding lands towards the lateral creeks.

From the disposition and outlines both of Lake Eyre, and of Lake Torrens, which forms its southern continuation in the direction of Spencer Gulf, it seems probable that these now isolated basins were formerly marine inlets communicating freely with the South Pacific. The terminal depression, however, which is certainly the lowest cavity on the Australian continent, still stands some 65 or 70 feet above the present sea-level. Another depression towards the centre of Australia is occupied by "Lake" Amadeus, alternately a shallow lagoon, morass, or saline waste. In the arid region of West Australia there also occur several depressions of like character, which are commonly designated by the name of lakes.

In the thoroughly explored basins, such as that of the Darling, the fluvial discharge is so slight compared with the rainfall that some observers have sought for an explanation of the discrepancy in the existence of underground rivers flowing beneath the surface clays, and carrying either to the sea or to some subterranean reservoirs the greater part of the running waters. Some portion, however, of the rainfall, instead of being carried off in river beds, remains on the ground in certain shallow basins, which in the Darling pasturages are known by the name of "gilgias." On these level tracts, where the rains spread out in stagnant sheets without the force required to excavate a fluvial channel, the only depressions where the water can be collected are the fissures formed in the arid soil during the dry season. Under the action of the heavy downpours the sides of these crevasses are washed away, the bed of the cavities thus formed is levelled, and water-holes are gradually developed, which vary in depth from 4 to 5 or 6 feet, and in size from a few feet to over a hundred yards in circuit. Some of these natural gilgias have even been enlarged by the natives, and converted into reservoirs capable of containing considerable quantities of water.

#### CLIMATE.

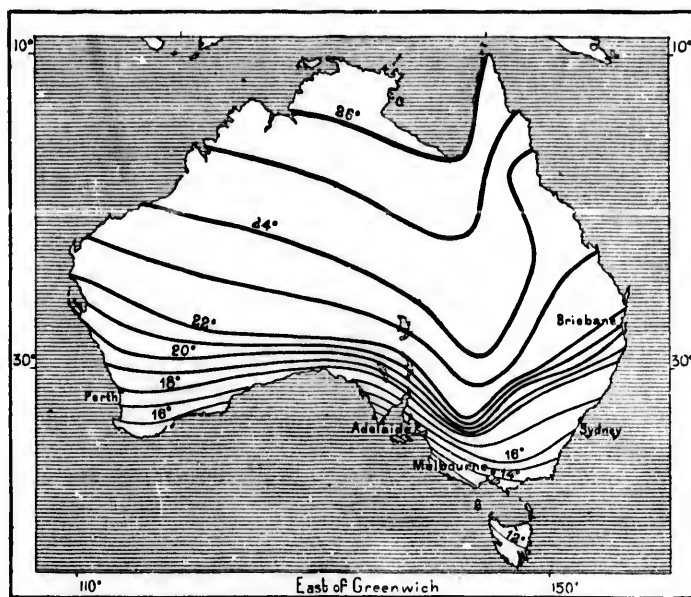
The climate of Australia is written on the surface of the land, its more salient features being clearly indicated by those bare rocks, those treeless plains and waterless depressions which occupy the greater part of the continent. Although surrounded by marine waters, Australia is of too massive a form to enjoy an insular climate, such as that of Europe with its deeply indented seaboard. Owing to the dryness of the atmosphere, due to the slight relief and the monotonous contours of the coastline, the meteorological conditions are essentially of a continental character.

Lying half within the tropical and half in the south temperate zone, this region presents, from the York Peninsula to the terminal point of Tasmania, a

long succession of graduated isothermal lines, with a mean temperature ranging from  $78^{\circ}$  or  $80^{\circ}$  F. in the extreme north to not more than  $54^{\circ}$  in the extreme south. But this gradual decrease does not correspond uniformly with the change of latitude, for the normal averages are often greatly modified, raised in one place, lowered in another, by the influence of the prevailing winds, marine currents, and mountain ranges. Thus the temperature is diversely affected by the backward flow of the equatorial and polar currents, which meet on the coasts of Queensland and New South Wales. The contrasts are also always great between the opposite slopes of the higher ranges, while in the deserts of the interior, as in the African

Fig. 159.—ISOTHERMALS OF AUSTRALIA.

Scale 1 : 45,000,000.



Sahara, the extremes of heat and cold present enormous discrepancies, according to Sturt as much as from  $16^{\circ}$  to  $122^{\circ}$  F. and even more.\*

In Australia the normal wind is the south-east trade, which prevails in the lower, while the opposite north-west trade sets regularly in the higher atmospheric

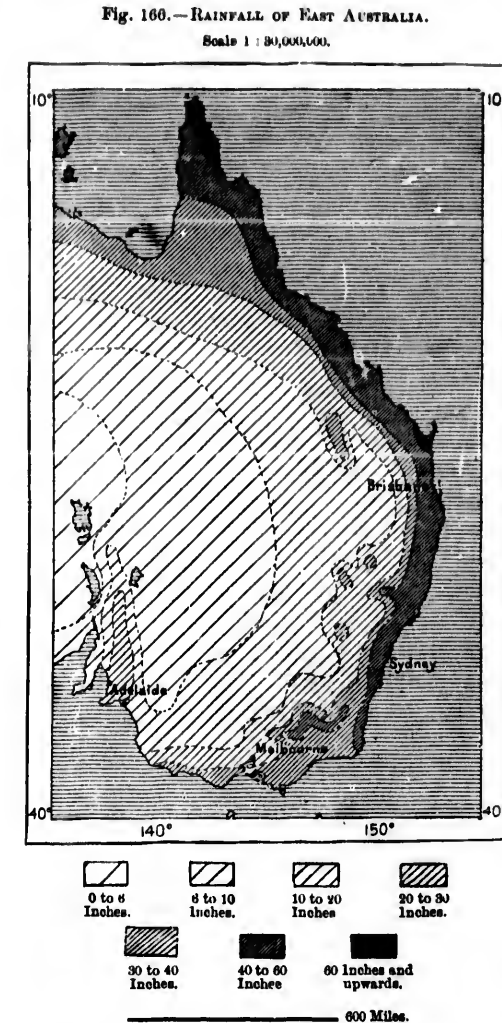
## \* Climate of various Australian towns:—

	Latitude.	Mean temperature.	Highest.	Lowest.	Rainfall.
Somerset, N.E.	$10^{\circ} 45'$ S.	$78^{\circ}$ F.	—	—	86 inches.
Brisbane, E.	$27^{\circ} 28'$	$69^{\circ} 8'$	$133^{\circ}$	$37^{\circ}$	53 "
Sydney, E.	$35^{\circ} 52'$	$92^{\circ}$	$104^{\circ}$	$35^{\circ}$	43 "
Melbourne, S.	$37^{\circ} 49'$	$99^{\circ}$	$110^{\circ}$	$27^{\circ}$	64 "
Adelaide, S.	$34^{\circ} 57'$	$94^{\circ}$	$113^{\circ}$	$34^{\circ}$	20 "
Perth, S.W.	$31^{\circ} 57'$	$88^{\circ}$	$112^{\circ}$	$32^{\circ}$	33 "

regions. Nevertheless, the regular direction of these currents is considerably modified by the great centre of attraction formed by the arid solitudes of the interior. The trades being deflected towards the coast are changed to easterly and even north-easterly winds,

while marine breezes set inland all round the sea-board. In the north-west the winds blowing from Indonesia in the winter are simply the north-east trades, which, coming from the northern hemisphere, change their direction with the change of zone.

Between these two zones of the south-east and north-west monsoons the neutral region, shifting with the seasons from east to west and north to south, corresponds in a general way with the York Peninsula. But in the south of Australia the prevailing westerly gales, which are often very strong and even tempestuous, find an unobstructed course from the Indian to the Pacific Ocean, and are consequently seldom deflected from the normal direction. On the mainland itself the changes of the dominant currents, especially in summer, are usually accompanied by sudden squalls known by the name of "busters." The barometer falls rapidly, clouds



of dust are stirred up, the storm gathers, peals of thunder echo from the welkin, and the rain comes down in torrents. In Melbourne these sudden gales from the interior are called "bricklayers," from the destructive whirlwinds of dust accompanying them. In the cultivated districts of the Australian coastlands no summer passes without several visitations of hot winds analogous in their effects to

the African scirocco. Under their action the temperature rises suddenly, both men and animals feel a sense of exhaustion, the vegetation droops, and if the wind lasts long enough the foliage becomes blighted and withers as if frost-bitten.

The rainfall diminishes rapidly from the coast towards the interior of the continent, and the quantity received by the inner slopes of the coast-ranges is scarcely more than one-half that of the slopes facing seawards. Thus the forty inches received by Sydney is reduced to less than sixteen on the western plains of New South Wales, and the supply of moisture is certainly much less in the central regions, where the winds arrive deprived of nearly all their vapours. At the station of Charlotte Waters, in the heart of the continent ( $26^{\circ} 29'$  south latitude), the mean annual discharge is only five inches, and at times a whole year passes without a single shower. Hence the greater part of Australia is too arid for European settlements, or for the development of agricultural enterprise. Nevertheless, the colonists have had the immense advantage of finding a perfectly healthy climate in all the districts where they have built their towns or established cattle farms. Salubrity remains in the eyes of the immigrants from Great Britain the special privilege of Australia, and is regarded by them as a compensation for many material disadvantages. Notwithstanding the changes required by a new social life, the Anglo-Saxon suffers no inconvenience by migrating to the Austral hemisphere, and the average period of existence is even said to be higher in his new home at the antipodes. That people advanced in years here enjoy "a new lease of life" has become a local saying in most of the settled districts.

## FLORA OF AUSTRALIA.

The Australian flora presents a highly original character. Few other vegetable zones are so well defined, offering as it does a most astonishing contrast even to that of New Guinea, from which it is separated only by narrow and shallow waters. This originality must be explained by the long ages that have elapsed since the separation of the southern continent. But it still seems surprising that a region physically so monotonous compared with Europe, and moreover of smaller extent, should possess so many more botanical forms. These are estimated altogether at about 12,250, of which number as many as 7,550 are quite peculiar to Australia. The only vegetable zones which present a comparatively richer or more varied flora are the southern extremity of Africa and the island of New Caledonia. There must be some common cause for the extraordinary concentration of distinct species in these three regions of the southern hemisphere, where the floral world appears to have increased in variety according as the lands themselves diminished in superficial area. Nor is it the tropical, but, on the contrary, the temperate part of all three zones that presents the greatest proportion of vegetable forms; and these forms are again more numerous in the arid western section than in the romantic eastern division of the Australian Continent. Hence the submergence of the land must have been greater on the side facing the Indian than on that turned towards the Pacific Ocean.

The splendour and exuberance, if not the variety, of vegetable growths depends above all on the abundance of the rainfall. Thus the lovely family of palms, which might be supposed restricted to the tropical part of Australia, seems almost independent of latitude, here following the seaboard far to the south of the torrid zone. No members of this group occur on the arid west side of the continent. A narrow belt of palms is seen only along the northern and eastern shores as far south as New South Wales, where the slopes of the hills beyond Sydney in 35° S. latitude are still shaded by the *livistona*, which here grows to a height of over 80 feet. In its palm flora, as in so many other respects, Australia resembles South Africa.

The pandanus penetrates southwards no farther than Moreton Bay, on the Queensland coast, and in general the Australian tropical is less original than the temperate flora. Numerous Indian and Malayan species give it in many places an Indonesian aspect; but there also occur in the tropical zone a few forms of quite a special character, which, however, occupy a very narrow area. Such are, near Hanover Bay on the north-west coast, those remarkable *capparis*, which grow to a considerable height, and whose branches, laden with fruits as large as coconuts, bend gracefully over in the form of a vast canopy. The stem is always inflated, bulging out like a pumpkin and giving a sickly appearance to the plant. Its fruit, however, is excellent, and the white gum obtained by incision of the bark resembles macaroni both in flavour and colour.

Amongst plants restricted to a narrow range botanists have also discovered on the New South Wales uplands some forms belonging to the north European regions. Of these Hooker enumerates 38, including varieties of the ranunculus, gentian, and myosotis. Since the arrival of the whites the vegetation has been greatly modified, and some northern forms have not only invaded Australia, but have spread thence to New Caledonia and other South-Sea Islands. According to Hooker there are at present over 200 perfectly acclimatised European plants in the Sydney district, where they grow freely without the aid of artificial cultivation.

Amongst the 950 species of trees which attain a height of at least 30 feet the most common are those with small slender leaves, throwing off but slight evaporation and affording little shade. The genus acacia is represented by no less than 320 species, some almost destitute of true foliage, but overladen in spring-time with fragrant blossom. The casuarina also lacks a fully developed foliage, but is covered with little rigid branchlets, and often presents a black, withered appearance. This family is very numerous, as is also that of the so-called grass-tree (*xanthorrhæa*), which is characterised by a large tuft of wiry, grass-like foliage shooting up from the stem, with a spike like a bulrush in the centre, which is covered in summer with a mass of white blossom.

In Queensland is met another curious forest plant, the bottle-tree, so named from its shape. But the Australian tree in a pre-eminent sense is the eucalyptus, or gum-tree, of which there are about a hundred different species. Amongst these is the famous *eucalyptus globulus*, to which have been attributed so many curative properties, and which is said to exceed all other trees in mean height, with

perhaps the single exception of the *wellingtonia* of California and Oregon. But this prerogative is by others assigned to the *Regnans* variety of *eucalyptus amygdalina*, which attains its greatest size on the mountain slopes of eastern Victoria, where trunks have been measured no less than 480 feet long.\* Gums 420 feet high are by no means rare in the gorges of Victoria and Tasmania; but farther north scarcely any are met exceeding 200 feet. Those growing on the Tasmanian uplands shoot straight up like bamboos, without any branches below a height of 50 or 60 feet. When the wind whistles through the ravines, the strips of bark hanging from these tall stems clash together with a weird, creaking sound as of moaning spirits. Growing only on the slopes of the hills, the giant gum-trees are not seen to full advantage from a distance.

In Australia there are scarcely any dense forests with a tangled growth of interwoven branches and creepers, as in most tropical regions; nor are there many woodlands with close-set stems, as in the pine and fir plantations of north Europe. As a rule, the trees lie wide apart, like those of the English parks, and beneath their shade stretches the grassy sward, where formerly grazed herds of kangaroos, now mostly replaced by flocks of sheep. Till recently these open wooded tracts covered the greater part of the western slope of the New South Wales and Queensland uplands; but farther west, towards the centre of the continent, they give place to scrub, usually consisting of thorny plants, such as acacias, dwarf eucalyptus or spinifex (*triodia irritans*), growing together in thickets. North of the 28° south latitude, where this scrub prevails, men and animals often find it impossible to make way, and many travellers, unable to force a path through the spinifex, have been fain to change their route or retrace their steps.

The dense growths of *eucalyptus dumosa*, the *mallee* of the natives, are also a great obstacle to explorers, though they may still be traversed. They have the appearance of tall bulrushes, growing to a height of 10 or 12 feet before throwing off any branches, and completely covering the ground with a uniform sea of verdure, in which the wayfarer disappears, while laboriously striving to force a passage. The cuttings made for highways across these mallee thickets are as sharp and clearly defined as those of roads flanked by walls. Of the scrubby tracts the most easily penetrated are those composed of *melaleuca*, a shrub which resembles the myrtle, and which grows in clusters with free intervening spaces. The natives of the desert regions are acquainted with a plant, the pitchouri (*auboisia hopwoodii*), whose leaves reduced to powder sustain them on long journeys, and keep off the pangs of hunger. When fighting they continually chew these leaves, which appear to have the effect of exciting their warlike spirit to a pitch of frenzy.

A beginning has long been made in the process of disafforesting Australia. About the year 1860 some stockbreeders entertained the idea of extending their grazing grounds by clearing away the forest growths that clothed the slopes of the hills. The process of felling the eucalyptus and other large trees would have been too slow and too expensive; hence the squatters had recourse to the more expeditious plan of barking the stems. This practice spread rapidly, and by 1880 at

\* George Sutherland, amongst others, declares this to be "undoubtedly the largest tree in the world."



least three-fourths of the forests in the basin of the Hunter had already disappeared. The time seems approaching when scarcely a single tree will be left in the boundless pastures of the interior. This ruthless destruction of the woodlands has had the effect of transforming the most charming landscapes into dreary monotonous wastes. But strange to say, the clearing of the forest tracts has not been followed by any decrease in the annual rainfall, while such a luxuriant herbage has been developed, that in some places a thousand sheep find an abundance of food where scarcely a hundred could formerly be kept. The eucalyptus and other trees, whose roots ramified far and wide in search of moisture, left little for the grasser, which sprang up in the rainy season and perished on the return of the droughts. Now, however, the pastures receive the full benefit of the whole supply, which sufficiently explains their improved condition.

#### FAUNA OF AUSTRALIA.

Like the flora, the Australian fauna presents a strikingly individual physiognomy, attesting the long succession of ages during which this southern continent has been separated from the Asiatic mainland. Of its 160 species of mammals scarcely any correspond with those of the northern regions, except some rats, mice, and the dingo, a half-wild dog, which probably accompanied the first human immigrants, and the remains of which are found amongst the bones occurring in former cave-dwellings. There is no elephant, no rhinoceros, no monkey, nor a single member of the feline group. The characteristic species are, in fact, mainly marsupials, which scarcely occur in any other region of the globe, except in America, where several varieties of the opossum family occupy a wide range. The fossils discovered in the Australian quaternary deposits show that at some remote period the continental fauna resembled that still surviving, but was represented by animals of far larger dimensions. The *diprotodon*, a species allied to that of the kangaroos, was nearly as large as the elephant, and others rivalled the rhinoceros in size; one variety of carnivorous phalanger was as formidable as a lion, and birds of the emu family surpassed the largest ostriches in proportions.

Of all Australian mammals the kangaroos and kindred forms are by far the most numerous. There occur some fifty distinct species of these marsupials, one of which, the great red kangaroo, is over 5 feet high and weighs as much as 225 lbs., while others are no bigger than a hare or even a rat. The other chief representative animals of the Australian fauna are the *peramelide*, locally known as "rabbits," which have the marsupial pouch like the kangaroo, but which run on all fours like other quadrupeds, and not by a series of hops on the hind legs; the *phalangers*, which live in trees and feed on leaves; the *phascolomys*, or wombat, which burrows in the ground and feeds on roots; the carnivorous *dasyuride*, with bear-like tail, which prey on mice, birds, and even small live-stock; lastly, the anomalous *ornithorhynchus*, or duck-bill, a monotreme oviparous mammal allied to the marsupials.

The Australian avifauna is very rich, comprising 630 species, or 130 more than

the European, but, viewed as a whole, it presents less marked features than the order of mammals. Doubtless Australia has its emus, its casowaries, and various species of *megalopodius*, which does not hatch its eggs, merely covering them with brushwood; but most of the birds found on this continent belong also to the Indonesian and Asiatic zones, thanks to the faculty of flight by which they cross the intervening marine spaces. Birds of graceful form and gorgeous plumage are scarcely less numerous than in New Guinea and the Moluccas; those whose food is nectar and honey are relatively the best represented, for Australia abounds in flowering trees and shrubs. Nevertheless, whole groups, such as the families of vultures, the pheasants and magpies, are absent from this region of the globe.

The crocodile is found only on the seaboard facing the Malay Archipelago, but the venomous species of snakes are very numerous. Other zoological orders, such as fishes, insects, molluscs, also present special types with a great diversity of forms, but already much modified in their general distribution since the introduction of corresponding European species. Even the forests and thickets, formerly seldom enlivened by the songsters' notes, now constantly echo with the music of the new arrivals from the mother country. Indigenous plants and animals alike have been thrust into the background by the intruding species, just as the Australian himself retires before the strangers of white stock. Not only have the English brought with them all the European domestic animals, but since 1846 they have even imported the Asiatic camels with their Afghan and Baluchi drivers. Thanks to these human and animal immigrants, accustomed to cross vast desert wastes, expeditions have been successfully undertaken, which but for them would have been impossible.

#### INHABITANTS OF AUSTRALIA.

The aboriginal population before the establishment of the first British settlements has been conjecturally estimated at from one hundred and fifty thousand to two hundred thousand. But even were it three or four times more numerous Australia would none the less have to be considered as at that time almost uninhabited, regard being had to its vast extent. All the tribal groups thinly scattered over this boundless region everywhere presented great resemblance in type and speech; hence most anthropologists agree in looking on the natives as belonging to a common stock, constituting a well-marked independent branch of the human family. Nevertheless, it seems probable that before the European immigration peoples of diverse origin, either driven before the storm or following long familiar marine routes, had reached the Australian mainland and intermingled with the primitive populations. During his exploring expeditions across the north-western regions George Grey noticed in all the tribes the presence of individuals with relatively light complexion, who seemed to wield a certain authority over their fellow tribesmen. According to Grey these warriors represented an element of Indonesian origin, and even their dogs, quite different from the Australian dingo,

resembled the Malay species found in Timor.\* On the other hand there exist in the islands of Torres Strait peoples with abundant frizzly hair, who belong probably to the same stock as the Papuans. Maer (Murray Island) is inhabited by a dark race differing in no respects from the New Caledonians.

But whatever be the origin of these contrasts amongst the natives, whether due to difference of race or to diversity of environment and social life, the ordinary type of the Australians not yet debased by a degraded existence amongst the colonists is much finer than is usually supposed. Those especially who occupy more favoured domains along the fertile river-banks are distinguished by fine figures and a well-developed muscular system, with low but broad forehead, rather flat nose, large mouth, massive jaws, brown animated eyes sheltered by very prominent superciliary arches. The natives are generally free from physical defects, and amongst those of West Australia Bishop Rudesindo Salvado noticed only four blind, but not one either deaf, dumb, or insane.

Although of dark or blackish complexion, like the Sudanese Africans, unlike them the Australians have no woolly or frizzly hair, being in this respect distinguished from all other dark races. The beard, also, is much more developed than that of the Negroes proper, while the lips are never everted so as to show the red inner skin. Their weak point are the lower extremities—spindle legs, flat calves, flat but very small feet. On the whole, they doubtless yield to the Europeans in physical strength, though not in endurance and power of supporting pain, but they are by no means the beings of grotesque and repulsive appearance as described by travellers who saw them only in the wretched hovels on the outskirts of large towns, or as depicted by the sportsmen who hunted them down like so much game. To believe some accounts, they are little better than animals, intermediate between man and the higher apes, and even more allied to the latter than the former.

On the other hand these vilified aborigines have found enthusiastic champions amongst the dominant race. Mitchell, who had taken the black Yuranigh as his guide across the tropical regions, expressly declares that the Australians of his escort were "superior in penetration and judgment" to his white assistants, although he had no occasion to complain of the latter. Yuranigh he calls his companion, his counsellor and friend, and from the physical point of view regards his superiority as self-evident. As a mere specimen of natural history, what civilised animal, he asks, could have compared with this native for the beauty of his teeth, his powerful digestion, the perfection of his organs of sight, hearing, smell, taste, and touch, his staying powers in walking, running, and climbing trees, his healthy constitution, and the intensity of his animal existence? †

As a rule the superior tribes have a coppery rather than a black complexion, while nearly all the skulls are of the dolichocephalous or long type. The aborigines appear to be most degraded physically in the arid central region, where man, exhausted and stunted by hunger and thirst, passes his days in grubbing the

\* *Journal of Two Expeditions of Discovery in North-Western and Western Australia.*

† *Tropical Australia.*

earth in quest of a few roots and of a little muddy water. Tribes are even said to exist which, together with their dogs, have adapted themselves to the use of sea-water.

The finest natives were those of the east coast, where a more beneficent nature supplied food and water in abundance, including, however, certain articles of diet calculated to excite the astonishment and loathing of Europeans. Thus Von Lendenfeld tells us that Mount Bogong takes its name from the grubs which the aborigines here collected in myriads for their daily meals.

Although numbering but a few thousand souls, the Australian race is divided into hundreds of tribal groups. In certain districts there are as many languages as communities or scattered family circles. In others, again, the native idioms present great uniformity throughout considerable tracts of country. Thus from the banks of the Hawkesbury to Moreton Bay, a distance of about 350 miles, the natives have little difficulty in conversing together; so, also, those of the south-west coast, between Hamalin Bay and King George Sound, speak closely related dialects. Another extensive linguistic zone comprises the whole region between Cooper's Creek and the Middle Darling, a space of over 40,000 square miles, and this surprising uniformity of speech is attributed to the extreme dryness of the land, which obliges the tribes to gather round the watering-places in summer, suspending all hostilities, and for the time being merging, as it were, in a common nationality.

On the other hand, the tribes of the Lower Darling, where there is never any lack of water or vegetation, have been able to keep aloof for long ages, and their languages have consequently become greatly diversified. The fact is evident from the very names of the different peoples in this region, all of which have exactly the same meaning, though often differing altogether in form. Such are the Baraba-Barabas, the Wati-Watis, the Waiki-Waikis, the Lichi-Lichis, the Darti-Dartis, the Yari-Yaris—terms meaning "No-No," just as by an analogous mental process mediæval France was divided into the Langue d'Oui and the Langue d'Oc. The rapid divergence of the local dialects is also partly due to the respect paid to the dead requiring the survivors to taboo for a time, and even for ever, a large number of words which bore or seemed to bear a certain relation to the deceased either in sound or sense.

But, however they may differ from each other outwardly, all the native idioms present some common points of resemblance. They are polysyllabic and agglutinating by means of harmonious suffixes abounding in vowels. Aspirates are slightly developed, the sibilants are completely absent, and the accent falls usually on the penultimate syllable. Onomatopœic terms are very common, and all objects perceived by the senses are indicated by numerous synonyms, or at least by what pass as such amongst strangers interrogating the natives. But on the other hand, these primitive tongues are extremely poor in abstract expressions, as well as in the names of numerals. Scarcely any appear to have distinct terms for more than *one* or *two*, while probably none of the tribes can count beyond five.

In the absence of accurate knowledge attempts have been made to classify the

Australian languages on the ground of a few common points of resemblance, but these attempts have not proved very successful, often yielding the most contradictory results. In any case the Tasmanian idioms, of which a few vocabularies are extant, are regarded as forming an independent group. The islanders themselves were evidently of a different stock, and much more closely allied to the Melanesians than to their Australian neighbours.

To the great physical differences of the aborigines correspond moral traits of a no less divergent order. Hence the varying and even contradictory reports of observers, some of whom vaunt their native pride, courage, and respect for their pledged word, while others describe them as cowards, liars, and traitors. One of the most common charges urged against them is their cruel and oppressive treatment of the women, and in most communities this accusation is only too well founded.

Instances are not lacking of women who have acquired a certain moral ascendancy in the tribe, but as a rule they fare little better than slaves. Not only are they forbidden to eat in the presence of men, but many kinds of food are denied them, while they are required to show in speech and attitude a sort of adoration towards their masters, the least inattention being visited with the severest castigation. The husband may kill and even burn his wife, her friends and relations being powerless to interfere on her behalf. He may throw her body to his dogs, because the wife is his property, which he has the right to use or abuse at his pleasure. Nevertheless, traces still survive in Australia of a primitive matriarchal system, and even now name, kinship, rank, and fortune are for the most part transmitted through the female line.

Polygamy prevails amongst the native populations, and in the north-western districts cases occur of powerful tribesmen acquiring as many as ten wives. In some communities exogamy is strictly observed, all marriages contracted with women of the same class being regarded as incestuous, yet amongst others unions between near relatives are held in honour. In one place marriages are effected by a real or simulated abduction, in another the only formality is the payment of the contract price.

This purchase of the women by the strong and wealthy members of the community has the effect of condemning the poor and the young men to a state of celibacy, or obliging them to put up with the divorced wives of their elders. The dearth of wives amongst most Australian populations is all the greater that the women are far less numerous than the men; not, however, because female births are rarer, as has been asserted, but because during their short existence the women are exposed to many more dangers, such as premature confinement, excessive hardships, bad treatment, night attacks, and the like. Amongst many tribes infanticide is common, and as a rule it is the girls who are removed either by being buried alive or knocked on the head immediately after birth.

Children who survive the perils of infancy are treated with much kindness; they are never beaten and grow up freely to man's estate, following their elders to the chase and war. Nevertheless they have to undergo the severe trials of the

*bora* before being admitted as equals into the society of the men. In a large number of tribes two incisors of the upper jaw are broken or extracted. Most of the youths are subjected to circumcision, or else to various kinds of extremely painful mutilations. They are also required to run down a kangaroo in the chase, to remain alone in the forest without food for several days at the risk of their lives, to endure horrid tortures without wincing, and so on. Amongst the Kurnai of South Australia these probations end in a magnetic sleep, after which the youths wake up "men." Then at last they are entitled to wear the girdle, bracelets, the frontal band, and other ornaments, indicating that they have reached the virile state.

These initiatory ceremonies are usually concluded with a *corrobori*, or tribal gathering, held during the full moon, combining the administration of justice, parliaments, solemn treaties of alliance, and concluding with theatrical representations, midnight dances, feasts, and orgies. Once initiated, the youths may take part in the songs, dances, and oratorical displays. As members of the clan they are branded on the breast or thigh with the *kobong*, that is, the national emblem, some plant or animal, like the totem of the North American Redskins. But these emblems are at times insignificant enough, a simple ant or spider, or other small insect. The person so marked must henceforth show his respect for the talisman that symbolises the family group, holding himself as the inseparable companion or kinsman of all bearing the same totem, as well as of all natural objects associated with his particular *kobong*. Thus during the funeral rites care must be taken that the body be buried under a tree regarded as belonging to the same clan.

Tattooing is often limited to the figure of the *kobong*, but in some tribes the body is covered with symmetrical scarifications of a rude design, incised by means of sharp shells. On the north-east coast the natives also follow the Papuan custom of piercing the cartilage of the nose and introducing a bit of stick or a kangaroo bone, which impedes the respiration and obliges those so adorned to keep the mouth open. According to the various occasions of war, feasts, or mourning they paint the face and body in red, yellow, white, or black colours. White is an indication of grief, while red is the sacred colour reserved for the great events of the tribal life.

Before the arrival of the Europeans the natives of the tropical regions went naked, or restricted their attire to a few rags or waist-bands of fibre, while in the colder southern districts the women wore a smock or tunic of kangaroo skin. The northern tribes still paint the face and body in various colours, and near Port Darwin the white streaks traced on the black ground of the face give from a distance the effect of a death's head. But the form and pattern of dress and ornament, as well as of the dwellings, vary endlessly. In one place the only shelter are the natural caves and rocks, in another a screen of foliage, hovels, and even rude stone structures. The weapons also differ greatly, though the most prevalent are spears, clubs, and darts with fish-bone or flint heads. In certain districts the aborigines still make use of unpolished stone hatchets, but the bow and arrow are unknown, except along a small strip of the east coast.



succeeded in domesticating. Nevertheless, industry has been so far developed among certain tribes that they appreciate the advantage of taking foreign articles in exchange for skins, nets of vegetable fibre, spear-heads, diverse pigments, and other native produce. This intertribal commerce is carried on through the so-called *ngalla watos*, who are solemnly elected to the office, and who act as mediators between their own and other tribes whose languages they speak. Thanks to certain pass-words, signs, and "writing sticks," they are able to present themselves everywhere with confidence, their person being sacred even in time of war.

The remarkable development of certain Australian tribes is shown especially by their knowledge of the starry firmament. They give to the different constellations the names of legendary heroes, and are able exactly to describe their position according to the eight points dividing the sphere. The path of moon and stars enables them to determine the hours with great accuracy, although the poverty of their idioms in names of the numerals prevents them from having any exact sense of measure, and from combining the primitive elements with sufficient skill to develop a rudimentary geometry. They acquire languages with remarkable facility, and in the mixed schools where the native children are seated by the side of the whites, the latter are not always at the head of the class.

Their linguistic faculty is probably due to the extreme delicacy of their sense of hearing. They have no musical instruments except rude drums of kangaroo skin, and in some of the southern tribes a kind of flute on which they play with the nose. But singing is much practised in joy or grief, during the fury of battle, or even to allay the pangs of hunger. Events interesting to the community are also commemorated in song. Like the South African bushmen, to whom they have often been compared, they are fond of figuring human faces and animal forms on their skin garments, on the bark of trees and the face of the rock. The paintings seen by Grey on the banks of the Glenelg in the north-west were in diverse colours, black, red, yellow, white, blue, coated over with a gum which while enhancing the brightness of the tints protected them from the weather. Certain figures reproduced by Grey recall those of Byzantine saints surrounded with their luminous nimbus. This traveller also noticed a head in relief remarkably well sculptured on a sandstone rock.

In the central parts of the continent the most conspicuous objects are images of snakes done in charcoal or painted with ochre. Grey also mentions certain designs traced on a person clothed in a long red robe, which so closely resembled written characters that it was impossible not to associate the representation with the idea of an inscription. It would seem natural to attribute such designs to some casual visitors from the neighbouring Eastern Archipelago, but for the fact that the less rudely executed figures were precisely those which were discovered farthest from the coast. Figures, however, have also been found carved on the surface of the rocks far to the east both in Queensland and New South Wales.

Funeral rites vary to a surprising degree from tribe to tribe. In one district the dead are burnt, in another they are buried or else exposed on rocks or the branches of trees. In South Australia they are interred with the head turned



towards the rising sun, and a fire is then kindled near the grave to scare away the evil spirits. In the York Peninsula they are placed on the headlands, and a terrace on a rocky islet at the very extremity of Cape York is covered with an enormous pile of skulls enclosed by a fence of stones and surmounted by a stout bamboo cane. No more solemn site or more in harmony with a deep poetic sentiment could have been chosen for the necropolis of the community.

Amongst numerous tribes, especially in the northern regions, the mother cuts off a finger at the death of each child. Elsewhere the obsequies are accompanied by cannibal scenes. When a man dies young or through old age his nearest and dearest consider themselves bound to eat him in proof of their affection. In South Australia, also, the child dying of any illness is devoured, the mother taking the head in the hope of thus restoring the lost one to life; but in other tribes she is condemned to keep with her the dead body of her child for months together. A common practice is also that of consuming the enemy killed in battle, the motive being to acquire their strength and valour, and to prevent their shades from avenging their death. But in order to achieve this object all that is needed in certain districts is to eat the kidney fat, which is regarded as the seat of the soul. Elsewhere the same purpose is secured merely by consuming the eyes, in which shone the rage of battle.

The Australians believe in charms, incantations, and miracles. No malady but has been caused by some hostile magician; no cure but has been effected by a beneficent wizard. The universe is full of spirits and genii, some wandering about in pain and seeking to reoccupy some new body, others animating the trees and rocks, heaven itself, the storm, clouds, and stars. But the natives do not appear to have idols properly so called, though all their surroundings are objects of worship; in everything they see some formidable or benevolent being, who must be invoked to appease his wrath or secure his aid. The moon-god especially seems to be a potent deity, more powerful than the sun-goddess; for he is born again each month to beget the stars, trees, animals, and men. Thanks to the action of the Christian missionaries the various national myths have gradually assumed a certain biblical aspect, so that some writers have discovered a distant resemblance between them and the Mosaic records.

Few Australian tribes show even the rudiments of a state in their political organisation. Amongst these mention is made of the Narrinyery people of Murray River, who, according to Taplin, have elective "kings" assisted by a council of elders; but such constitutions are rare, and their existence is absolutely denied by Curr. In any case each head of a family has almost complete control over the destinies of his domestic group. Doubtless the *balyas*, or sorcerers, exercise great influence, and this influence combined with that of age at times secures them real political power. But these are all exceptional cases, and it seems safe to assert that there is at all events no transmission of authority from father to son or through the female line in any Australian community.

The universal rule is equality of rights for each family as well as for each tribe. In time of peace all were held to be of equal worth; but in the course of

ages particular groups had devoted themselves to some special industry which rendered them necessary to the others. One found within its territory an excellent material for the manufacture of stone hatchets, and thus acquired perfection in that art; another supplied the best boomerangs, or the finest kangaroo skins, and so on.

But throughout nearly the whole of the Australian world the history of the aborigines is already a thing of the past. The race itself is steadily decreasing and dying out. Even the few that still survive are being rapidly transformed by crossings and the adoption of a settled existence. In many districts more than half of the population has been swept away by the diseases introduced with the Europeans, and especially by small-pox, the invasion of which coincided with the landing of the first convicts at Botany Bay. Besides small-pox, whose ravages were continued down to the year 1840, there are other influences at work, some even within the tribes themselves. Such are the monopoly of the women by the old and rich, infanticide and abortion; but most of all is the irresistible advance of the European settlers, driving to the background the primitive populations which at first regarded these "white men" as their kinsmen returning from the world of spirits. Thrust back towards the wilderness the natives find themselves deprived of their rich hunting-grounds, and many, conscious of the doom pending over them, give up the struggle for existence, and even refuse to perpetuate their race. How could it be otherwise when certain colonial magistrates declare all those to be marauders and poachers who persist in remaining on the territory of their forefathers?

The very appearance of European cattle is already the death-knell of the aborigines, for this is followed by the extermination or disappearance of the kangaroo, and the native hunters finding no more game are obliged also to retire or perish of hunger. In sixteen months as many as 220,000 kangaroos were killed in the single Queensland district of Warwick. But a war of extermination is waged not only against the native game, but also against the natives themselves. On the borders of many estates, notably in Queensland, which stretches to the confines of the desert, the sheep farms are guarded by mounted police—Australians, Melanesians, or Kafirs—who are instructed to fire on the independent blacks and thus relieve the peaceful squatters from "these troublesome loafers."

The island of Tasmania has already been completely "cleared" by the systematic destruction of its primitive inhabitants, who were estimated at about seven thousand on the arrival of the whites, and who were said to be of a remarkably gentle and kindly disposition. On December 28th, 1834, the last survivors, hounded down like wild beasts, were captured at the extremity of a headland, and this event was celebrated as a signal triumph. The successful hunter, Robinson, received a Government reward of 600 acres and a considerable sum of money, besides a public subscription of about £8,000.

The captives were at first conveyed from islet to islet, and then confined to the number of two hundred in a marshy valley of Flinders Island, washed by the stormy waters of Bass Strait. They were supplied with provisions and some lessons in the catechism; their community was even quoted as an example of the

progress of Christian civilisation. But after ten years of residence in this place of exile more than three-fourths of the natives had perished. Then pity was taken on them, and the twelve surviving men, twenty-two women, and ten children, nearly all half-breeds, were removed to a narrow promontory at Oyster Cove near Hobart, and placed under some keepers, who enriched themselves at their expense.

In 1860 the Tasmanian race was reduced to sixteen souls, in 1869 the last man perished, and in 1876 "Queen" Truganina, popularly known as Lalla Rookh, followed her people to the grave. But there still survived a few half-castes, and

Fig. 162.—LALLA ROOKH, THE LAST TASMANIAN.



in 1884 a so-called "Tasmanian" woman obtained a grant of land from the colonial parliament.

On the Australian mainland, also, most of the coast tribes have disappeared. Of the one thousand five hundred natives occupying the Botany Bay district in 1788 not a single descendant can be found, and in the settled districts where a few of the aborigines still linger, all tribal grouping has been effaced. At the census of 1881 the total number in the colonised territory was estimated at some thirty thousand. Since then there has been an apparent increase in some of the colonies, which is explained by the fact that the frontiers have been enlarged so as to include a few hundred tribes till recently independent, and consequently not included in the earlier returns. Nevertheless, some recent statistics seem to show

that there has been a real increase either of the pure or the mixed aboriginal elements in certain "reserves," where the natives are treated with kindness. In the arid regions of the interior beyond the districts settled by the whites the aborigines are probably even less numerous than in the vicinity of the seaboard. The mixture of white and native blood produces an intermediate race of fair proportions and comely appearance.

At present the colonists of European birth and descent have become absolute masters of the continent, where they are already at least fifty times more numerous than the aborigines. But their beginnings were lowly enough, and whereas the inhabitants of other countries delight in celebrating the heroic virtues of their forefathers and predecessors, the present citizens of the Australian states prefer to trace their descent, not from the first arrivals, but from later immigrants. Those first arrivals were in fact convicts, who, to the number of seven hundred and eighty-seven, were transported in 1778 to Botany Bay, and thence soon after removed to a more favourable locality on the south side of Port Jackson. But the experiment to found a colony with elements drawn from the criminal classes was attended with little success. The prisoners, treated with excessive rigour, especially under the administration of Bligh, thought only of escape, and thousands perished in their repeated attempts at revolt or flight. Large numbers, however, succeeded in reaching the inland tribes, and although many were devoured by the natives, others rose to positions of authority and became tribal chiefs, while some played an historic part as conquerors of archipelagoes in the South Seas.

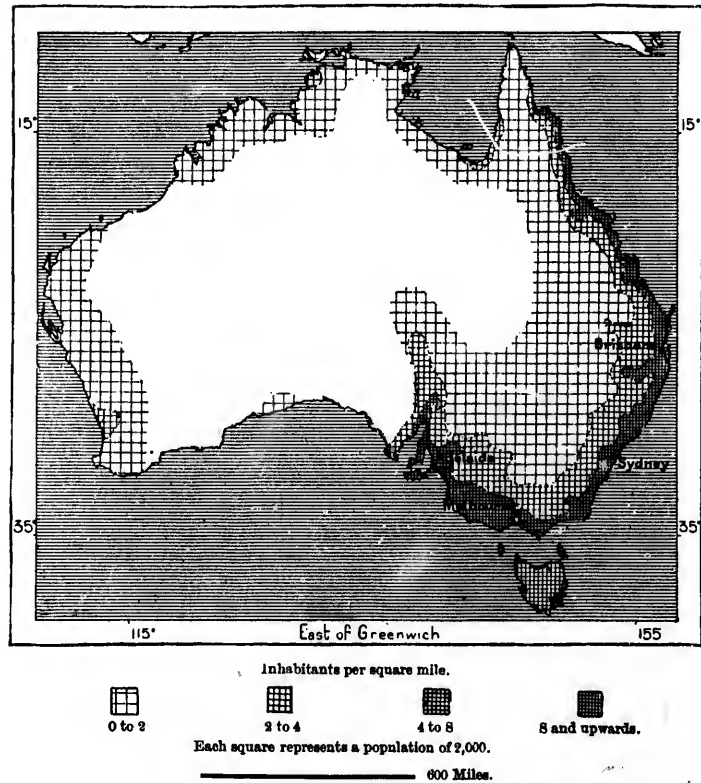
Between 1778 and 1820 Australia received from the mother country 28,878 convicts, of whom not more than 3,661 were women. During that period the births did not exceed 1,500, and so far from becoming self-supporting, these involuntary immigrants cost the British Government about £600,000 annually. But a new era opened for the Australasian world with the introduction of free immigration in the year 1820. The new settlers soon began to protest vigorously against the continuation of the system of transportation, and in 1840 their efforts were crowned with success, at least in the eastern provinces, for Tasmania continued to receive convicts till 1853, and West Australia till 1868. At present the original convict element may be regarded as completely merged in the rest of the population, and all sense of humiliation associated with the early penal settlements has entirely disappeared.

The white population, which had hitherto increased at a moderate rate, received a tremendous impulse by the discovery of the gold-fields about the middle of the century. Since that time it has been multiplied tenfold, rising from three hundred thousand to considerably over three millions in 1889. The mining element consisted for the most part of adult males, while other fortune-hunters, traders, artisans, or tillers of the soil, arrive in large numbers without families. Hence the discrepancy between the sexes is all the greater the more copious is the stream of immigration. In Queensland, which receives the largest influx of settlers, the women are least numerous, whereas the equilibrium is already nearly re-established in South Australia, towards which the tide of immigration has almost ceased to flow. From

year to year the disparity diminishes, because the excess of births over the mortality, which is much higher than in most other civilised lands, acquires more importance the more the general population increases. This excess is already greater than the whole number of immigrants, and thus are gradually re-established the normal conditions. It is also noteworthy that the mortality is far less amongst

Fig. 163.—DENSITY OF THE AUSTRALIAN POPULATION.

Scale 1 : 30,000,000.



the women than the men, so that by the end of the century the Australian population, like that of Europe, will show a slight predominance of the fair sex.

In the movement of immigration the part taken by the English, Scotch, and Irish preponderates to such an extent that all other ethnical elements may be regarded as of no account. Language, institutions, usages, all is English, and in some places even more English than in England itself.\* Many Australians take a certain pride in resisting the current of modern ideas prevalent in the mother country, although their new environment obliges them to strike out fresh paths, severing

\* Froude, *Oceana*; Anthony Trollope, *Australia and New Zealand*.

them gradually from their European fellow-citizens, and bringing them somewhat nearer to their North American kinsmen, whom they resemble in figure, bearing, and even features.

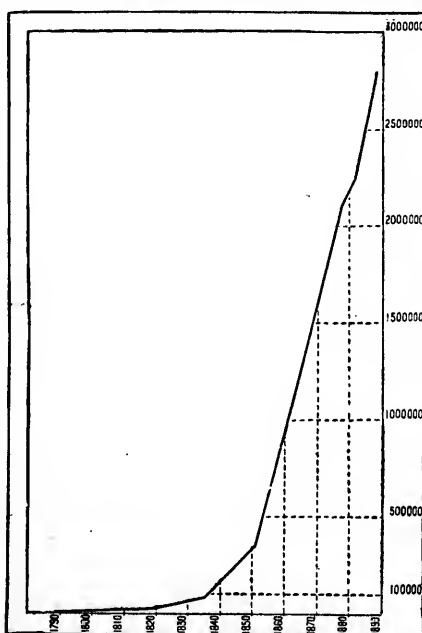
The German settlers, although numerous, are nowhere grouped in sufficient masses to enable them to live apart from the English, and, in fact, they become rapidly absorbed in the surrounding Australian populations. On the other hand, the Chinese, formerly introduced in large numbers by capitalists to work their plantations and mines, had begun to form a powerful class, which threatened to drive the white workmen out of the labour market. But the national antagonism aroused by these conflicting interests, by the "yellow danger," as it is called, has had the result of rendering a residence in Queensland and the other Australian colonies almost impossible for the "Celestials." Thousands have had to leave the country, while recent laws passed in contravention to the treaties concluded with China, prevent them from landing, except on payment of a heavy fine, besides imposing on them all sorts of vexatious burdens.

As in all modern colonies of an industrial character, the immigrant populations have been to a large extent centred in the towns, and owing to this tendency the cities of Sydney and Melbourne alone contain nearly a third of the whole Australian population. Yet it is from the land that the settlers in this new world derive their chief resources. A comparative study of the ample statistics now available

for the various provinces shows what an important economical position is already occupied by the Australian colonies. Although the vast domain belonging to the Crown has only been utilised to a relatively small extent, considerably over 100,000,000 acres had already been disposed of to private individuals at the end of 1886, and either brought under cultivation, or devoted to stock-breeding, and especially sheep-farming. Artesian wells, sunk in many of the inland regions, have tapped the underground reservoirs, and transformed extensive arid wastes into good grazing grounds; projects are also being entertained for husbanding the surface waters by means of dams and other hydraulic works.

Australia is the first wool-producing country in the world, ranking in this

Fig. 164.—INCREASE OF THE AUSTRALIAN POPULATION.



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respect even before the United States, the Argentine Republic, and Russia. The wool yielded by its twenty-four million sheep being of the finest quality, commands the highest prices in all the markets of the globe, and represents an annual value of about £20,000,000. The stock-breeders also own large herds of cattle, excellent horses and swine, yielding for the export trade considerable quantities of hides, suet, fat, tinned meats, and since 1882 frozen carcasses. The Australian dingo is much dreaded by the sheep-farmers; for he regards the flock as so much game, killing all he cannot devour; whole folds have been destroyed by the depredations of this animal, which, however, is rapidly disappearing with the natives themselves. The fox has also become dangerous; but the great scourge of the stock-breeders is the rabbit, which, once imported from Europe, soon found a congenial home in the rolling, grassy, and flowering plains formerly tenanted by the kangaroo. Here the coney has multiplied to a prodigious extent, and although at least fifty millions are yearly destroyed by the shepherds and their dogs, he encroaches more and more on the pasturages to the great detriment of the live-stock. To get rid of this pest several plans have been tried or suggested, amongst others the complete enclosure of the grazing grounds, and the systematic extermination of the does, thus arresting the propagation of the species. Experiments have also been made at Rodd Island, near Sydney, with "chicken cholera," inoculated according to the Pasteur method, in the hope that the rabbits themselves will spread the contagion. But fears have been expressed that the disease may thus be gradually disseminated among the domestic animals.

In 1888 the arable lands comprised a total extent of nearly 8,500,000 acres, yielding a relatively high proportion of produce, which is largely required for the local consumption. But Australia has already begun to take a prominent position amongst countries exporting wine, sugar, and tobacco. Some of the vintages have even acquired a certain reputation, and the burgundies especially shown at the Paris Exhibition of 1889 were much appreciated by French connoisseurs. Other classes of wine, such as bordeaux, champagne, moselle, port, are also successfully grown; but the vineyards have unfortunately begun to suffer from the ravages of the phylloxera.

Cereals and other alimentary plants are chiefly grown on small holdings, while the Queensland sugar plantations, like the pasture lands of the Darling and of other regions lying beyond the east coast-ranges, are for the most part in the hands of large land-owners. Despite the laws limiting the extent of land which one person may purchase, or rent for seven, fourteen, or twenty-one years, the tendency in Australia, as in the mother country, is in the direction of vast landed estates. In New South Wales the smallest plot offered for sale is about forty acres, but in some of the colonies allotments of 2,500 acres may be purchased, and syndicates have been formed for buying or renting far more extensive holdings. Certain estates, sheep-runs, or sheep-walks, as they are called, are laid out in the central part with a park, gardens, and a magnificent residence with turrets, galleries, and conservatories, for the squatter is the true Australian aristocrat, a wealthy citizen, owning sheep by the hundred thousand, administering his

domain through agents, and residing in the coast towns, or even in London or



Fig. 165.—ENCAMPMENT OF AUSTRALIAN SQUATTERS.

Paris. Thus it has come about that the land is already largely monopolised by a





the New South Wales coal-fields yield in importance only to those of West Europe, the United States, and Russia. The coal-mines increase in value according as those of gold fall off, and to them, combined with sheep-farming, New South Wales is indebted for the first place which it now holds amongst the Australian colonies. The silver-mines have but slight economic importance, whilst the salt lakes are scarcely utilised at all, as they yield only an inferior article full of impurities.

The Australian manufacturing industry differs in no respect from that of Great Britain, so far as regards the raw materials and mechanical processes; but it is not yet sufficiently developed to give rise to any considerable export trade to the surrounding oceanic world. The country offers little beyond agricultural and mining produce in exchange for the manufactured wares imported almost exclusively from England, and for the teas received from China. But the total value of this commercial movement is prodigious, regard being had to the relatively slight population of the continent. Amongst trading lands Australia takes a first rank for the value of its exchanges compared with the number of its inhabitants. In this respect, however, the inter-colonial traffic is reckoned as so much foreign trade, because the custom-house tariffs differ in the different states, and are even regulated with a view to protecting special industries against the competition of neighbouring provinces.

This local and foreign commerce employs thousands of vessels, constantly plying along the seaboard and on the highways of navigation converging from all quarters on the periphery of the continent. The main lines of oceanic steamships subsidised by the British Government maintain the communications between the great seaports of the British Isles and the Austral regions; foreign steamers, also, such as those of the French Messageries and the German Company, touch at the more important Australian ports. Thanks to the combined service of steam navigation and railways, letters have been received in Adelaide from London within twenty-seven days. The colonies have also developed a considerable local shipping, and the mercantile marine registered in the various seaports already equals that of several European trading countries, such as Austria-Hungary and Greece.

In the interior of the continent railways have been constructed between all the large towns of East Australia, and the completion of the viaduct across the Hawkesbury river now places Adelaide in uninterrupted communication with Brisbane by a straight line over 1,700 miles long, or as far as from Paris to Moscow. West Australia at the south-west corner of the continent also possesses a few short lines and has just begun the vast undertaking of a coast railway to connect King George Sound with the South Australian system. The government of the latter colony on its part is pushing forward the construction of a trans-continental line between Adelaide in the south and Palmerston on the north coast. Tasmania also is adding a few branches to its main line between Launceston and Hobart. With the exception of a few mineral and other industrial lines all the Australian railways belong to the several colonies whose territory they traverse.

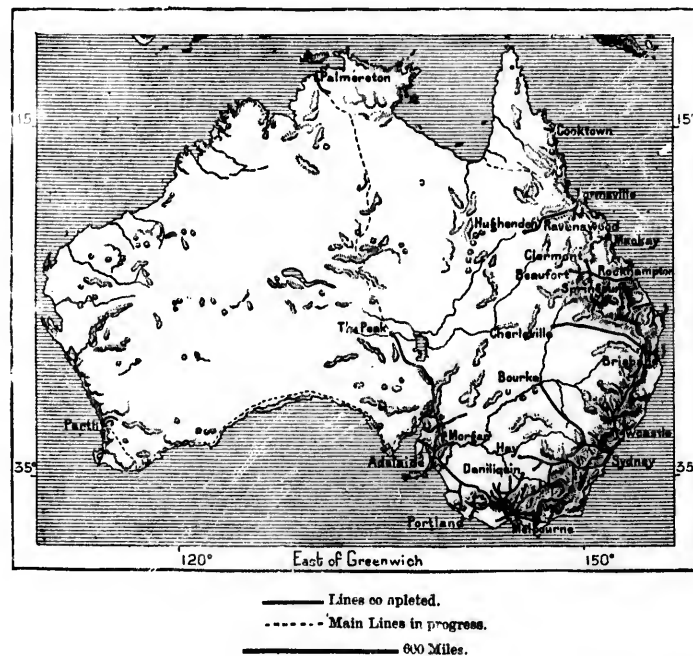
The telegraphs, which are also maintained by the national budget, connect all

the colonies with each other, as well as with New Zealand and Java. Two submarine lines will soon be laid from Ceylon to West Australia, and from Sydney to Vancouver Island on the Pacific coast of British North America, and thus will be completed the electric circuit of the English colonies round the globe.

Education being compulsory and free, at least in the Government schools, all children pass a few years in the public schools. The average standard of instruction is even higher in Australia than in England, and as a rule girls attend school longer than boys. The expenditure for educational purposes is very high, amount-

Fig. 167.—AUSTRALIAN RAILWAYS AT THE END OF 1887.

Scale 1 : 40,000,000.



ing in 1885 to £5 for each pupil. The Australian press comprises about 800 newspapers and other periodical publications.

At present Australia constitutes five, and with Tasmania six, separate colonies or states. According to the date of their foundation, their economic interests, and the influence of dominant political parties, these various states frame for themselves different constitutions; but all require their fundamental enactments to be ratified by the British Government, and also receive as governor a direct representative of the Crown. Nevertheless a recent controversy between Queensland and the metropolis on the appointment of a governor resulted to the advantage of the colony. In the two states of Victoria and Tasmania the institutions are demo-

cratic, and the two chambers are elected by universal suffrage, applied in such a way as to give a proportional representation to minorities. In New South Wales and the other states the upper house is either entirely or partly named by the Crown.

According as they grew in power and wealth the Australian colonies felt the need of drawing closer the bonds of union. A federation, authorised beforehand by the Imperial Parliament, has been projected for the purpose of amalgamating the states under the suzerainty of England, and safeguarding the common interests on the mainland and in the South Sea Islands. But certain questions of

Fig. 168.—AUSTRALIAN COLONIES.

Scale 1 : 44,000,000.



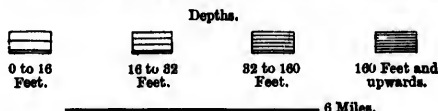
rivalry and precedence have hitherto prevented the definite constitution of the future federal state of Australasia, which must establish the absolute and permanent dominion of the Anglo-Saxon race in the oceanic world. Albury, on the Murray, about midway between Sydney and Melbourne and on the common frontier of New South Wales and Victoria, seems destined by general consent to become the metropolis of the rising empire. In anticipation of its future rank it has already been named the "Federal City," although it is still possible that this high honour may fall to the share of another place.

To the first conference held in 1886 at Hobart, New South Wales, South Australia, and New Zealand had sent no delegates, although the Fiji Archipelago

was adequately represented. But in 1888 a second conference, attended by delegates from all the Australasian states, discussed the establishment of supreme tribunals for the whole group of colonies. South Australia also, hitherto opposed to all projects of federation, has recently joined the movement. Australia naturally looks forward to the time when the confederation will be joined not only by British New Guinea and Fiji but by all the Pacific islands already acquired or to be acquired by Great Britain, and thus secure an uncontested hegemony throughout

Fig. 169.—KING GEORGE SOUND.

Scale 1 : 250,000.



the southern hemisphere. In many instances, notably during the recent discussions with France on the subject of the New Hebrides and the transport of convicts to New Caledonia, it became evident that the Australians aspire soon to be masters in the Austral regions, and proclaim, like the North Americans, their "Monroe doctrine"—the Oceanic World for the Oceanians.

As a military power Australasia would already present formidable difficulties to a foreign invader, for the adult population between their twentieth and fortieth year exceeds half a million of men thoroughly organised in volunteer corps, which

the coast railways might rapidly concentrate on any threatened points along the seaboard. Moreover, the three strategical positions of King George Sound at the south-west corner of the mainland, the entrance to Port Jackson at Sydney, and some islands in Torres Strait, have been strongly fortified. A fleet of gunboats, torpedoes, and swift cruisers guards the approaches of the seaports, while recent conventions with England provide for a rapid increase of the Imperial navy. In 1888 over £800,000 were voted for the coast defences and the construction of forts.

Financially Australia is heavily burdened. The possession of seemingly inexhaustible gold-fields fostered a spirit of extravagance to such an extent that the public liabilities, head for head of the inhabitants, are already higher than those of France. But this incumbrance is much less felt, thanks to the rapid development of the population and of the resources of the land. The annual increase of the population exceeds a thirtieth, while that of the national wealth is still more rapid; yet the demon of pauperism has already raised his head in Australia.

A table of the Australian states, with their respective areas and populations, is given in the Appendix. The administrative subdivisions differ in the various colonies, and even in each state, according to the density of the population and the several political and economic interests. They take the various names of counties, boards, shires, municipalities, boroughs, electoral and pastoral divisions.

## WESTERN AUSTRALIA.

This colony, the first Australian land sighted by vessels arriving from Europe, is the least populous and the least important of all the Australasian states, although its territory comprises about one-third of the mainland. It was founded over half a century ago in 1829, yet its residents of European origin scarcely exceed forty thousand and may possibly be still surpassed numerically by the natives, whose tribes continue to form relatively compact groups in the north western districts. In 1850, when the colony had no more than six thousand inhabitants, the British Government made it a penal station, and by the year 1868 nearly ten thousand convicts had been introduced into Western Australia.

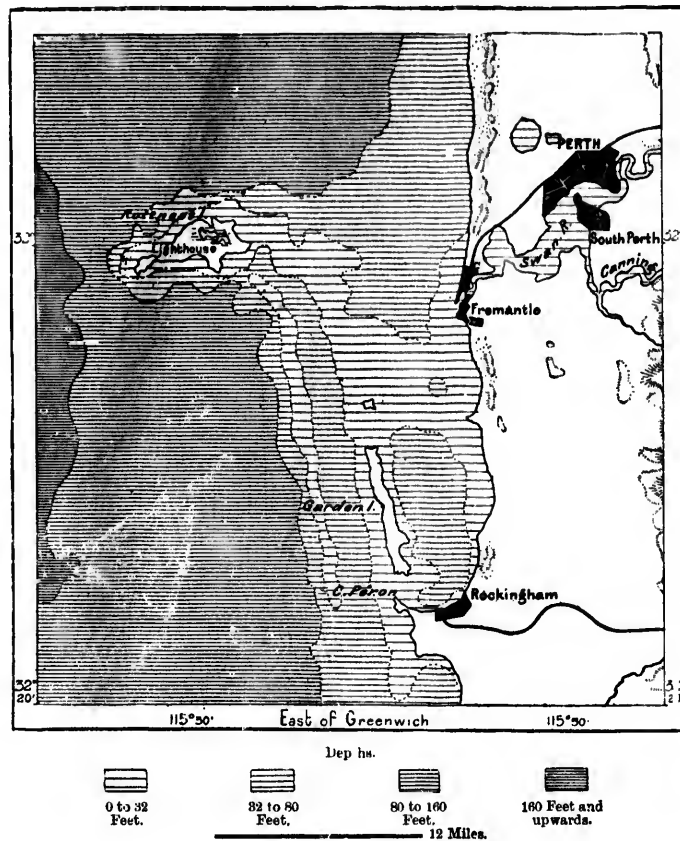
But despite, or possibly in consequence of, this continuous stream of involuntary colonists, the population increased very slowly until a decided stimulus was given to the movement by the discovery of auriferous deposits in the part of the territory situated between the Irwin and Murchison Rivers. The reluctance of intending colonists to turn their steps towards Western Australia was, however, mainly due to the dryness of the climate, the arid soil, brackish waters, and inferior pasturages infested in several districts by poisonous plants. The greater part of the colony, which stretches north and south from shore to shore, and eastwards to 129° east longitude, is even still unexplored. The settled parts are, in fact, chiefly situated in the south-west corner of the continent and along the lower reaches of the coast streams, which follow in the direction of the north beyond Perth. Western Australia is thus an isolated world separated by vast desert

spaces from the other Australasian colonies, with which it communicates only by sea. The dangerous overland routes across the intervening solitudes still rank with those rare and daring exploits which are recorded in the annals of geographical exploration.

The centre of the colony is the city of Perth, which has been founded 12 miles from the coast on the banks of the Swan River, at a point where it expands into

Fig. 170.—PERTH AND ITS ENVIRONS.

Scale 1 : 600,000.



the form of a lake. This modest capital is connected by road and rail with its seaport of *Fremantle*, which lies on the south side of the Swan estuary; but there is no natural harbour and the open roadstead is so unsafe during the prevalence of the north and north-west winds that the shipping has at times to take refuge farther south in Cockburn Sound between the coast and *Garden Island*. Nevertheless, Fremantle is the busiest port in the colony, and here are shipped the

wools, which have hitherto formed the chief resource of Western Australia. *Rott-nest Island*, which partly shelters Gage Road on the west, is fringed with salt beds worked by the convicts and natives for the Government. Farther north follow the three ports of *Rockingham*, *Bunbury*, and *Busselton*, from which is mainly exported the jarra-wood (*eucalyptus marginata*), which is highly valued by ship-builders and others for its durable properties and power of resisting the action of termites and borers.

In the north-east the Perth railway is continued up the Swan Valley towards *Guildford*, *York*, and *Beverley*, flourishing agricultural centres surrounded by pastures and scrub, where sandalwood formerly abounded. A carriage road 250 miles long, running south-eastwards to a great extent through barren wastes, places Perth in communication with *Albany*, almost the only seaport on the south coast. The lack of arable lands in the neighbourhood of this place prevents it from developing as rapidly as might be expected from its excellent harbour of King George Sound at the south-west angle of the continent. Albany is a port of call for steamers plying between England and Melbourne, and the terminus of the cable connecting the telegraphic system with the rest of the world. The British and Australasian Governments are at present occupied with the construction of fortified works around this important strategical point on the south-west coast. In 1826 the Governor of New South Wales stationed a small garrison here to prevent its seizure by the French after the systematic survey of the seaboard by Baudin and Freycinet. French geographical names occur most frequently along this section of the Australian seaboard. Farther east the only settlement on the south coast is *Eucla* (*Yircla* or *Yergalla*), that is, "Morning Star" in the native language. Although scarcely inhabited Eucla bears the name of a seaport; it lies on the frontier of the two colonies of Western and South Australia.

North of Fremantle the coast is almost a solitude for a space of about 180 miles. In this direction lies the Roman Catholic mission of *New Nurcia*, which has been made memorable by the ethnographical studies of Rudesindo Salvado. Still farther north the work of colonisation has acquired considerable importance in the district of Victoria, which is watered by the river Greenough. The banks of this river are fringed by wheatfields, and the produce of the districts is forwarded by rail to the port of *Geraldton*, which stands on Champion Bay. Off this coast flows the Geelvink Channel formed by the chain of the Houtman's Abrolhos islets and reefs. The Victoria district is the chief mineral region of Western Australia, abounding especially in lead, copper, and gold. Beyond it the spacious inlet of Shark's Bay and the north-west coast are annually visited by about a hundred fishing smacks in quest of pearls and mother-of-pearl, for which the chief depôt is the village of *Roebourne*, at the mouth of the Sherlock River. The yearly value of the fisheries exceeds £20,000; but nowhere else in Australia have the whites treated more oppressively the native labourers, who have been practically reduced to the position of slaves by a so-called act of "assignation."

The whole of the Australian seaboard stretching round to the north-east was uninhabited by any white people before the year 1869, when auriferous deposits



were discovered in the hilly district bounded on the south by the course of the Fitzroy River. This event attracted large numbers of gold-hunters to the spot; villages sprang up, and ports were established along the river-banks and on the shores of the neighbouring inlets. In 1886, when the mines were placed under official administration, this district of Kimberley was found to be inhabited by several thousands, mostly connected with the mining industry. *Derby*, the capital, stands on the east side of an estuary, where the Fitzroy River reaches the coast.

The settlement of this part of Australia, which over half a century ago was already described by George Grey as one of the most promising regions on the continent, is an event of primary importance in the history of colonisation. Although comparatively well watered and fairly productive, it had been avoided by the British colonists owing to the heat of the climate. It certainly lies entirely within the tropical zone; but it occupies a favourable position over against the Dutch East Indies, from which it is separated only by the narrow Arafura Sea. Hence Kimberley is probably destined to become the chief centre of trade and intercourse between the Indonesian and Australian populations, at present almost complete strangers to each other. In some of the estuaries along this coast the tides rise to a height of from 35 to 40 feet.

Of all the continental colonies Western Australia has remained longest attached to Great Britain by direct administrative ties. Hitherto not only the Governor and Executive Council, but even the Legislative Council has been at least partly nominated by the Central Government. In 1889, however, the Imperial Parliament favourably entertained a bill passed by the Legislative Council substituting a responsible government for the hitherto existing representative system of administration. By this change Western Australia will doubtless soon be placed on the same footing as all the other colonies of the Australian continent. It is divided into fourteen electoral districts, the franchise being extended to all citizens possessing landed property of the value of £1,000, or paying a yearly rent of at least £10. The defensive force comprised in 1889 a volunteer corps of over 600 men.

#### SOUTH AUSTRALIA.

The name of this colony is scarcely justified by its geographical position, for its territory does not include the southernmost part of the mainland, while on the other hand it stretches right across the continent northwards to the Arafura Sea. It thus comprises all the central region westwards to 129° east longitude, and eastwards to 138° on the Gulf of Carpentaria and as far as 141° on the slope draining to the Southern Ocean. On the north coast it embraces the peninsula skirting the west side of the Gulf of Carpentaria; on the south the Gulfs of Spencer and S. Vincent form the chief indentations of its seaboard, and over a fourth of the mainland lies within its borders.

The settlement of South Australia began on the shores of the southern gulfs in the year 1834, and towards the close of 1836 the official proclamation of the new state was made near the port of Glenelg under a large eucalyptus, whose now life-

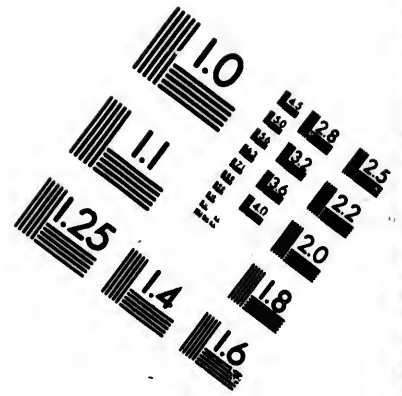
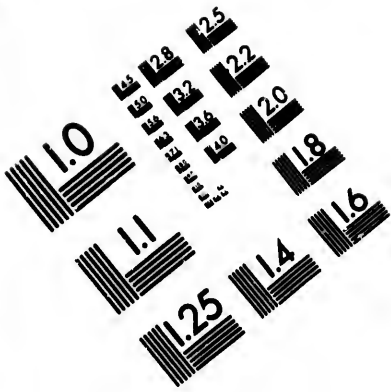
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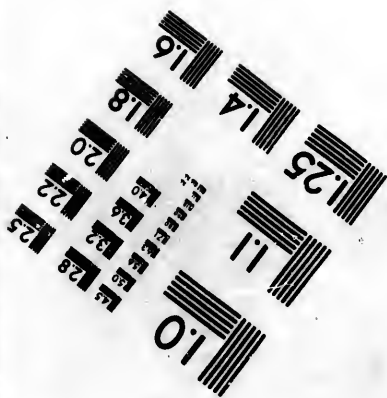
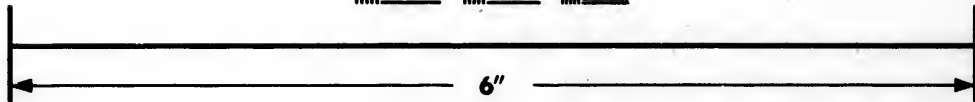
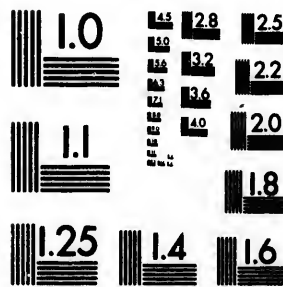
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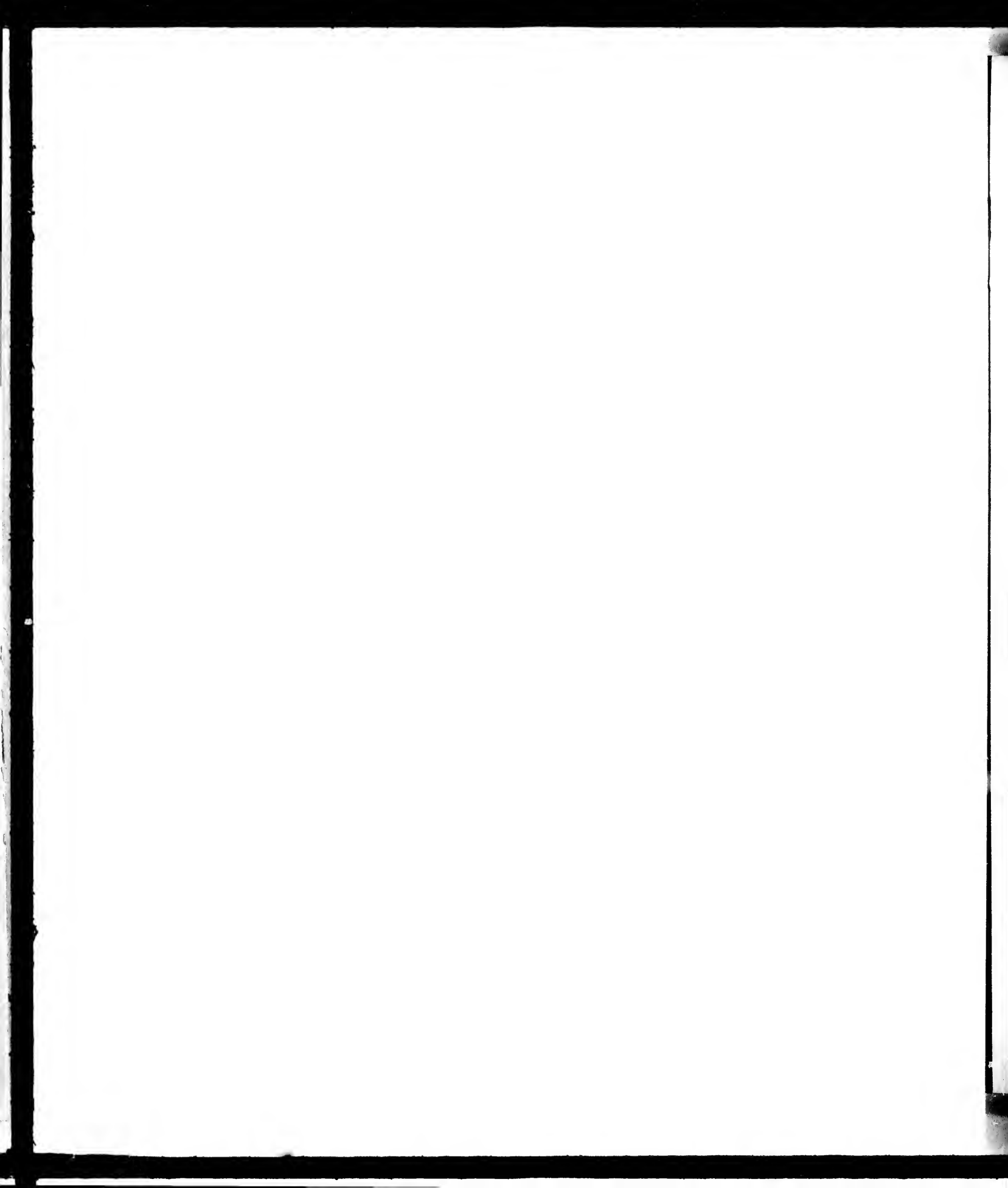
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less stem bears a commemorative inscription. Here the people gather in multitudes on the anniversaries of the foundation to celebrate the national feast. Free settlers alone have taken part in the development of the colony, where no convicts from beyond the seas were ever landed. Nevertheless, the growth of the population was extremely slow down to the year 1846, when the discovery of rich copper-mines immediately attracted numerous speculators and miners. But notwithstanding this stimulus South Australia has lagged far behind the three eastern colonies of Victoria, New South Wales, and Queensland in population, wealth, and trade. In the years 1885-6 it even presented the phenomenon, unique in Australia, of a temporary decrease in the number of its inhabitants, the emigration to the West Australian mines and to other regions having exceeded the immigration and the natural excess of births over the mortality.

Although the climate is one of the healthiest for Europeans, it is dreaded on account of its heats and the lack of invigorating sea breezes, the concave formation of the coast facing the desert causing the parching winds of the interior to prevail. Infant mortality is high, and the acclimatisation of the race presents greater difficulties than in most other regions of the continent. Here also consumption, the Australian malady *par excellence*, is more common than in any of the other colonies. Another obstacle to progress are the long periods of drought, which occasionally occur, and which render much of the land arid, unsuitable for tillage, and in many places even saline and destitute of vegetation. In the northern districts the torrid climate is still more unsuitable for European workmen, so that the suzerain Government has been fain to tolerate the introduction of Malay and Chinese labour.

Thus nearly the whole of the white population is confined to the southern region between the lower course of the Murray and the east side of Spencer Gulf. From here also come the copper, wool, and wheat, from which South Australia derives its importance in the British colonial world; for the production of wheat it takes the first place amongst the Australian states. Essays have been made at ostrich-farming, while wine-growing has received a great development during the last few years; wines are already produced, which the growers in the different districts compare to port, sherry and hock. The colony also exports fruits and preserves.

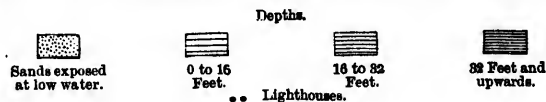
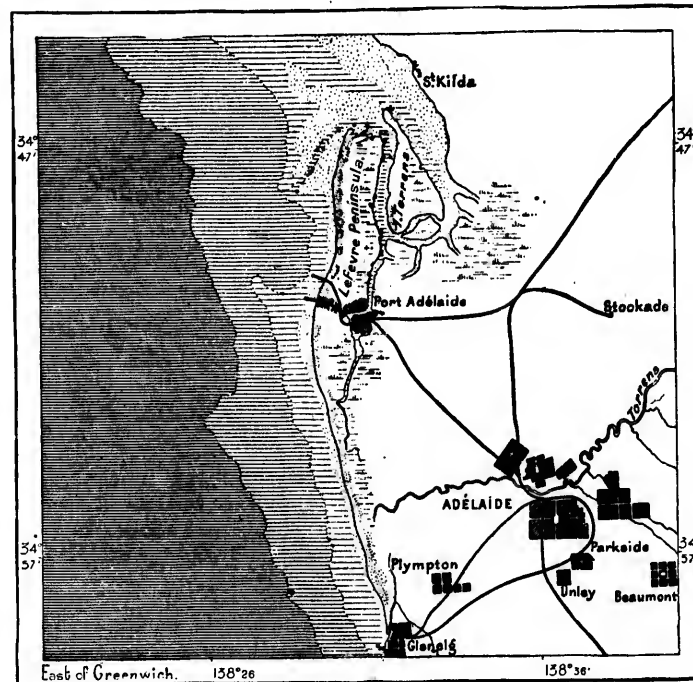
*Adelaide*, the "Model City," capital of South Australia, ranks for population after Melbourne and Sydney, already containing over one hundred and thirty thousand inhabitants in the central quarters and its suburbs. It lies on a plain near the sea not far from the first slopes of the Lofty Range rising to the east, and on the banks of the Torrens River, which often runs dry. The broad streets running at right angles in the direction of the cardinal points dispose the city in a number of regular blocks. Enormous sums have been expended on the construction of vast reservoirs in the neighbouring hills needed to supply the city with water. There are also numerous promenades, extensive parks, and one of the most beautiful botanic gardens in the world. The University of South Australia, the Institute and other learned societies, have their seat in the capital,

where is centred all the scientific and literary work of the inhabitants. Beyond Adelaide, which, with its suburbs of *Hindmarsh*, *Norwood*, and *Kensington*, alone contains over a third of the whole colonial population, there are no towns or villages except those exclusively occupied with trade, agriculture, or mining.

Adelaide has several ports, the chief of which, *Port Adelaide*, lies three or four miles to the north-west near a creek which has been artificially deepened and lined

Fig. 171.—ADELAIDE.

Scale 1 : 280,000.



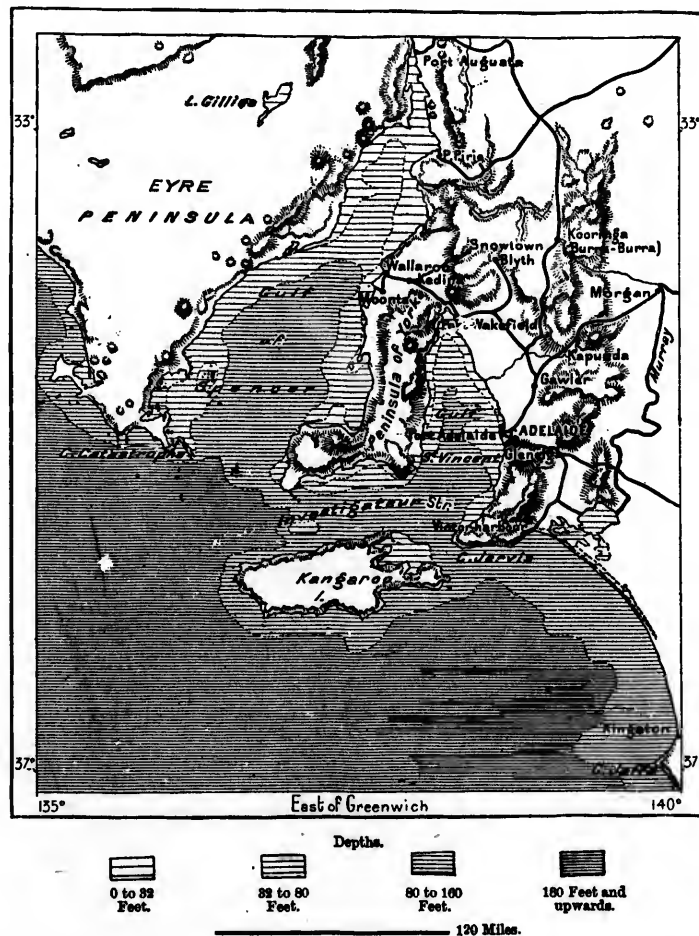
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with wharves. *Glenelg*, situated to the south-west, and almost connected with the capital by continuous groups of suburbs and villas, is a port of call for mail steamers. Farther south follows *Victor Harbour*, on the shore of the Southern Ocean, but connected with the capital by a railway. Another line running north-eastwards to *Morgan*, at the chief bend of the Lower Murray, places Adelaide in communication with the only line of inland navigation on the Australian mainland; above *Morgan* the Murray is navigated by about forty small steamers.

The little fluvial port of *Goobera*, seven miles above the mouth of the Murray on its terminal Lake Alexandrina, exports a considerable quantity of wool. Beyond the river and near the frontier of Victoria, *Mount Gambier*, or *Gambierton*, at the southern foot of the volcano of like name, is the most active commercial

Fig. 172.—ADELAIDE, SPENCER AND ST. VINCENT GULFS.

Scale 1 : 5,900,000.



centre in the southern districts. It is connected by rail with the capital, and supplied with water from the lake in the neighbouring crater.

Other railways run from Adelaide towards the northern mineral districts, where *Gawler*, *Kapunda*, and *Koorunga* are the chief centres of the copper mining operations. The deposits of *Boora-Boora*, near *Koorunga*, have largely contributed

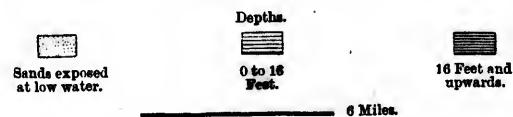
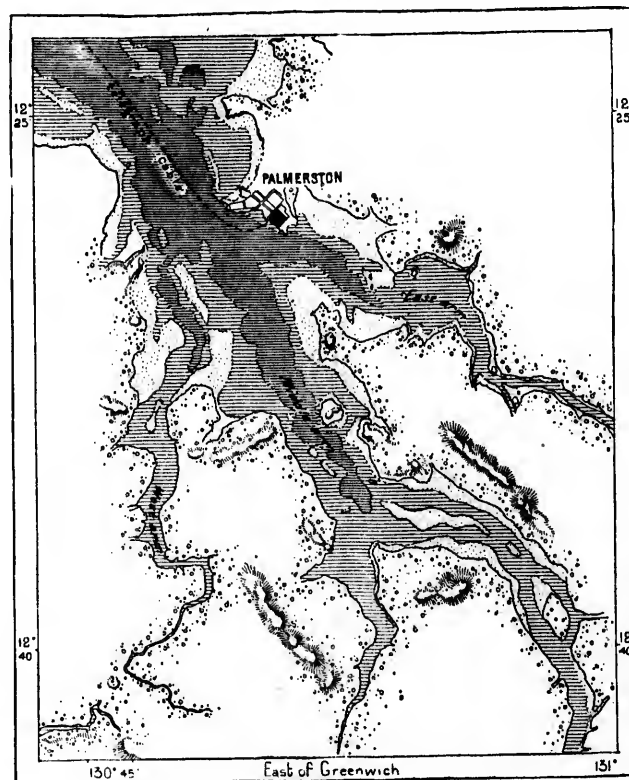


to the prosperity of the colony, having yielded ores to the value of over £4,000,000 between 1846 and 1877. No less productive are the copper mines of *Wallaroo*, *Moonta*, and *Kadina*, on the east side of Spencer Gulf, while *Teetulpa*, in the north-east, near the frontier of Victoria, has been enriched by its gold mines.

Farther north the railway, penetrating inland through the pastures, deserts,

Fig. 173.—PORT DARWIN.

Scale 1 : 830,000.



and saline wastes, soon advances beyond the mineral districts, and serves only for the transport of wool and some agricultural produce. But when it has pushed its way across the continent this trunk line will be used by most travellers and immigrants bound for the flourishing regions of east and south-east Australia. The two submarine cables already connecting the northern end of this line with

Banjuwangi, in Java, were broken by a volcanic eruption in the year 1888. They were supplemented in 1889 by a third cable laid between the same Javanese port and Roebuck Bay on the coast of West Australia. This line, which is about 1,000 miles long, serves not only for the local communications of West and South Australia, but also, in case of interruption, for those of the eastern colonies.

*Palmerston*, the future terminus of the trans-continental railway, already enjoys a considerable trade. Since 1875 *Port Darwin*, on the east side of which Palmerston has been founded, has been thrown open to the commerce of all nations. This extensive inlet forms one of the largest, most convenient, and best sheltered harbours frequented by seafarers in the eastern seas. The population of the *Northern Territory*, as this region is officially called, has considerably increased since 1881, when it contained only 4,550 inhabitants. Over four-fifths of the residents are Chinese, occupied in discharging cargoes, in clearing the land for plantations, constructing highways, and working the southern gold-mines of *Burrundie* and other districts. Here the employers of labour are vigorously opposed to the laws restricting Chinese immigration. Being unable to employ white labour in these torrid lands, they naturally look to China for the hands required to cultivate their plantations.

A little traffic has already been developed between Palmerston and the Javanese city of Surabaya, which lies on the future highway of inter-continental trade between Australia and Europe. The essays at colonisation made so early as 1824 on Apsley Strait between Melville and Bathurst Islands, as well as subsequent attempts of the same kind made farther east on the Coburg Peninsula, all proved failures owing to the isolated position of the British settlers in a torrid climate and on an unproductive soil, covered with an almost ferruginous laterite. The station of *Victoria*, founded on the fine harbour of Essington, has never risen to the rank of a town.

The colony of South Australia is autonomous. The governor, appointed by the Queen, is assisted by six responsible ministers chosen by the Parliament, which itself consists of members elected by the citizens. The Legislative Council, or Upper House, comprises twenty-four members, and the House of Assembly, or Lower House, is formed of fifty-two deputies, chosen for three years. The franchise for electors of the Council is limited to about two-fifths of the adult male population, holders of property, or paying a certain annual rent; but all citizens settled not less than six months in the country have a right to vote at the elections for the House of Assembly. Some thirty municipalities enjoy the privileges of communal autonomy. The armed forces comprise over three thousand volunteers and the crew of a small man-of-war.

## QUEENSLAND.

Its very name is an indication of the recent creation of this colony. Originally it formed part of New South Wales, from which it was not separated till the year

1859. But although its political life is shorter than that either of Western or South Australia, it already surpasses both of those states in trade and population. Convicts, however, had been transported to the shores of Moreton Bay so early as the year 1824, and the territory had been thrown open to free colonisation in 1842. The inhabitants of North Queensland, whose economic interests are not always in harmony with those of the southern region, are already demanding the formation of a new state, to comprise the shores of the Gulf of Carpentaria, the York Peninsula, the Torres Strait islands, and British New Guinea. The country is meantime administratively constituted in the three "divisions" of North, Central, and South Queensland, which are regarded as destined one day to form three distinct political states.

More than one-third of the inhabitants is still concentrated in the south-east corner of Queensland, the old district of Moreton Bay. But beyond this region centres of population are already very numerous, settlers being attracted to different parts by the diverse agricultural and industrial interests. As in New South Wales there are vast grazing grounds, especially on the western slope of the mountains; Queensland also possesses rich auriferous deposits, which are scattered throughout the whole colony from the New South Wales frontier to the York Peninsula, and the valleys sloping towards the Gulf of Carpentaria. Its deposits of copper, tin, and coal have also attracted speculators and miners to various parts of the territory, while such alimentary plants as wheat, maize, sugar-cane, tea, pine-apples, which do not thrive under the same climate, have had the consequence of developing several distinct centres of colonisation throughout the colony.

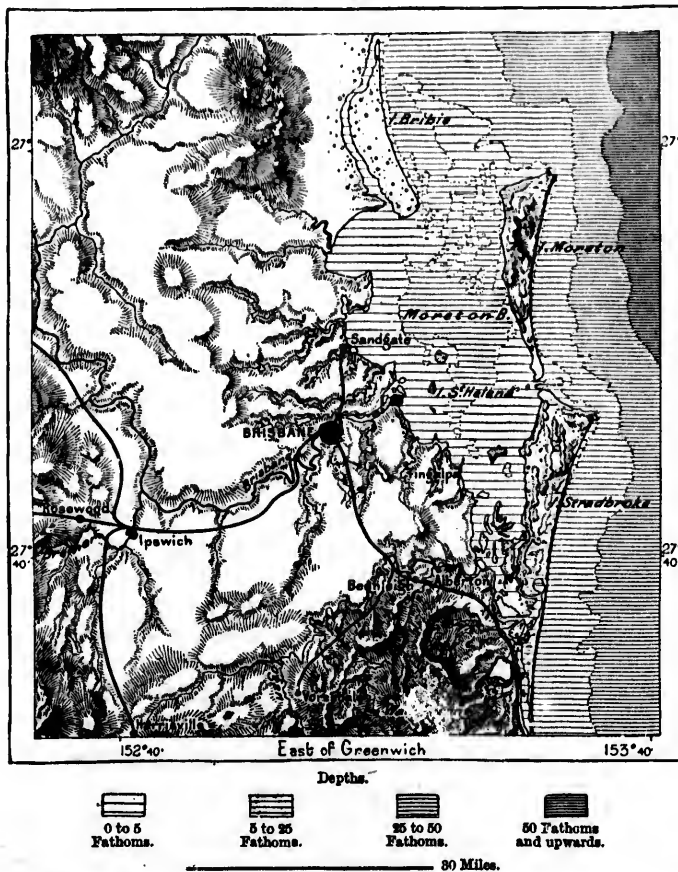
For the cultivation of tropical plants the growers have had recourse to the services of South Sea Islanders engaged for a term of years, and usually comprised under the general name of "Karnakies," that is, Kanakas, a word in the Polynesian languages simply meaning "men." But this system of contract labour, carried on by means of the so-called "labour-vessels," has been a fruitful source of crime and of outrages against the freedom and even the lives of the Oceanic peoples. The presence of the Chinese also has given rise in Queensland to the most cruel injustice on the part of the "representatives of the higher civilisation." Kidnapping expeditions have often been organised in this colony, which have spread havoc and ruin throughout many Melanesian and Polynesian archipelagoes.

*Brisbane*, capital and oldest town in Queensland, stands on the river of like name, at the point where it expands into an estuary communicating with Moreton Bay some 24 miles lower down. Vessels of average tonnage ascend this estuary to a bridge about 1,150 feet long, which here crosses the river. The port of Brisbane, the most frequented in Queensland, is approached through the fine roadstead of Moreton Bay, which is sheltered by a long chain of low islands, and connected with the capital by two railways. One of these lines runs north-east in the direction of *Sandgate*, a favourite watering-place and summer residence; the other passes south-eastwards through *Alberton* to the southern entrance of the bay, which is accessible only to boats. Brisbane is supplied with an abundance

of water, and like the other large Australian towns has a beautiful botanical garden.

*Ipswich*, some 35 miles above Brisbane on a southern affluent of the river, stands at the head of the fluvial navigation, and receives by water the wares which are thence forwarded to the various stations of the interior. At this point the

Fig. 174.—BRISBANE AND MORETON BAY.  
Scale 1 : 1,300,000.



main railway begins to climb the coast range, after crossing which it descends to *Warwick* in the upper valley of the *Condamine*, chief headstream of the *Darling*. The trunk line continues to run beyond *Warwick* westwards through *Toowoomba*, *Dalby*, and *Roma*, while a branch connects the system southwards with the *Sydney-Melbourne* line. Another branch has already been projected to bring *Point Parker*, on the *Gulf of Carpentaria*, into direct communication with the southern regions.

*Maryborough* occupies, 170 miles farther north, a position analogous to that of Brisbane; it stands on the navigable river Mary, which expands to a broad inlet and reaches the coast through an arm of the sea sheltered on the east side by Great Sandy Island. At Maryborough the river is crossed by a bridge about 1,640 feet long. Sugar is chiefly grown by the neighbouring planters, and there are numerous factories in the district. On a southern tributary of the Mary stands the straggling town of *Gympie*, noted for its gold mines, which were discovered in 1867, and which by 1880 had already yielded a quantity of the precious metal estimated at over £2,000,000. At *Burrum*, lying to the north, rich coal-fields of excellent quality have been discovered, and productive copper mines have been opened in the north-western district of *Mount Perry*, which is connected by a railway with the port of *Bundaberg*, at the mouth of the Burnett.

*Rockhampton*, another fluvial port, is the largest town in Queensland next to Brisbane. It occupies a fine position in a fertile district, within view of the wooded cliffs skirting the broad river Fitzroy, which is accessible to large vessels. Rockhampton, which lies in the vicinity of rich gold, silver, and copper mines, stands, like Brisbane, at the terminus of a railway, which penetrates far into the interior in the direction of the central plains, and which ramifies to the right and left towards the mining districts.

Farther on follow along a deeply indented seaboard the port of *Mackay*, whence are exported tobaccos, sugar, coffee, and other tropical produce; *Bowen*, or *Port-Denison*, with easier access than any of the other harbours sheltered by the Great Barrier Reef, and *Townsville*, which derives its importance from the gold mines of the Burdekin and its tributaries. *Ravenswood* and *Charters Towers* are the chief centres of the mining operations, the latter place producing about £250,000 of the precious metal annually.

On the Pacific Coast the last frequented port is *Cooktown*, which was founded in 1873 and soon became a flourishing place, thanks to the vicinity of the Palmer River gold-fields. Cooktown is also the chief market and victualling station of the British and German establishments in New Guinea and the Melanesian Islands. The settlement of *Somerset*, which was founded at the northernmost extremity of York Peninsula in the hope of making it a second Singapore, has remained an obscure village with a bad climate; but the neighbouring *Thursday Island* is already a much frequented station, which owes its prosperity to its favourable position on the route of vessels traversing Torres Strait. Since 1877 it has also become the centre of the pearl-shell fisheries in these waters. Here over two hundred craft of all sorts with one thousand five hundred hands find employment on the pearl, mother-of-pearl, tortoiseshell, and *bêche-de-mer* fishing grounds. A central station of the London Missionary Society has been established on *Erub* or *Darnley Island*, which lies in the eastern part of the Strait.

On the slope draining to the Gulf of Carpentaria the two stations of *Normantown* and *Burketown* were till recently nothing more than little rural markets for supplying the stock-breeders of the surrounding districts with provisions and

European wares. Burketown had even been almost entirely abandoned, owing to the insalubrity of the neighbouring marshes. But the discovery of the *Croydon* gold-fields made in 1885 immediately attracted thousands of speculators and colonists to these districts. *Point Parker*, at present the only seaport of the whole region, is sheltered from the northern winds by the *Bentinck* and *Mornington* insular groups.

Queensland has not yet severed the administrative ties connecting her with the British Government. The Governor and Legislative Council, that is, the Upper House, are still nominated by the Crown. The members of this chamber numbering thirty-six, are named for life, while the Legislative Assembly, or Lower House, is elected by universal suffrage for five years, and receives no payment for its services. The armed forces comprise a standing corps of 1,650, about 600 volunteers, and 136 cadets. A gunboat and a few marines are charged with the defence of the coast-line, some 3,000 miles in length.

#### NEW SOUTH WALES.

This colony, the oldest on the continent, has recently celebrated its first centenary. But it bears a name which recalls its dependence on England, and which certainly presents a somewhat cumbrous and inconvenient form. Hence it has been frequently proposed to change its official designation for the simple title of "Australia," just as the United States have claimed the exclusive right to the name of "America." But the old designation still holds its ground, owing chiefly to the protests of the other Australian states against this assumption. Doubtless there was a time when New South Wales really comprised all the European settlements on the mainland and neighbouring islands. But after the foundation of West Australia, and the separation of Victoria and Queensland from the mother colony, this state was reduced to little more than one-tenth of the continent.

Yet even this space remains out of all proportion with its relatively slight population, for its superficial area is still far more than twice that of the British Isles. The southern frontier towards Victoria and on the Pacific slope, follows a straight line traced across mountains and valleys between the south-eastern headland of Cape Howe and the Pilot Mountain on the main range. But farther inland the common limit of the two colonies is indicated first by a headstream of the Murray, and then by the Murray itself as far as 141° east longitude. Towards Queensland the border line is marked by a mountain range beginning at Danger Point, and then in the Darling basin by the course of various rivers as far as the 29° south latitude, which constitutes a conventional frontier across the boundless inland plains.

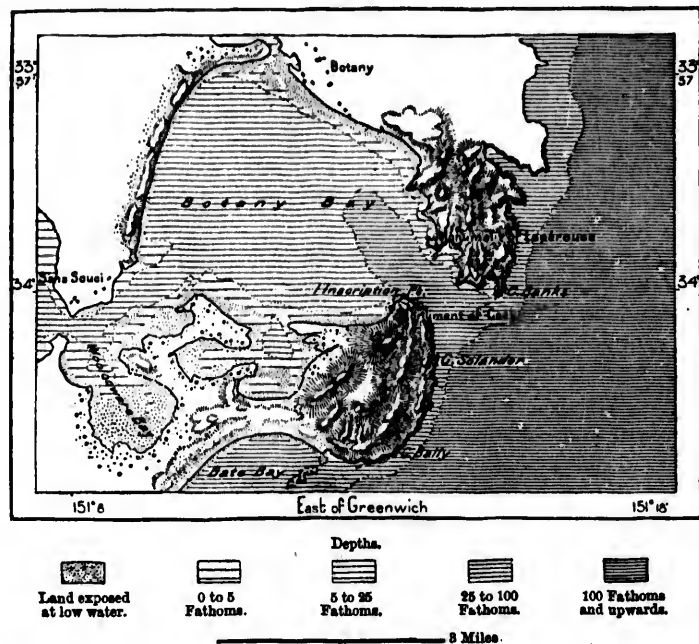
Since the abatement of the gold fever, which gave a temporary ascendancy to Victoria in population and commercial importance, New South Wales has resumed its natural position at the head of the Australian states. She is no doubt less rich in gold; but the yield of this metal is yearly losing its relative importance in the general economy of the continent, while wool, which has most contributed to the

development of the colonies, is produced in the largest quantities in New South Wales. Here also coal mining, and several other less important industries are far more developed than elsewhere, and the claim to the hegemony among the surrounding political groups seems strengthened even by priority in point of time. Victoria, Queensland, Tasmania, and New Zealand were, moreover, to a great extent founded by settlers from New South Wales, and the very spot already indicated by Cook has thus become the true centre of the Australasian colonial world.

The site chosen in 1788 as the first convict station at the antipodes of Great

Fig. 175.—BOTANY BAY.

Scale 1 : 160,000.



Britain still remains unoccupied by a town of any size. The shores of *Botany Bay*, whose name was long applied to the aggregate of the British possessions in Australia, are dotted round only by a few small watering places and scattered villas, which already form part of the environs of Sydney. The approach to the harbour is indicated by the monument to Cook, who discovered this bay in 1770; farther north stands the statue of Lapérouse, who sailed in 1788 from this spot on the last expedition, from which he never returned. The names of Banks and Solander given to the two headlands facing each other on either side of the channel also perpetuate the memory of illustrious pioneers in the work of Australian discovery. If the inlet described in glowing colours by these first explorers has

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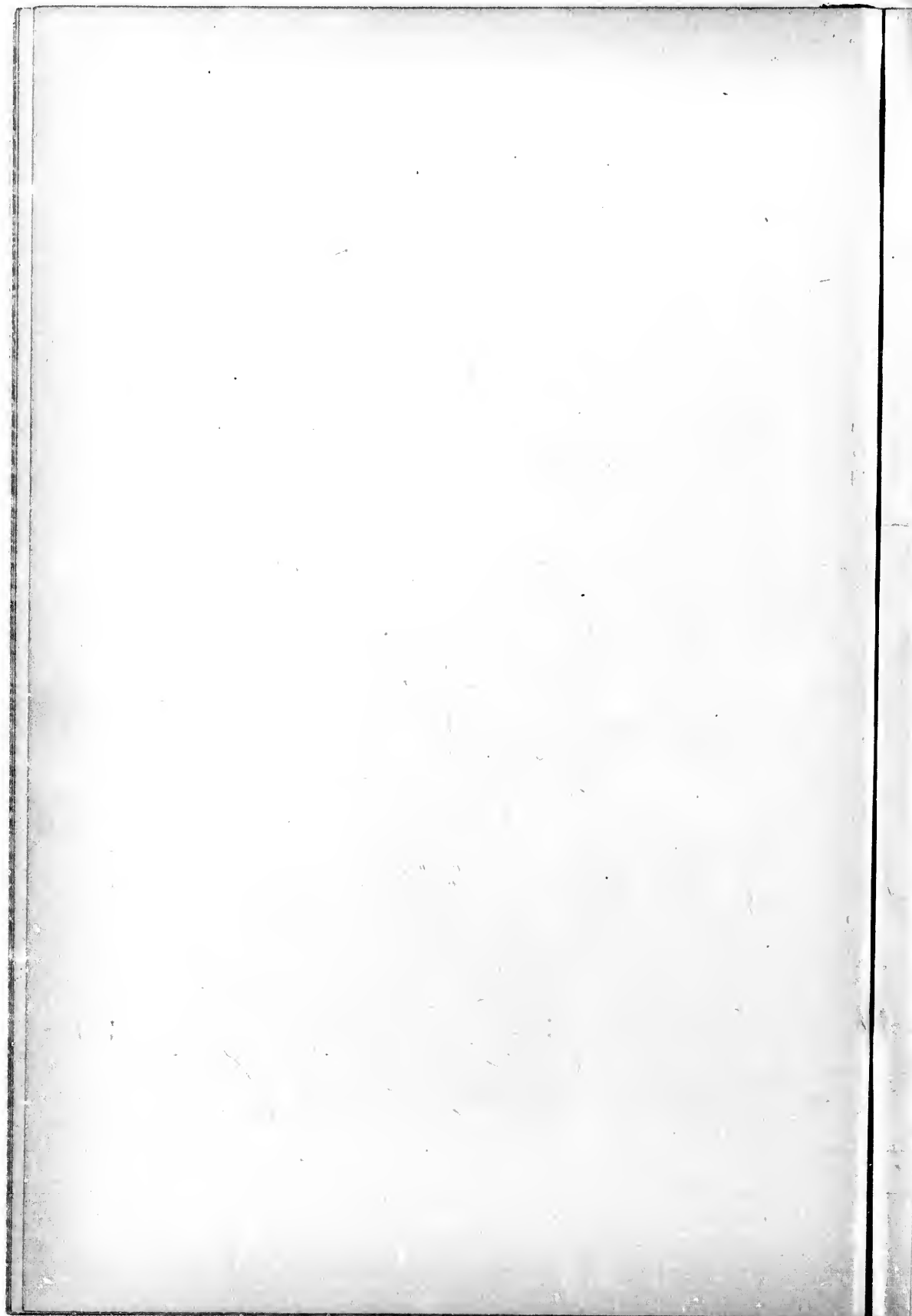
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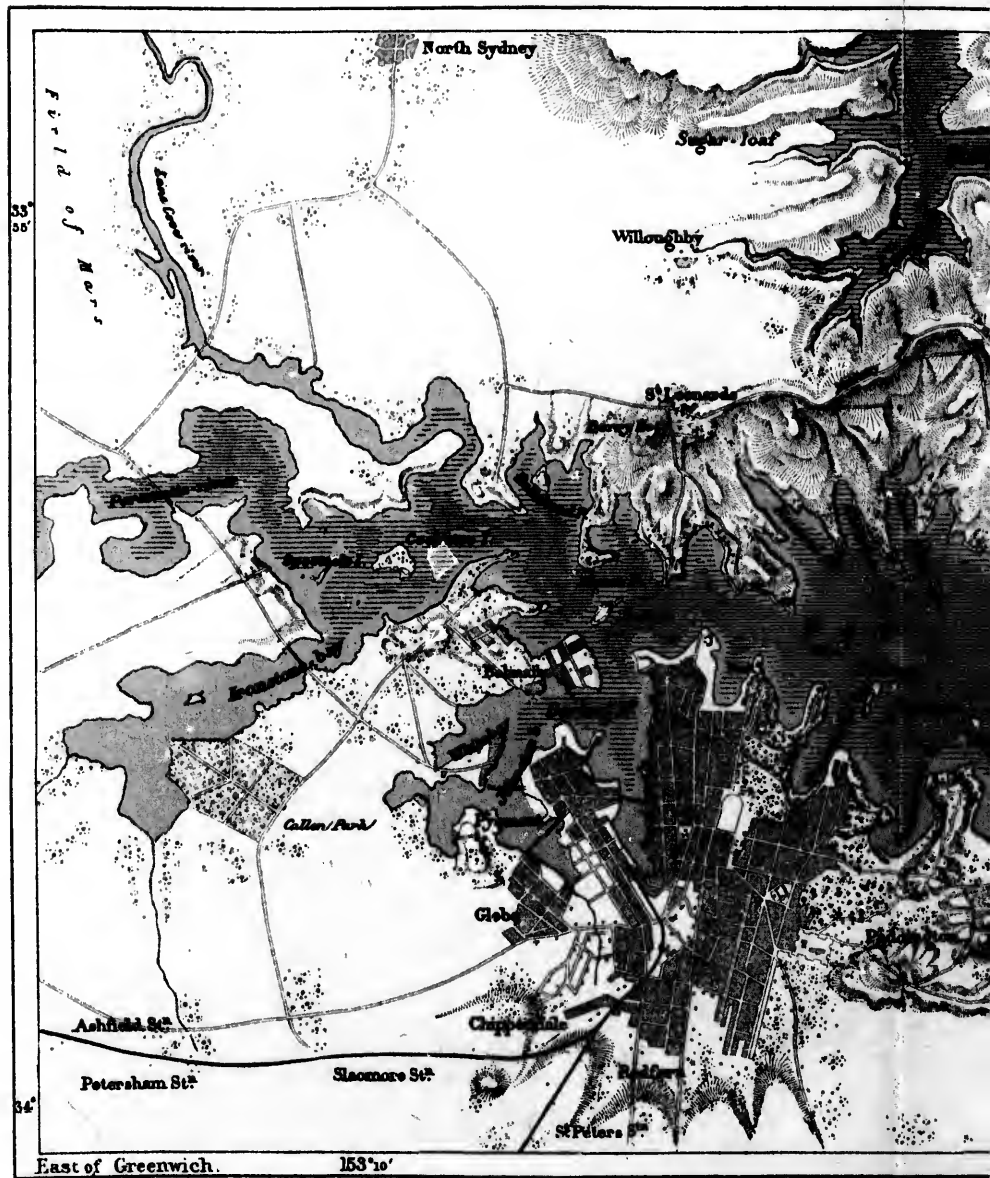
VIEW TAKEN AT MIDDLE HARBOUR, SYDNEY BAY.







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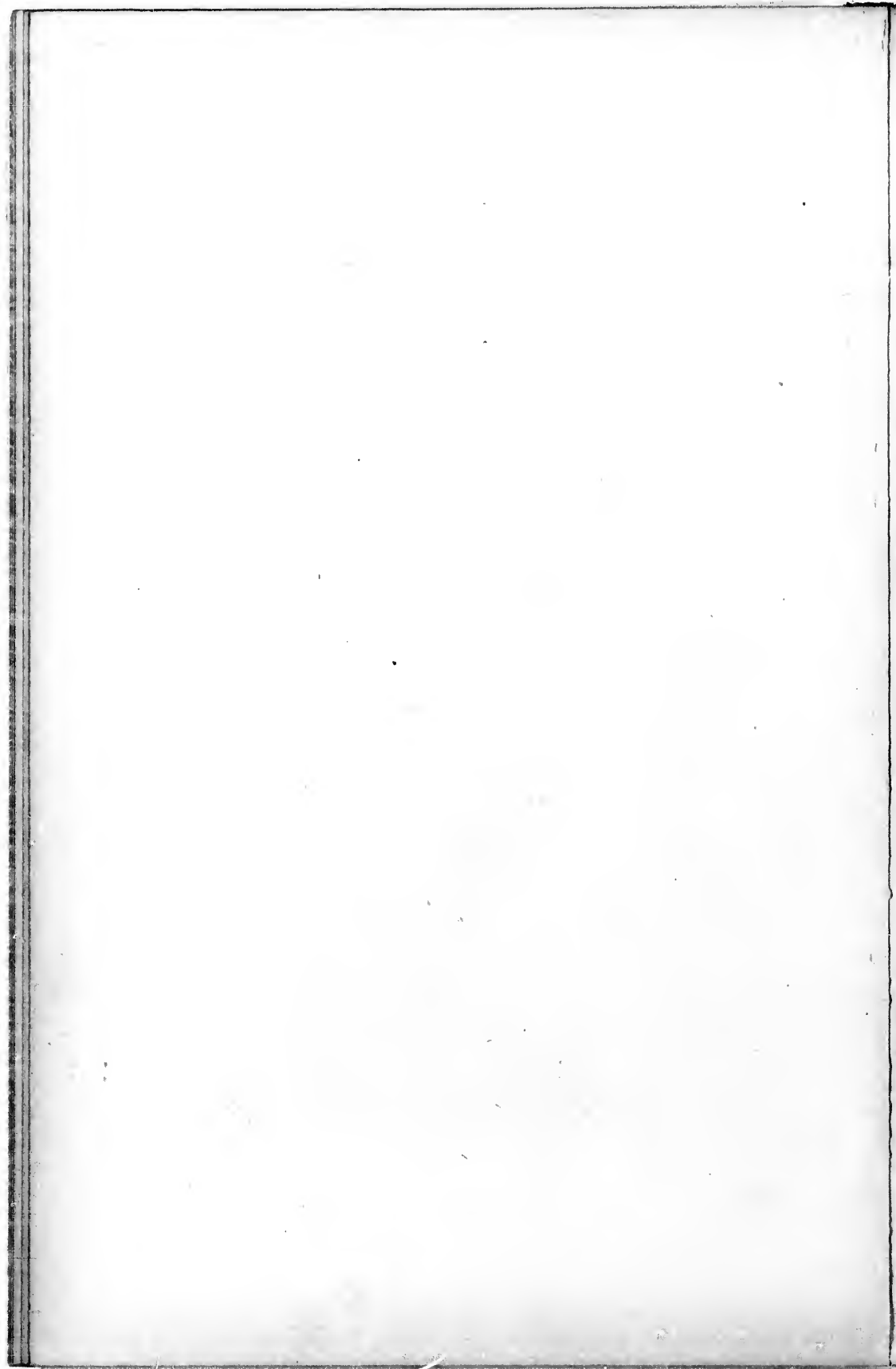
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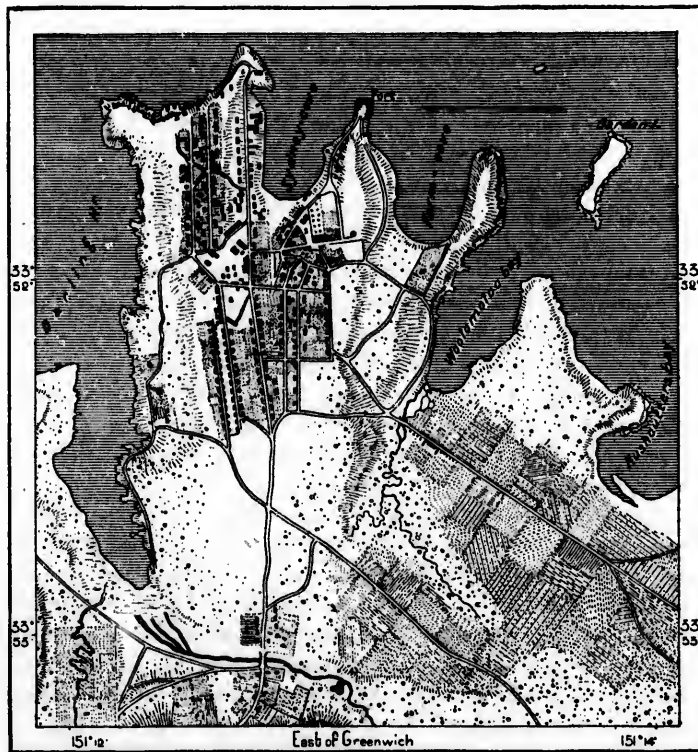
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since been abandoned by commerce, the neglect was not due to any lack of deep waters or of sufficient shelter for shipping, but to the marvellous group of havens which are collectively known as Port Jackson, and which are scarcely rivalled in the whole world for extent, safety, and nautical advantages of every kind. The only drawback is the entrance passage between the headlands, which is scarcely quite deep enough for modern ocean vessels. The anchorage has a total area of 9

Fig. 176.—SYDNEY IN 1802.

Scale 1 : 88,000.



1,100 Yards.

or 10 square miles, and the shore-line of the inner waters with their bays and secondary creeks is no less than 50 miles long.

*Sydney*, founded on the south side of this magnificent harbour, is the oldest city in Australia, for a cycle of a hundred years is still a long period in the history of European settlements in the southern hemisphere. At first a simple convict station, and afterwards the headquarters of the prisons scattered over the surrounding territory, *Sydney* long remained an obscure village built in a forest

clearing at the extremity of a conspicuous headland. At present it is a great capital, which competes with Melbourne for the first rank in the oceanic world, and which has already received from its inhabitants the title of Queen of the South. Thanks to the numerous windings of the shores, and the irregular relief of the encircling lands, Sydney has nothing of that insipid monotony so characteristic of most Australian and American cities. Instead of resembling a chess-board with square blocks of uniform size and structure, it is laid out with streets of varying proportions running up hill and down valley, and interrupted by creeks, inlets, and ridges, by which the irregular plan of the city is disposed in several distinct quarters. In the centre lies the old town in the form of an open hand stretching its promontories far into the well-sheltered roadstead. Southwards run the fine avenues of *Woolomooloo*, while animation is added to the bright scene by the steam ferries incessantly plying on the north side between the old quarters, the new town of North Shore and the watering place of *Manly* with its double beach, one exposed to the ocean surf, the other facing the tranquil inland sea.

Every street thus presents a constantly varying prospect sweeping over the surrounding hills, the harbour with its innumerable creeks and bays, the public gardens and more distant woodlands. For few other capitals are more liberally provided with parks and grassy swards. Moor Park, one of the tracts reserved on the south-east side as a public pleasure-ground, has an area of no less than 600 acres, while another open space in the very heart of the city commands a superb panoramic view of the inland waters and the channels communicating with the Pacific Ocean. A project has been formed to supply the city with fresh water from Lake George, which lies to the south-west amid the Australian Alps; but in years of unusually protracted droughts this lacustrine reservoir has itself been almost completely dried up.

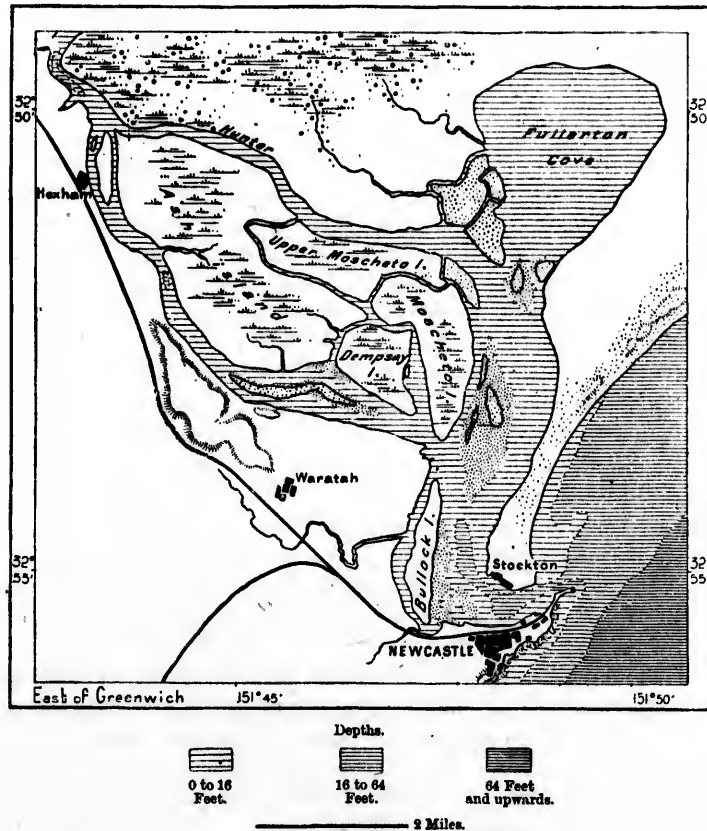
As a seaport Sydney occupies a vital position as the chief centre of the lines of steam navigation in the Pacific, as well as of the coasting trade along the east Australian seaboard. Moreover, the harbour is so vast that room has also been found for the development of an ever-growing inland traffic for the transport of passengers and the distribution of merchandise amongst the rising markets of the interior. Forts erected on the headlands commanding the seaward approaches defend the city and roadstead, which, however, have never yet been attacked by any enemy.

Compared with Melbourne, the only other place which aspires to the first rank on the Australian Continent, Sydney has the great advantage of occupying a relatively more central position in relation to the whole group of Austral Colonies; it also lies nearer to the oceanic lands and America, thus facing inhabited regions and not turned, like Melbourne, towards the ice-bound Antarctic lands. Amid its rapidly increasing material prosperity Sydney has also taken a pride in fostering the arts and sciences; besides the well-endowed university of New South Wales it has founded several museums, learned societies, and a vast well-administered botanic garden. A marine zoological station was lately founded by the Russian naturalist Miklukho-Maklay on an inlet near the capital.

Sydney is connected by rail with all the important towns and centres of population in the colony and the neighbouring states of Queensland, Victoria, and South Australia. In May, 1889, was opened the great steel bridge across the Hawkesbury River between the Capital and Newcastle. This bridge, which has seven spans of

Fig. 177.—NEWCASTLE.

Scale 1 : 125,000.



500 feet each, completes the main coast line, affording uninterrupted communication between New South Wales and Queensland.

*Paramatta*, the nearest town to Sydney, may be regarded as one of its natural dependencies, for it lies at the western extremity of the same bay, at the mouth of the river from which it takes its name. The Paramattan district is spoken of as the orchard of Sydney, and here are grown the finest oranges on the continent.

The basin of the Hawkesbury River north of Port Jackson has no towns properly so called; but the Hunter, flowing still farther north, waters one of the



most densely peopled districts in New South Wales. *Newcastle*, which occupies a triangular promontory on the south side of the estuary, is the second city in the state, and some 20 miles higher up stands *Maitland*, another busy centre of traffic, comprising two contiguous communes on the banks of the Hunter, which is navigable to this point. *Newcastle*, as well as the neighbouring borough of *Wallsend*, owes its name to the rich coal-mines which have been opened on the banks of the Hunter, and which both in quality and abundance compare favourably with those of the north of England. The export coal trade, which represents about two-thirds of the total production in Australasia, yearly attracts to *Newcastle* over a thousand colliers. Thanks to this industry the traffic of *Newcastle*, a place founded but yesterday, already exceeds that of many European cities, such as *Nantes* and *Cadiz*. Near the coalpits several factories have sprung up.

*Port Stephens*, *Port Macquarie*, and the other seaports following northwards in the direction of Queensland are little frequented. Along these coastlands the only place of any importance is *Grafton*, which owes its prosperity to the neighbouring plantations, and to its deposits of gold, copper, antimony, and especially tin. Of these the *Vegetable Creek* or *Ennerville* mines are the most productive. On the opposite slope of the water-parting in the pastoral district of New England a few small towns occur at long intervals. Of these *Tamworth* is the chief intermediate station on the railway connecting *Sydney* with *Brisbane*. *Bathurst*, on another line running from *Sydney* north-eastwards in the direction of the *Darling*, is a still more active centre of trade. Lying 2,300 feet above the sea in an upland valley of the Blue Mountains draining westwards to the *Darling* through the *Macquarie River*, *Bathurst* has the aspect of an English agricultural town surrounded by corn-fields, pasture lands, and scattered clumps of trees. Farther on the main line is continued across a region of the same appearance through *Orange*, *Wellington*, and *Dubbo* to *Burke*, which stands on the *Darling* at the head of the navigation during the floods. Here this watercourse is known by the name of *Riverina* or the "Australian Mesopotamia."

Other railways, branching off from the trunk line between *Sydney* and the Blue Mountains cross the affluents of the *Murray* and the *Murray* itself, touching at several mining or agricultural centres and riverain ports. Of these places, all recently founded, the most important are, *Forbes*, on the *Lachlan*; *Gundagai* and *Wagga-Wagga*, on the *Murrumbidgee*; and *Albury*, on the *Murray*. *Albury* especially has made rapid progress as a station midway between *Sydney* and *Melbourne*, and as the centre of extensive tobacco plantations and vineyards yielding a wine of excellent quality. At this point the *Murray* is crossed by a long bridge. Eastwards, beyond the course of the *Darling*, occur the silver and lead mines of *Silverton*, which are frequently designated by the name of *Wilcannia*, from a town on the banks of the river.

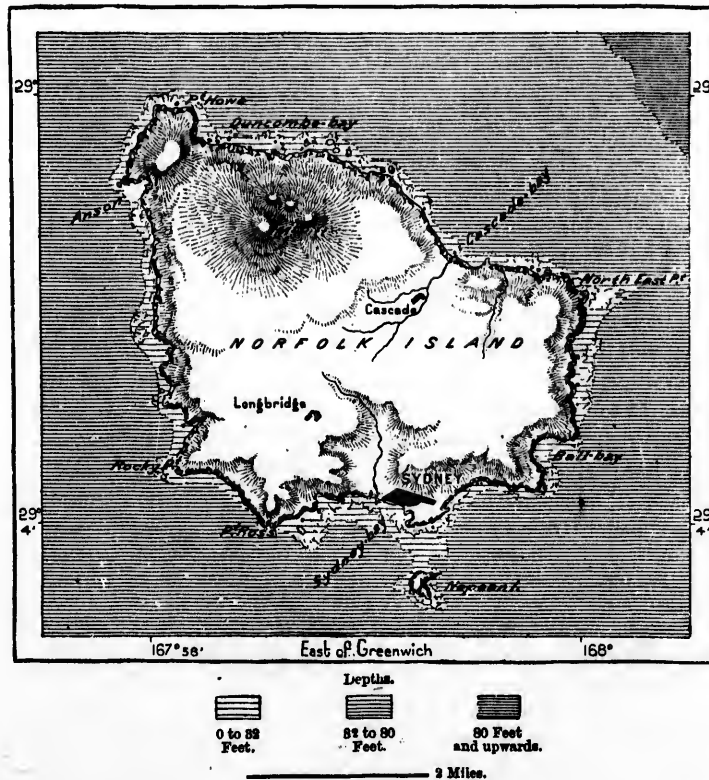
South of *Sydney* the ports of *Wollongong*, *Kiama*, *Nowra*, and *Shoalhaven* do a little traffic in coal and agricultural produce. But in this part of New South Wales the chief commercial and industrial centre is the inland town of *Goulburn*, which stands on an upper affluent of the *Hawkesbury*, 2,130 feet above sea-level. The

Goulburn district, with certain tracts in New England, is the best cultivated and most productive in New South Wales. In 1880 a section of the seaboard between Sydney and Wollongong was set apart as the common inheritance of all Australian citizens. This "national park" of *Port Hacking*, with its hills, woodlands, navigable streams and inlets teeming with fish, has a total area of no less than 37,000 acres.

Lord Howe and Norfolk Islands, with the contiguous islets, depend adminis-

Fig. 178.—NORFOLK ISLAND.

Scale 1 : 110,000.



tratively on New South Wales, although they belong geographically to New Zealand, as shown by the common submarine relief. On the other hand, they may be said to constitute little worlds apart in virtue of their highly characteristic flora and fauna. Lord Howe, 2,800 feet high, has been inhabited since 1840 by a few families, who get a living by supplying passing vessels with provisions. But they do not appear to prosper, judging at least from the emigration, by which the little community has been reduced from three hundred to some forty souls.

Norfolk, over five times larger than Lord Howe, is also relatively more densely peopled. At the time of its discovery by Cook in 1774 it was uninhabited; it was afterwards chosen by the British Government as a convict station for the more desperate class of criminals, who were at first treated with frightful rigour, many of the unhappy wretches being shot down within the very precincts of the church. Later several more or less successful experiments were made in Norfolk Island on "the reformation of criminals." But the station was abandoned in 1842, and the island again remained uninhabited till the year 1856, when it was ceded by the Government to the Pitcairn Islanders, descendants of British mutineers who had married Polynesian women and overpeopled their native island.

These half-castes, who now number over six hundred, enjoy self-government under the presidency of an elected magistrate, but really controlled by Anglican missionaries, who have here founded a large school for about two hundred young students brought from Melanesia. The results of this system of isolation and strict control have not been satisfactory: the natives have lost the spirit of self-reliance and enterprise, and have become cringing hypocrites with no industries or manly pursuits. Even agriculture decays, and in 1885 not more than 150 acres were under cultivation. The people seem to weary of life, and even forget to marry, so that in 1884 only one-fifth of the adults were living in wedlock.

Like Queensland, New South Wales depends on the Crown both for her Governor and the Legislative Council, which consists of twenty-one members named for life. But the Legislative Assembly is elected by universal suffrage, and at present comprises one hundred and twenty-four members, or two for each electoral district. At each official census this number is increased in proportion to the increase of the electors. The armed forces comprise nearly seven thousand regulars and volunteers, and the budget is much heavier per head of the population than that of Great Britain or France.

#### VICTORIA.

This is the smallest in extent, but relatively the most densely peopled of all the colonies on the mainland. Yet in this respect it still falls far behind the average of West Europe, the number of inhabitants to the square mile being scarcely eight or nine. In absolute population Victoria is second only to New South Wales, from which it was politically detached in 1851; it even temporarily occupied the first place during the height of the gold fever. To this cause of special attraction Victoria adds an advantage of paramount importance for British immigrants in a climate, which is cooler than that of the other Australian colonies, and in its variations more analogous to that of Great Britain. Hence the title of Australia Felix given to this region before the general wish of the people induced the Government once more to inscribe the name of Queen Victoria on the map of the world.

In 1851, when it was constituted a separate state, *Melbourne*, its capital, had already been founded sixteen years. But compared with Sydney it was still a

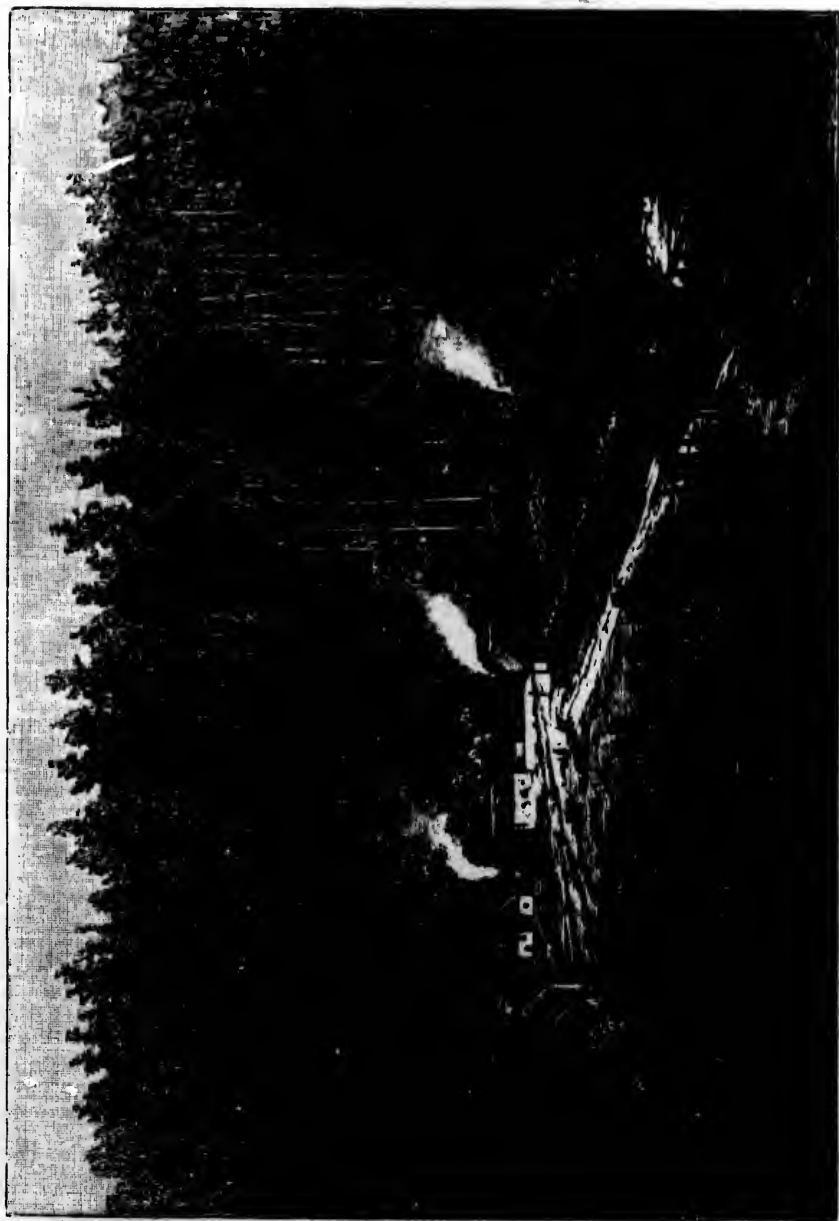
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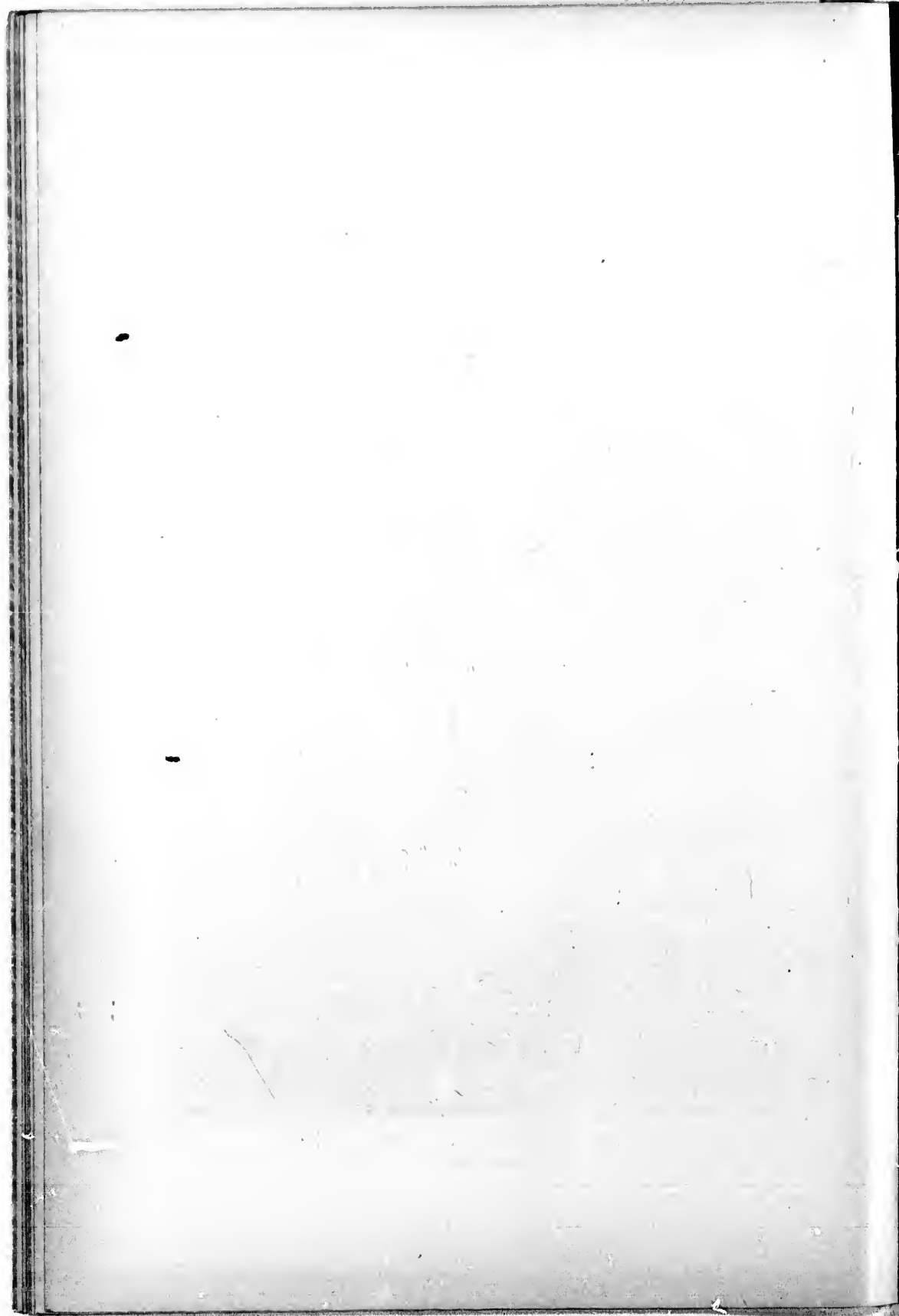
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VICTORIA SCENERY—FOREST NEAR FERNSHAW, NORTH-EAST OF MELBOURNE



place of little importance; nor did the great rush of immigrants take place till

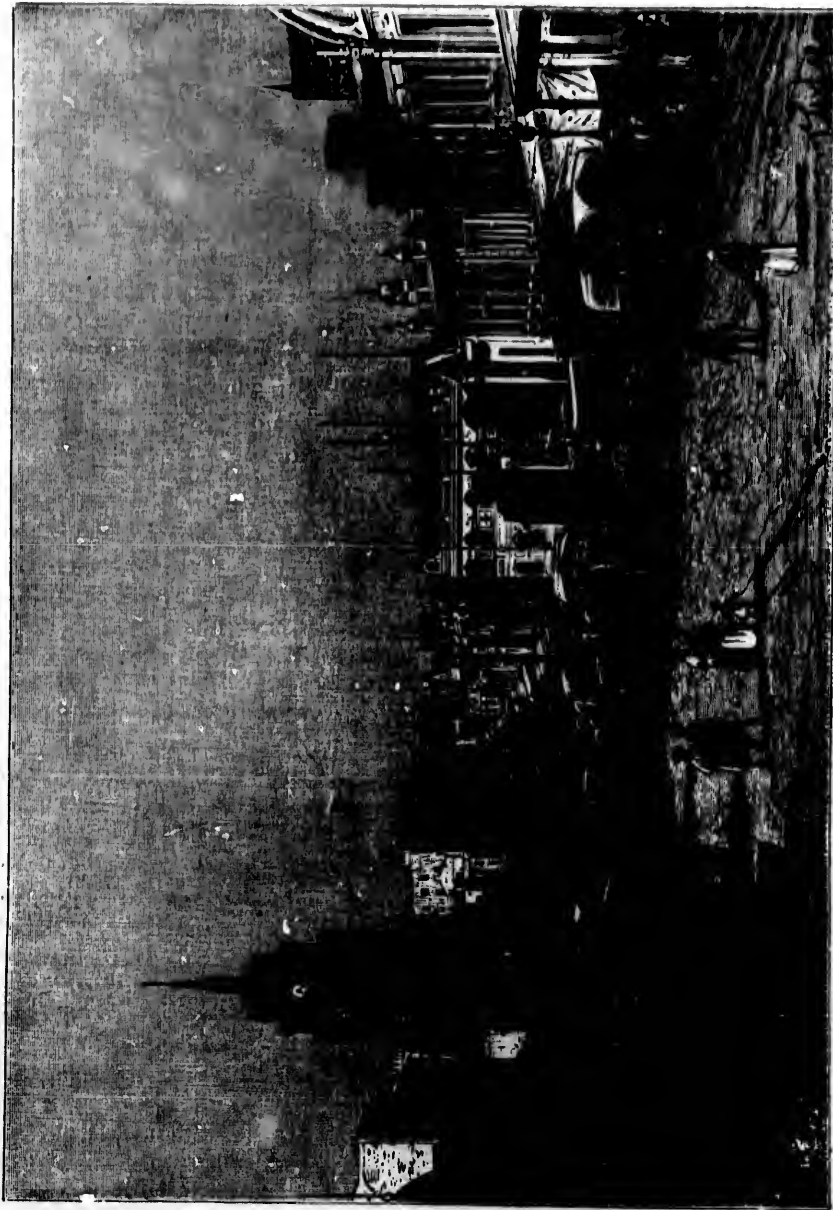


FIG. 179.—MELBOURNE.—VIEW TAKEN IN BOURKE STREET.

after the discovery of gold. At present it is one of the great cities of the British

colonial empire. Melbourne, the "Magnificent," claims, like Rome, to be built on seven hills, and in the Yarra-Yarra it may also boast of a modest Tiber with muddy or yellowish waters. Although founded at some distance inland it has grown rapidly seawards, and has already lined the beach with monumental quays and façades. The numerous suburbs, each with a town hall and municipality, and each forming a chess-board of streets and squares distinct from the central parallelogram, stretch to great distances in all directions, and collectively comprise a population of about four hundred thousand, or rather more than one third of all the inhabitants of the colony.

Far more regularly constructed than Sydney, Melbourne claims also to possess in the Houses of Parliament, the Governor's Palace, the University, museums, churches, and banks, a number of superb monuments, on which no expense has been spared. The libraries already rival in importance the secondary collections in Europe, and the Observatory, established in the midst of extensive gardens east of the city, is provided with the most costly instruments by the best constructors. The local savants have even largely contributed to the study of the Austral heavens, as well as to the geological exploration of the continent. In Melbourne has been projected that expedition of discovery in the Antarctic seas, which the parsimony of the Central Government has hitherto prevented from being equipped and despatched. Here also has been founded the Australasian Geographical Society.

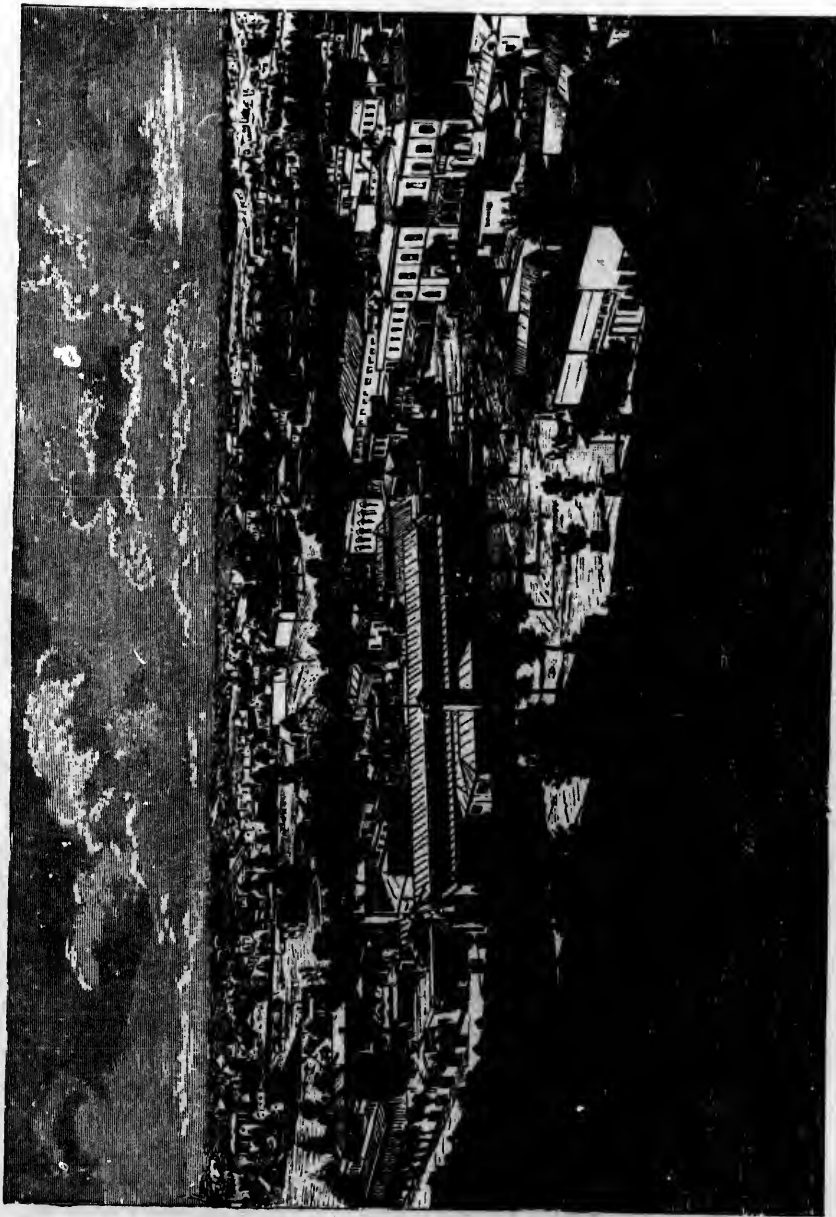
The port of Melbourne, discovered by Murray in 1802 and more specially designated by the name of Hobson's Bay, is crowded with shipping, amid which hundreds of steamers ply from shore to shore of the roadstead. The ocean packets stop seven or eight miles below the city proper, near the quays of *Sandridge*, or *Port Melbourne*, and in the *Williamstown* docks at the extremity of a tongue of land near the head of the bay. To the same commercial centre belong also the towns which follow round the vast triangular inlet, the head of which forms the port of Melbourne. One of these satellites of the capital is the town of *Geelong*, a busy centre of numerous industries, such as tanneries, spinning-mills, preserving establishments, and the like. The founders of Geelong hoped that, being situated nearer the sea, this place would soon outstrip Melbourne as a commercial mart. *Queenscliff*, on the west side of the strait or "Rip," giving access to *Port Phillip*, is also a dependency of Melbourne, its watch-tower and chief bulwark towards the southern ocean; east of this gully Nepean Point marks the site of the buildings connected with the quarantine station.

The small watering-places dotted round the shores of the inlet and along the adjacent coast are all indebted for their prosperity to the visitors from the neighbouring capital. Innumerable villas and little rural retreats are also connected with Melbourne by the twelve railways radiating in all directions from this great centre of Australasian life. Some ten miles to the north-east lies the artificial lake *Yan-Yean*, 14,000 acres in extent, which is formed by the River Plenty, a tributary of the Yarra-Yarra. This great reservoir contains about 6,380,000,000 gallons of water, or sufficient to supply the city for a twelvemonth at the daily rate of forty gallons per head.

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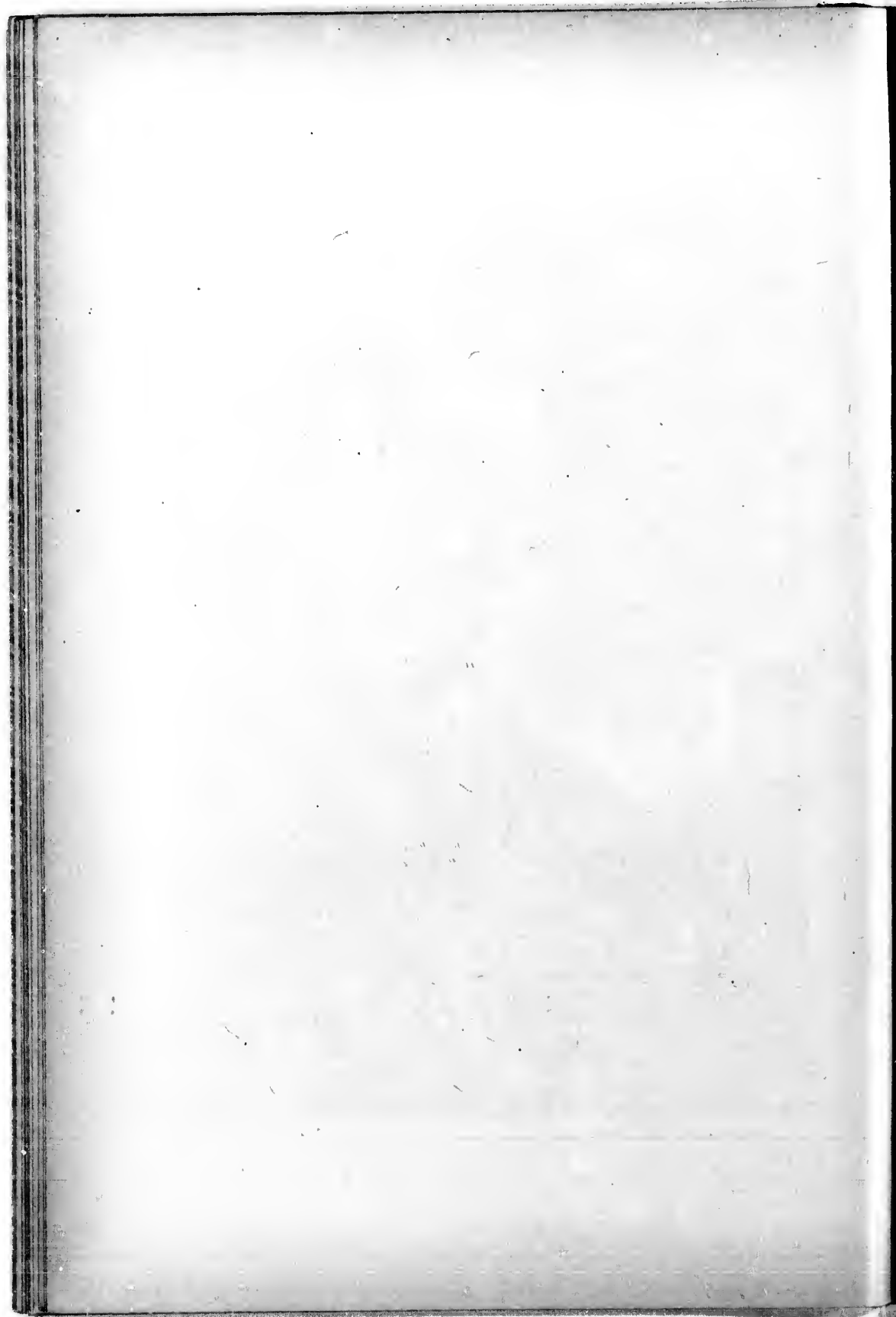
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GENERAL VIEW OF SANDHURST (BENDIGO), VICTORIA.

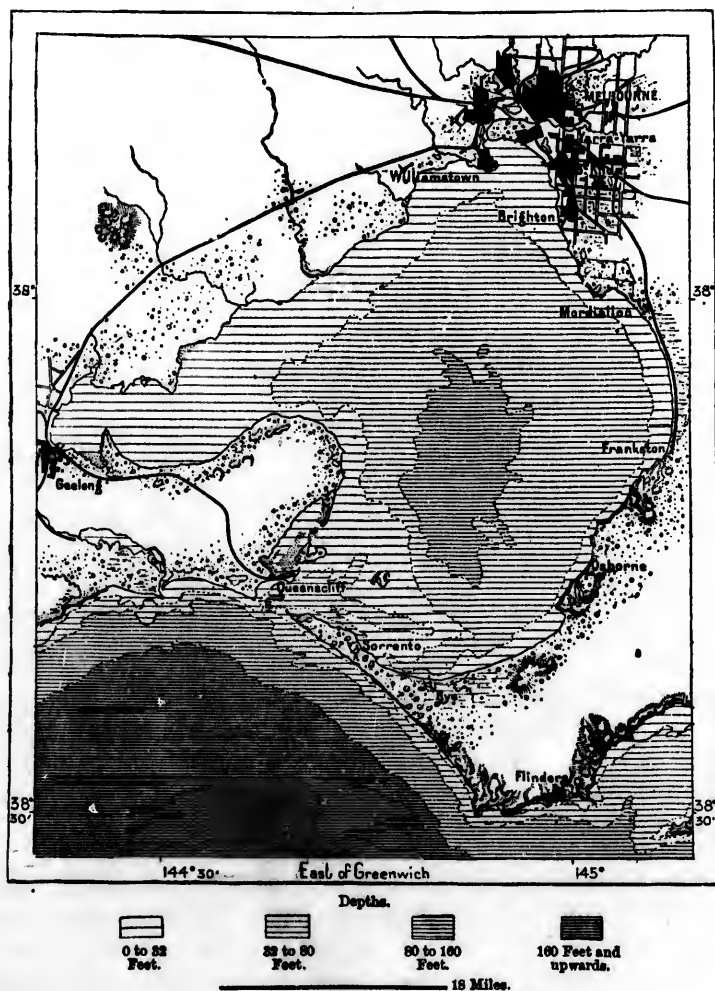




In the thinly peopled hilly district east of Melbourne the most important centres of population are *Sale* in the agricultural coast region of Gipp's Land, and *Beechworth* in the heart of a rich auriferous country near the sources of the Murray. Beyond Melbourne immigrants have been attracted in the largest num-

Fig. 180.—MELBOURNE AND HOBSON'S BAY.

Scale 1 : 850,000.



bers to the region which occupies both slopes of the waterparting for a space of from 60 to 100 miles to the north-west of the capital. Here were discovered the first gold-fields in 1851, and here is situated *Ballarat* (*Ballaarat*), the second city in Victoria, standing on ground every clod of which has been washed for the

precious metal. Since those days Ballarat, like Melbourne, has surrounded itself with villas, gardens, plantations, and has even constructed an artificial lake in the vicinity. Other flourishing towns, such as *Smythesdale*, *Creswick*, *Clunes*, *Daylesford*, *Kyneton*, and *Castlemaine*, are dotted over the district, beyond which follow the prosperous *Sandhurst* or *Bendigo*, rival of Ballarat itself, and *Eaglehawk*, both at the northern extremity of a chain of hills at the approach of the plains watered by the Bendigo and Campaspe affluents of the Murray. Three railways radiate from Sandhurst, one of which, crossing the Murray on a bridge 1,900 feet long at *Echuca*, runs northwards through New South Wales to the flourishing town of *Deniliquin*.

Echuca, the chief riverain port on the main stream, is conveniently situated on a peninsula at the confluence of the Campaspe.

Although not quite so thinly settled as Gipp's Land, the western part of Victoria has not yet developed any important centres of population. *Warrnambool*, *Belfast*, and *Portland* are small trading places following each other along the coast westwards from Port Phillip; but Portland is likely to attract a considerable traffic as soon as the roadstead is sheltered by the new breakwater from the fierce south-east gales. In the interior of this region the largest settlements are *Ararat* and *Stawell*, both founded in mining districts. The Stawell and Sandhurst gold mines are the most productive in the colony; the latter had been sunk in 1888 to a depth of 2,400 feet.

Victoria is one of the Australian states that depend least on the Central Government, which is here directly represented only by the Governor. The Legislative Council, or Upper House, is elected by ballot, each of the fourteen provinces naming three members, one-third of whom retire every two years, so that the whole representation is renewed every six years. The Legislative Assembly, or Lower House, elected by universal suffrage, consists of ninety-four members returned for three years, and receiving an allowance of £300 a year. No allowance is made to the Legislative Council, the members of which body must possess an estate of the annual value of not less than £100, while the electors must own or occupy property rated at £10 if freehold, or £25 if leasehold.

The land forces comprise nearly five thousand men of all arms, and the fleet, which includes an armoured turret-ship and several gunboats and torpedo boats, is manned by about five hundred hands.

#### TASMANIA.

Although the smallest in extent of the Australasian colonies, the island of Tasmania, formerly Van Diemen's Land, has a much larger population than the vast territory of West Australia; relatively to the superficial area it is even the most densely peopled of all these states with the single exception of Victoria. So early as 1804 it began to serve as a penal station, and the Central Government continued to send thither convicts from Great Britain till 1853, the year before Tasmania entered into the comity of the Australasian States: but after its political separation from New South Wales it received most of its free immigrants from that colony. But the discovery of the gold-fields on the mainland brought

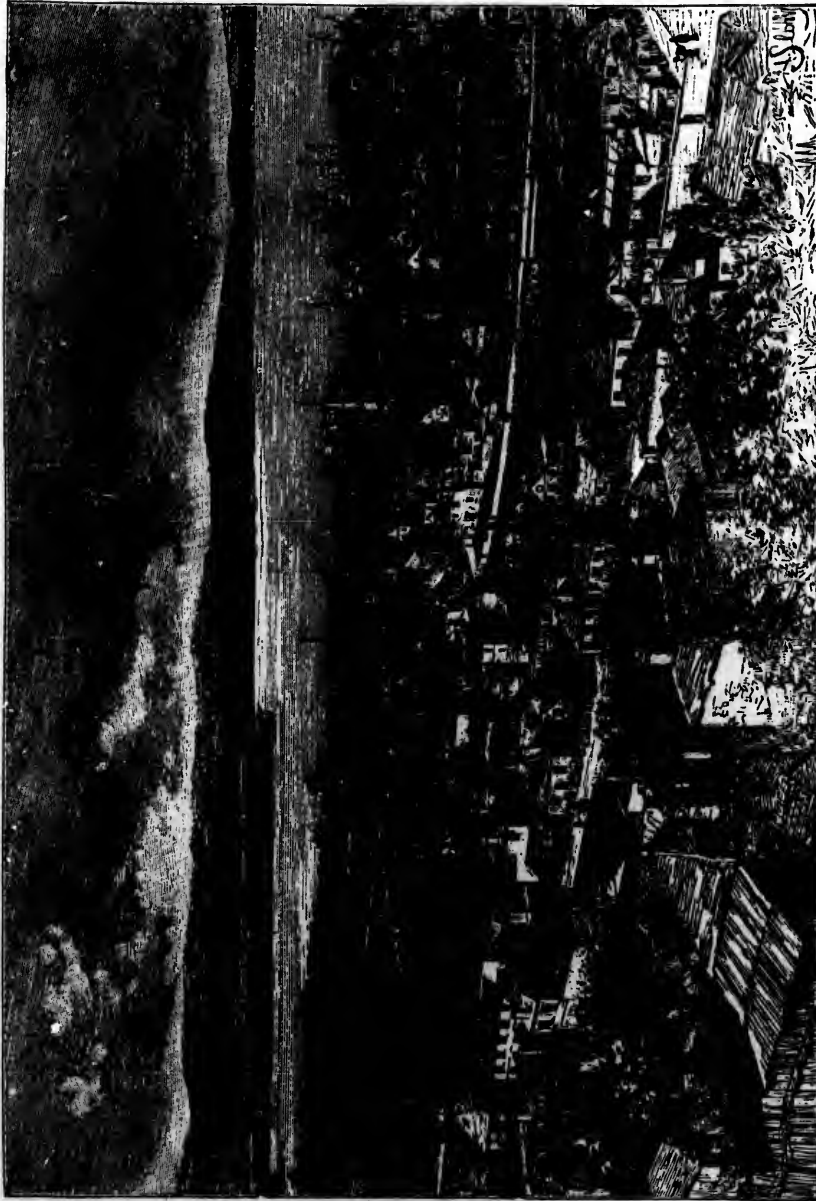
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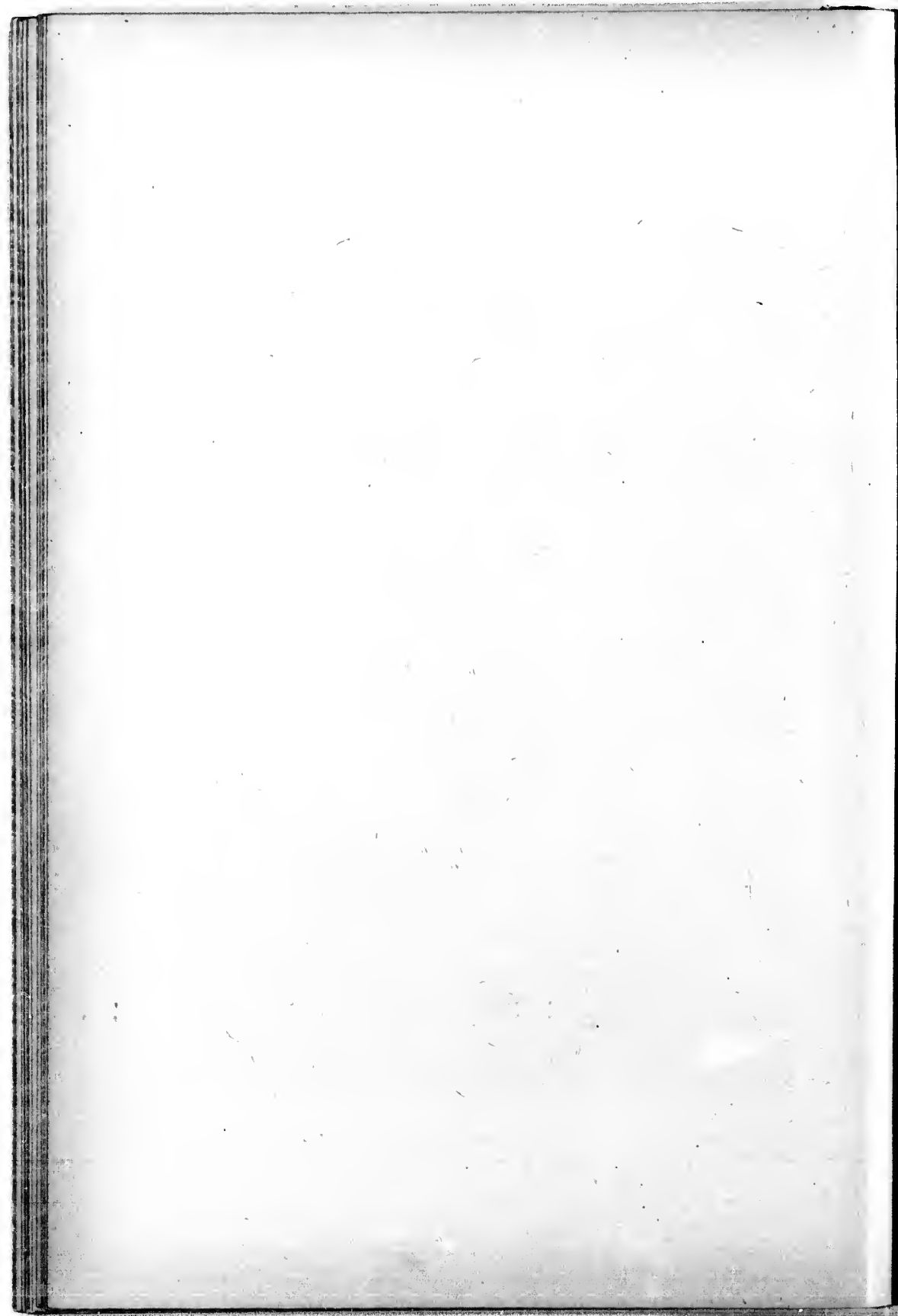
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GENERAL VIEW OF HOBART, TASMANIA.



about a reaction, and the Tasmanians rushed towards the new Eldorado, the prosperity of the island thus diminishing to the advantage of the neighbouring continent. Now, however, a fresh era of prosperity has set in, and the population continues steadily to increase.

Tasmania offers to British settlers a climate which, more than any other in the southern hemisphere, resembles that of their native land. Hence during the dry and sultry Australian summers, numerous temporary visitors come from Victoria and New South Wales to enjoy its fresh marine breezes. As in other Australian colonies, the staple export is wool; but the island also possesses deposits of tin, gold, and silver; another source of wealth are its excellent fruits, which grow in such abundance that the greater part rot on the ground. Tasmania, says Trollope, should prepare jams for the rest of the world.

The island contains only two large towns, and these have been founded at the northern and southern extremities of the depression connecting the two fjords that penetrate farthest inland. Both cities are also connected by a railway, and by a splendid highway, constructed by convict labour. *Launceston*, the northern city, is the chief commercial centre, and already a more important place than the Cornish town from which it takes its name. With its outer port of *Georgetown*, situated at the entrance of the fjord on Bass Strait, it monopolises nearly all the trade of Tasmania with Melbourne, from which it is distant only a day's voyage by steam.

*Hobart Town*, or simply *Hobart*, the southern city, has like Launceston a harbour accessible to vessels of average size, besides an outer port where ships of the largest tonnage can ride at anchor. As capital of the island Hobart possesses the finest buildings and the chief scientific and other institutions in the colony. Its magnificent park, covering an area of over a thousand acres, commands a panoramic view of the surrounding scenery almost unrivalled in Australasia. The western horizon is bounded by Mount Wellington, often snow-clad in winter, and by the other ranges and wooded hills, the headlands fringed with foaming surf, Storm Bay and the winding straits merging in the distance with the Austral seas. Eastwards Storm Bay is skirted by the bold promontory of Tasman Peninsula, broken by numerous secondary headlands, and connected with the mainland only by a narrow rocky ridge. At the southern extremity of this peninsula lies the inlet of *Port Arthur*, which had been chosen as a convict station for the more desperate class of criminals, here guarded both by armed sentinels and ferocious bloodhounds. Now that these painful scenes have passed from the memory of living generations, Port Arthur with its craggy heights, cavernous recesses and seething waters stands out as one of the most romantic spots along the seaboard. At the southern extremity of the peninsula all vessels bound for Storm Bay and the Derwent estuary have to double the frowning cliffs of Cape Raoul, whose black columnar basalt rocks are encircled by a white line of breakers. On the west side of the bay the inlet of Oyster Cove, near which perished the last survivors of the Tasmanian race, has been recently converted into an oyster-bed modelled on those of the French coast.

The western districts of Tasmania, mostly a rugged mountain region, are

almost uninhabited and for the most part even uninhabitable. Here the bare rocky heights, at most covered with almost impenetrable scrub, yield no fodder for cattle, and are clothed in a snowy mantle for eight months in the year. No settlements can be formed in these bleak tracts except at the entrance of a few valleys scarcely sheltered from the prevailing boisterous moisture-bearing winds.

Fig. 181.—HOBART AND THE DERWENT RIVER.  
Scale 1 : 1,250,000.



In this inhospitable region, however, are found all the mines of gold, tin, bismuth and antimony that have hitherto been opened in the island.

The constitution of Tasmania differs little from that of Victoria except in the number of members composing the two assemblies forming the local parliament. The former, numbering eighteen, are elected for six, the latter for five years. The defensive forces comprise nearly 1,000 volunteers of all arms.

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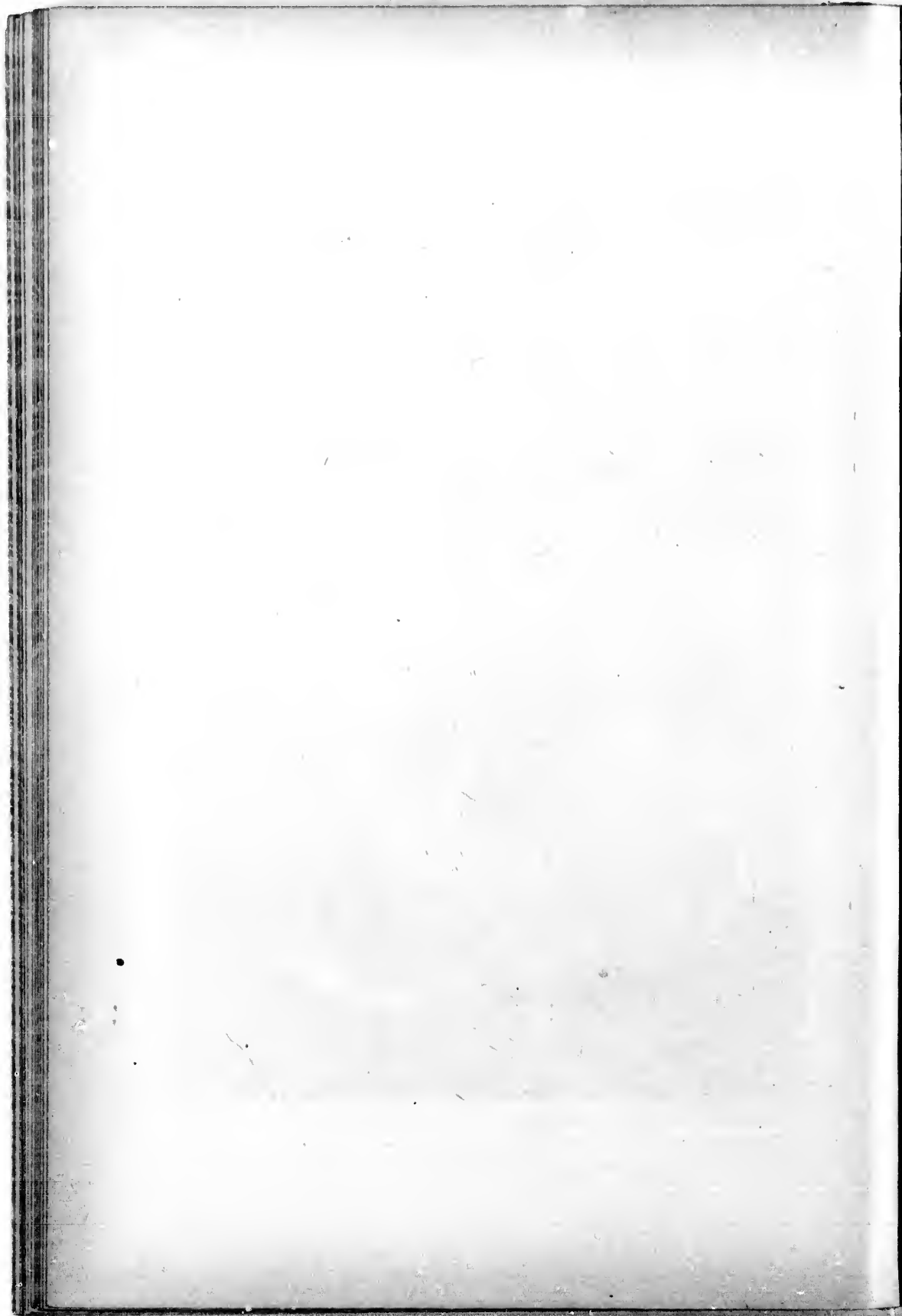
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GENERAL VIEW OF LAUNCESTON, TASMANIA.







## CHAPTER IX.

### NEW ZEALAND AND NEIGHBOURING ARCHIPELAGOES.



THE insular home of the Maori race, which penetrates southwards in the direction of the Antarctic waters, has preserved the name bestowed upon it by its Dutch discoverer. Although the most English of all the Australasian colonies, and often called the "Great Britain of the Antipodes," New Zealand thus still recalls the memory of the great navigator Abel Tasman, who sighted its western shores in 1642, and who at first named it Staaten Land, in the belief that it might possibly be continuous with the other so-named Dutch territory lying to the south of America. In consequence of a sanguinary encounter with the natives of Massacre Bay at the north-west side of the southern island, Tasman continued his northerly course to the extreme headland of the Archipelago without determining the insular character of the lands discovered by him.

This region was not again visited till the year 1769, when Cook touched first at an inlet on the east coast of the northern island, to which he gave the name of Poverty Bay, a name, however, now belied by the magnificent flocks of the surrounding pastoral district. Cook then coasted the seaboard in a southerly direction, and by circumnavigating the whole group showed that it formed no part of the Austral continent which he had hoped to have at last discovered. He again visited these waters on each of his two subsequent voyages, and altogether passed 327 days in surveying the archipelago, the chart of which, prepared by him, is remarkable for its surprising accuracy, even in details. Henceforth, nothing remained to be done beyond following the sinuosities of the coast-line and exploring the interior of the islands. The very year of its re-discovery by Cook, the French navigator Surville landed on the northern island, the shores of which were studied three years later by Marion and Crozet. Marion, with fourteen of his men, was here massacred by the natives, and after this period the whalers began to visit the New Zealand waters, without, however, founding any permanent settlements on the seaboard.

The earliest attempts at colonisation were due to the enterprise of Australian immigrants. A missionary station founded at Pahia, on the shores of the Bay of Islands, near the northern extremity of the archipelago, was soon followed by a settlement of fishers and traders, which sprang up at Kororarika over against

Pahia, and which was peopled by whites and half-castes. A resident magistrate was appointed by the British Government with jurisdiction over the Europeans of the rising colony, but without claiming any authority over the natives, who were regarded as a sovereign people.

Colonisation in the strict sense of the term, that is, with official occupation of the land, began in 1840 by the foundation of the *New Zealand Company*, which purchased territory from the natives and selected a site on Port Nicholson at the south end of the northern island as the capital of its possessions and the starting-point for the peopling of the archipelago. In the same year a French vessel belonging to the *Compagnie Nanto-Bordelaise* cast anchor in Akaroa Harbour, at the extremity of the hilly Banks Peninsula, near the present Christchurch, in the southern island. But when the French landed they found that they had been anticipated by some British officials who had already bought the land. Hence the French colonists had to establish themselves on their domain of 30,000 acres as subjects of Great Britain, and the little settlement became gradually merged in the surrounding English population.

This attempt at colonial annexation in the name of France had the effect of stimulating the action of the British Government and territorial companies. The latter, without even awaiting official approval or sanction, hastened to found villages along the seaboard, and to land immigrant families by the hundred. In 1841 New Zealand, ceasing to be regarded as a political dependency of New South Wales, assumed the title of a distinct colony, and twelve years later, when its white population already numbered some thirty thousand souls, it took its place amongst the Constitutional States of the British colonial empire. This event was followed in 1857 by the discovery of the gold-fields, which made the fortune of the colony by attracting thousands of capitalists and miners. Henceforth the population rapidly increased, and the archipelago now ranks as one of the leading Australasian states, as well as relatively one of the most densely peopled.

Although separated by Cook Strait the two large members of the group are naturally comprised under the collective name of New Zealand, for they form in reality but a single geographical unit, disposed in the same direction, presenting the same physical conformation and standing on a common submarine bed. The North Island, Marion's "Austral France," is the smaller of the two, and is occasionally designated by the Maori name of *Ika na Maui*, the "Fish of Maui," in reference to a native heroic legend. Another Maori name is *Aotea-roa*, that is, the "Great Expanse," or according to Kerry Nicholls, the "Bright Sun."

The South Island bears the native appellation of *Tevahi Panamu*, which, though variously interpreted, probably means "Land of Jade" (A. S. Thomson). Foveaux Strait separates South Island from the much smaller but steep and elevated Stewart Island (3,000 feet), which was also for a time formerly known as South Island. This is the *Raki-rua*, or "Arid Land" of the Maoris. The archipelago terminates southwards in the isolated peak of the Snares, which is encircled by a few rocky islets first sighted by Vancouver in 1791.

Many geographers have called attention to the remarkable resemblance of

New Zealand in its outward form to the Italian Peninsula, disposed, however,

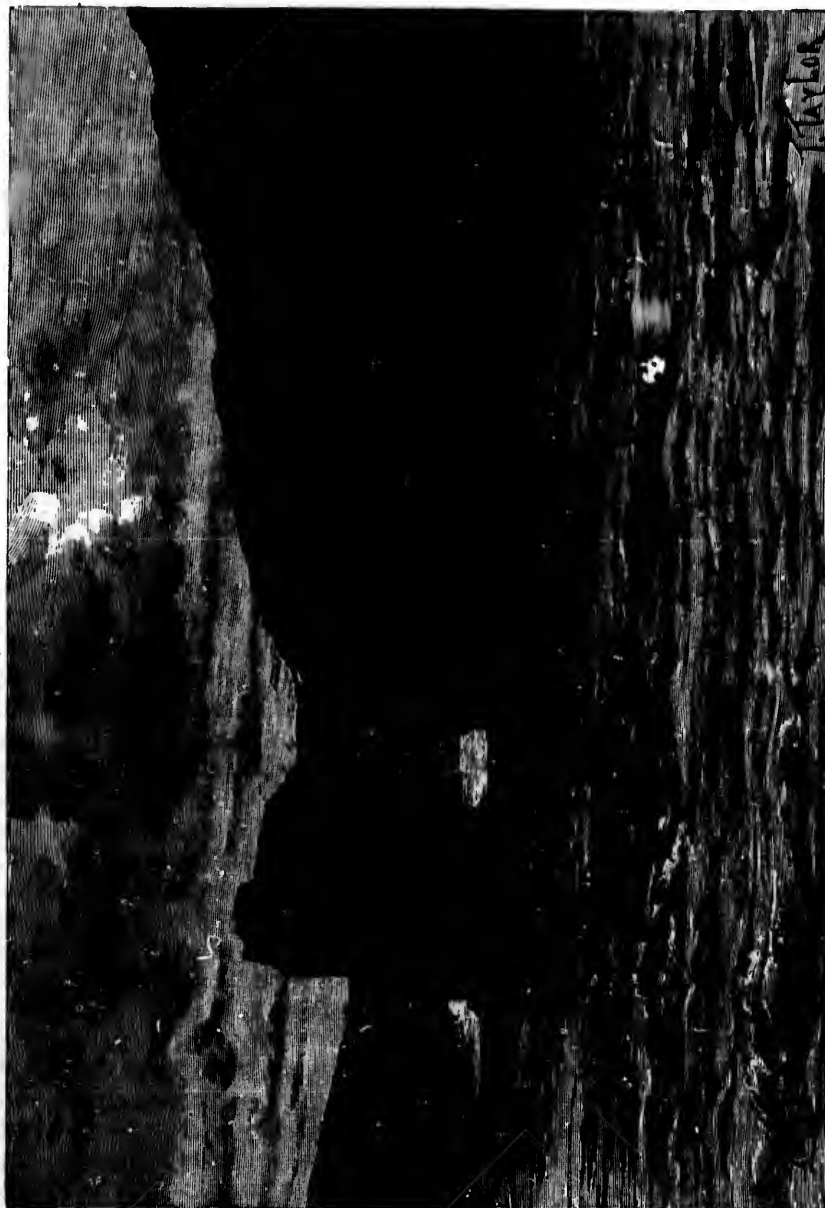


Fig. 182.—VIEW TAKEN AT ANTIPODES ISLAND.

in a reversed direction. Thus the north-west point corresponds to the Cala-

brian peninsula, while the north-east extremity recalls the "heel" of Otranto. Nevertheless, in their general relief the two antipodal regions present scarcely any analogy.

The general lie of the land is from south-west to north-east, and the submarine exploration of the Pacific also shows that in this part of the ocean the other insular groups are disposed in a like direction. The same remark applies to various other islets, such as the little Auckland Archipelago, the volcanic rocks of Campbell and Macquarie, and Emerald Island, discovered at the beginning of this century. North of New Zealand the chain of upheaved land becomes slightly deflected and is continued through the Kermadec Islets to the Tonga Archipelago. Lastly, the Chatham, Bounty, and Antipodes groups, lying more to the east, are all disposed parallel to the general axis of New Zealand. The Antipodes, better named the Penantipodes by Waterhouse, who discovered them in 1850, scarcely deserve their name, for they do not stand quite opposite the Observatory of Greenwich, as was supposed by the English explorer. Their position ( $49^{\circ} 42'$  south lat.,  $178^{\circ} 43'$  east long.) corresponds exactly to Barfleur Point on the opposite face of the globe, that is, 120 miles south-west of the astronomic point indicated by Waterhouse. The Antipodes are inaccessible granite rocks pierced with caverns and galleries through which the water rushes with thundering echoes. Mount Galloway, culminating point of the large island, rises to a height of 1,320 feet.

On the west the mainland is continued by two elevated submarine banks, which take a north-westerly direction. One of these banks, terminating in the pyramidal rocks of the Lord Howe group, is separated by deep waters from Moreton Bay on the Queensland coast. The other, forming a seaward prolongation of the north-west peninsula of New Zealand, rises above the surface at Norfolk Island, and again at the Chesterfield Reefs, west of New Caledonia, beyond which it merges in the Great Barrier Reef. These relatively shallow oceanic waters, where the soundings seldom reveal depths of over 900 fathoms, are supposed by some geologists to indicate the line of direction of the now submerged lands formerly connecting New Zealand and Australia in a vast continent corresponding to Africa and South America in other parts of the southern hemisphere. According to this view the New Zealand highlands would form the eastern coast range of the drowned continent, although, unlike most other coast ranges, they do not rise above the deepest oceanic waters. The sea is much shallower at the foot of the New Zealand Alps than along the east side of the Australian Alps.

#### PHYSICAL FEATURES OF SOUTH ISLAND.

The Alpine chain which gives the South Island such a striking resemblance to the Scandinavian uplands begins with the volcanic group of the Snares, beyond which it traverses Stewart Island, a fragment of a hilly plateau, consisting, like the mainland, of granites and old sedimentary formations. The backbone of the South Island mainly follows the west coast, which is very steep, with rocky walls rising in many places abruptly above the neighbouring waters. On the other hand the eastern slope is relatively but slightly inclined, but here the fall is

broken by ridges running parallel to the main axis and consisting chiefly of debris that has been carried by ancient moraines down to the valleys. In the southern part the uplands present the aspect, not of a continuous range, but rather of a plateau from 3,500 to 4,000 feet high dotted over with pyramidal eminences some hundred yards high. But this plateau gradually contracts northwards until at Milford Sound it is reduced to a mere crest dominated by the tower-shaped Castle Mountain (7,210 feet). Beyond Milford Sound the range rises higher and higher, presenting a succession of snowy peaks as far as Mounts Earnslaw (9,165 feet) and Aspiring (9,940 feet), which may be regarded as the southern limits of the New Zealand Alps properly so-called. This range, however, is abruptly interrupted by a gorge, no similar example of which is presented by any other large mountain system. Ascending a steep ravine, which is traversed by a foaming torrent, and crossing a sill about 16 feet high composed of debris, we reach a narrow plain sloping imperceptibly westwards down to the basin of the river Awarua (Haast). The gorge, which can hardly be called a pass, has like the neighbouring river been named after the late geologist and explorer, Von Haast, to whom we owe the most careful study of the New Zealand orographic systems.

North of the transverse fissure the mountains still continue to rise, and in this part of the island, about the middle of the waterparting, stands the giant of New Zealand, the "heaven-piercing" Ahravaigi, now Mount Cook, which attains an altitude of 13,200 feet. This glittering peak overtops all other summits, which have for the most part been named after distinguished naturalists, such as Darwin, Lyell, Hochstetter, Elie de Beaumont, and Malte-Brun. North of Mount Cook the Alps maintain an elevation of over 8,000 feet without any great breaks for a distance of about 120 miles, as far as Harper's Pass, which affords a communication 3,500 feet high between both slopes. But although this is the terminal point of the Alpine crest, some lofty masses, such as Mount Franklin (10,000 feet), still occur in the line of the main axis.

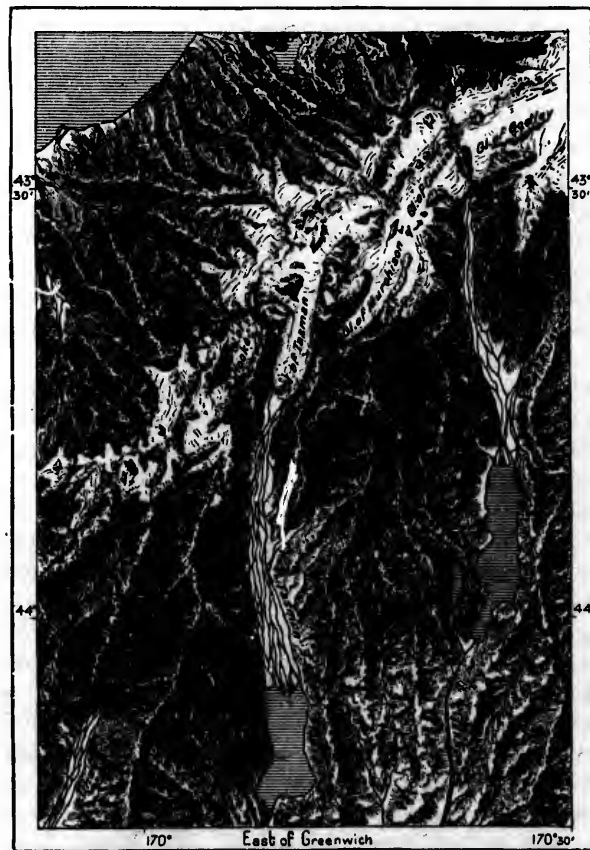
Farther on the system ramifies in all directions, the highest ridge continuing to follow the west coast, where the last lofty summit is Mount Arthur, 5,800 feet high. One of the offshoots of this branch sweeps round Golden Bay to Cape Farewell, north-eastern extremity of the island. It was in this district that the natives found the nephrite used in the preparation of the arms and ornaments which were so highly valued by the chiefs.

The New Zealand Alps rise high above the lower limit of perpetual snow, which here stands at from about 7,900 to 8,000 feet. Round Mount Cook the snowfields cover many hundreds of square miles, dominated by glittering peaks and discharging glaciers down both slopes of the mountains. On the east side descend such magnificent frozen streams as the Tasman, commanded eastwards by the isolated peak of Malte-Brun, whose outlines vaguely recall those of the Cervin. In amplitude the Tasman may be compared with the largest glaciers of the European Alps, being 12 miles long, and nearly 2 broad at its lower extremity, which is still 2,340 feet above sea-level; but the greater part of its surface remains concealed beneath heaps of shingle and mud.

On the west side the glaciers, being fed by more abundant snows, descend much lower, that of Cook approaching to within 790 feet of the sea-level. But here the valleys are too short to allow the congealed rivers the same development as on the east slope. On both sides, however, all the glaciers were formerly far more extensive than at present, as shown by the still existing moraines, polished rocks,

Fig. 183.—TASMAN GLACIER.

Scale 1 : 800,000.



and lakes. According to Green the New Zealand glaciers have again entered on a period of expansion.

While the highlands are still in the glacial epoch, the plains, and especially those of South Island, have reached the lacustrine phase. The beds of the former frozen streams are now partly filled by lakes, which are dammed up at their lower end by old frontal moraines, and which higher up are gradually being filled up

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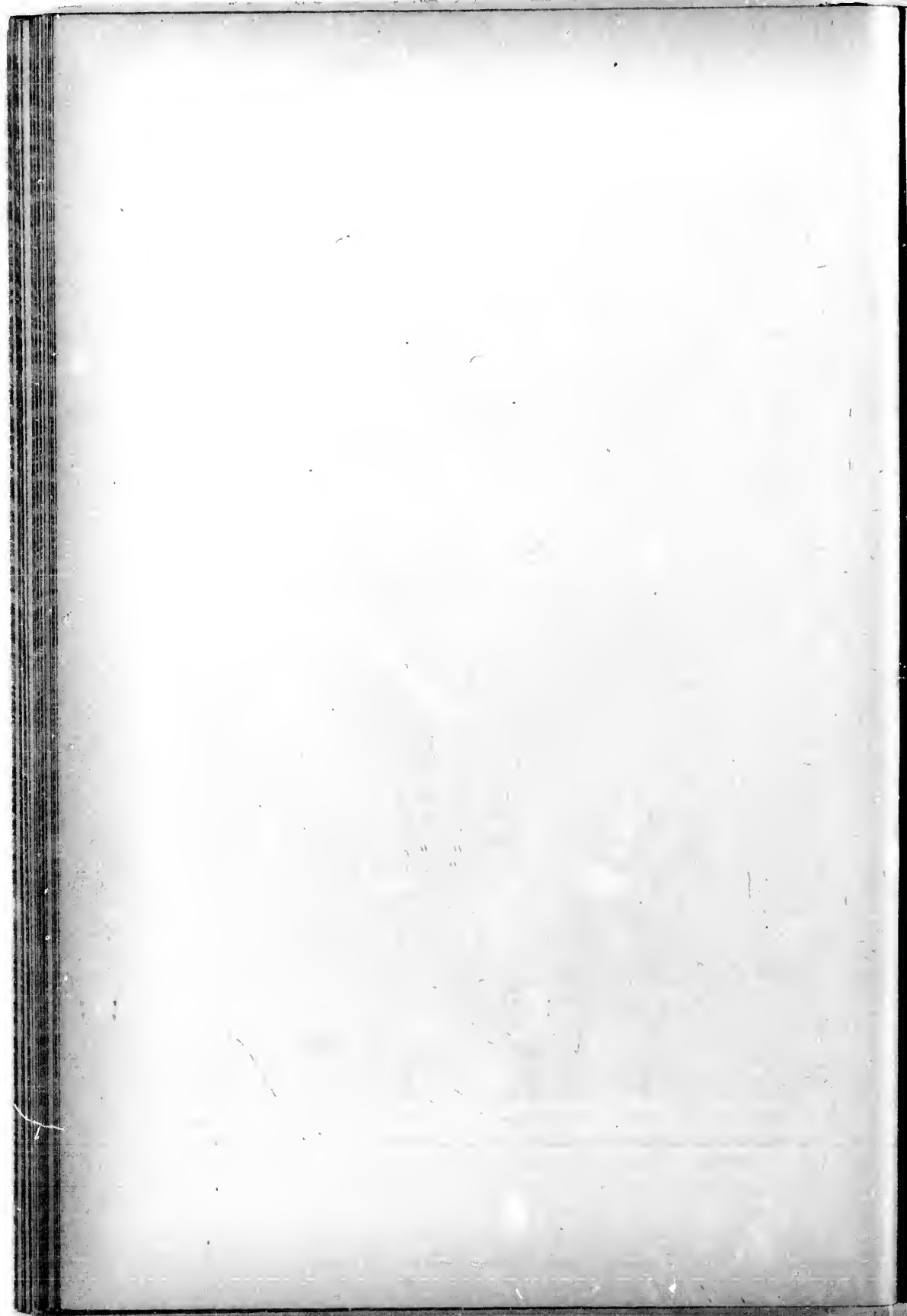


SOURCES OF THE WAIKAKARIRI, NEW ZEALAND.

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by the sedimentary matter washed down with the mountain torrents. Without counting numerous sparkling ponds or tarns less than a square mile in extent, South Island contains about sixty basins, some of which cover an area of over 40 square miles and fill cavities 300 feet and upwards deep. Nearly all these great reservoirs are grouped in the southern part of the island and on the east slope of the mountains. Rising abruptly above the western seaboard, the New Zealand Alps have too precipitous a slope on this side to allow the running waters to collect in large basins. But the opposite declivity and the plains stretching thence to the east coast present numerous depressions where the glaciers have been replaced by lakes, most of which have been formed in the intermediate zone between the uplands and the plains. A straight line drawn across the chief flooded basins from north-east to south-west for a distance of about 200 miles would run parallel to the main Alpine chain, and would represent the direction of the axis of the southern island.

The northern group of lakes east of the highest section of the Alps appears to be merely the remains of a labyrinth of inland waters, which formerly occupied the vast Mackenzie Plains, and which are now disposed in countless secondary cavities by moraines, heaps of erratic boulders, dams and sedimentary deposits. These basins—Te Kapo, Pukaki, Ohau—were formerly much deeper, and are now rapidly silting up, just as those farther north have already been filled in which were at one time traversed by the river Waimakariri. The day may be predicted when the glacial waters of the Waitaki, which now issue in a crystal stream from the flooded depressions, will roll down in a turbid current to the plains. Although its course scarcely exceeds 120 miles in length, the Waitaki is none the less a great river, according to W. N. Blair five times more voluminous than the Thames, although this writer gives no data in support of his statement.\*

Farther south the Clutha, which receives the overflow of the central group of lakes, is a much larger watercourse, being compared by the same author with the Nile. It is certainly the first river in New Zealand both for size and volume, its catchment basin exceeding 8,000 square miles in extent. The Clutha has also been more thoroughly explored than any other stream in South Island, thanks to the rich gold-fields, which since the year 1862 have attracted thousands of miners to the region about its headwaters. Wakatipu, one of the lakes belonging to this system, is no less than 50 miles long, but only from 1 to 3 miles wide. It thus presents the aspect of a winding river, without visible current, with a mean depth of no less than 1,200 feet, and in its profoundest chasms sinking to 1,400 feet. On both sides the encircling hills plunge abruptly into these abysmal waters.

Te Anau, largest of all New Zealand lakes, lies beyond the Clutha basin at the head of the Waiau, a short stream flowing to the south coast. The lake fills a long valley and several tributary branches for a space of 140 square miles, and in its deepest part the sounding line has measured 940 feet. Te Anau is separated by a narrow isthmus from Manapuri (Manipori), another lacustrine basin, which is also said to be very deep, and which branches into numerous creeks and bays, winding

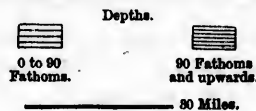
\* *Scottish Geographical Magazine*, November, 1887.

between numerous islands and steep rocky headlands. The Maoris who formerly dwelt in these now almost deserted uplands never ventured without a sense of awe to approach the shores of this lake, in whose gloomy waters were reflected the dark forest-clad slopes of the encircling hills. The name Manapuri, that is, "Sad Heart," possibly expresses the sense of melancholy inspired in them by the god concealed in this silent lake.

To the lakes on the east slope correspond the fiords indenting the west side of

Fig. 184.—FIORDS OF SOUTH-WEST NEW ZEALAND.

Scale 1 : 2,200,000.



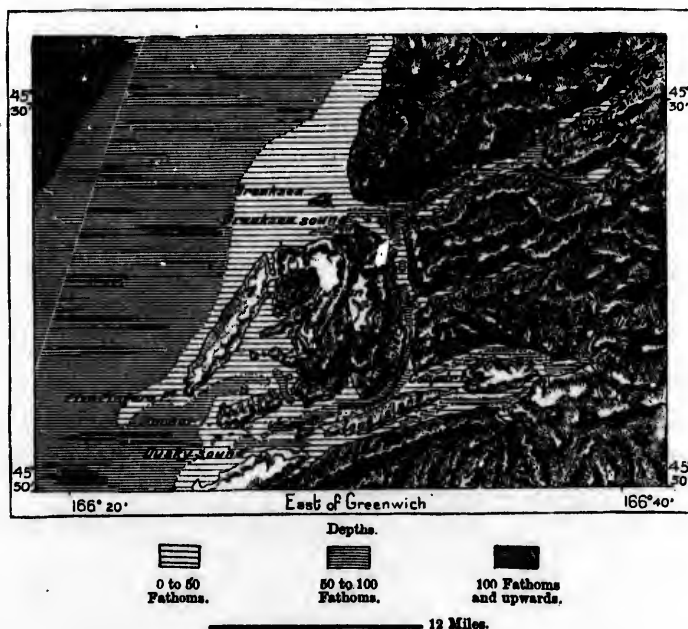
the southern plateau of the New Zealand Alps. Both are of analogous formation, the only difference being that the eastern depressions are flooded with freshwater, while those on the west are saltwater basins communicating with the sea. In this region of the archipelago the contrast is consequently the same as that presented by the eastern and western valleys of the Scandinavian Peninsula, where Sweden with its lacustrine and fluvial valleys corresponds to Norway with its marine

indented seaboard. As in the northern region, the New Zealand fiords, or sounds, as they are here called, occur only at the issue or at the converging points, where glaciers filled the primitive valleys, protecting them from the deposits of debris which were formed round about wherever the surface was not covered with layers of ice. Neither moraines nor alluvial matter could help to fill these profound depressions, which were preserved in their original form by the frozen streams occupying all their cavities.

But as soon as the glaciers withdrew above sea-level and their lower reaches became gradually converted into running waters, the levelling-up process set in. Avalanches, landslips, torrents, marine waves, and currents combined to fill up the

Fig. 185.—BRAKESA AND DUSKY SOUNDS.

Scale 1 : 600,000.



basins, which thus became transformed at first to chains of lakes, then to swampy tracts and fertile plains. All the fiords that formerly existed north of 44° S. latitude have already been obliterated, and those still surviving are now all concentrated in a space about 80 miles long in the south-west corner of South Island. The largest, as was to be expected, are those which open exactly at the southern extremity of the seaboard. Such are Preservation Inlet, Dark Cloud Inlet (Chalky Sound), and Dusky Sound, which last has an area of no less than 80 square miles. The northernmost fiord in New Zealand, or in any region of the southern hemisphere, is Milford Sound, a magnificent sheet of water, in which are mirrored the surrounding snowy crests, glittering peaks and verdant headlands. Sheer above

the surface rise the rocky walls of the encircling hills, through whose fissures are precipitated several sparkling waterfalls.

All the New Zealand fiords offer a general resemblance in the length, narrowness, and great depth of their troughs, which present as a rule but few ramifications. Nevertheless several are connected by lateral branches, which thus form islands of regular outline along the seaboard. In the central parts these inlets have an average depth of over 700 feet, while Milford Sound, deepest of all, averages 1,180 feet. All without exception have a sill or bar at the entrance, like the "sea-bridges" of the Norwegian fiords, and the seaboard is everywhere washed by relatively shallow waters. Depths equal to those of the sounds are not met in the open sea within 60 miles of the coast.

Is this phenomenon due to the vast quantities of refuse formerly brought down by the glaciers from the uplands? Or are the submarine banks the remnants of mountain ranges first destroyed and then redistributed in regular layers? Or are they to be referred to geological agencies more potent than the glaciers? The general form of the coast, disposed in regular convex curves between the fiord estuaries, seems to point at the action of a powerful current, by which the old beach was eroded and the débris deposited far seawards. On the east side, on the contrary, the land has encroached on the marine waters, the rivers with their sedimentary matter developing vast alluvial plains protected at two points from erosion by volcanic promontories. One of these is Cape Saunders, under the shelter of which Otago harbour has been opened; the other is the much bolder Banks Peninsula, a superb and completely isolated mountain mass indented with several deep-water creeks and bays, such as Akaroa Harbour, Pigeon Bay, Port Levv, and Port Cooper. The south side of Banks Peninsula is connected with the mainland by a strip of marine sands enclosing an extensive muddy lagoon. The whole formation presents a surprising resemblance to Monte Argentaro on the Italian coast. Excluding the minor indentations and windings of the seaboard, Thomson estimates the whole New Zealand coast-line at over 3,000 miles.

#### PHYSICAL FEATURES OF NORTH ISLAND.

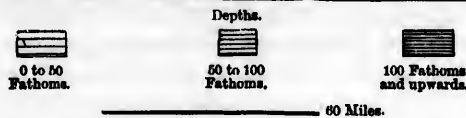
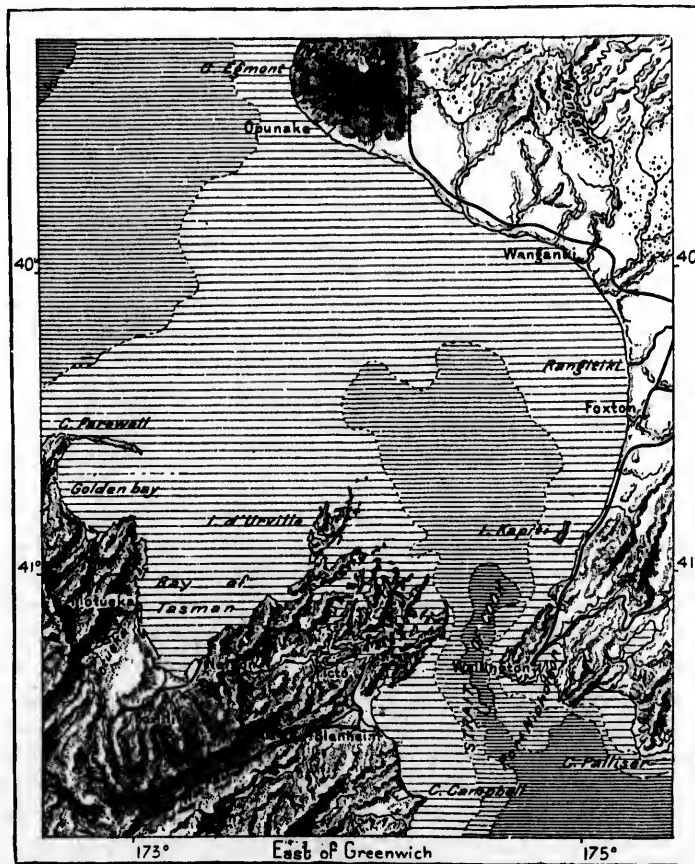
Despite the deep gap caused by Cook Strait, the eastern ridges of South Island are continued on the opposite side by low parallel crests disposed in the same normal direction from south-west to north-east. But while in the south the Alpine system skirts the west coast, in North Island the ranges are developed along the east side, or at least within 50 miles of the shore. The foundation on which they rest forms almost a separate region, a long quadrilateral terminating in the south-west and north-east in massive peninsulas, and attached to the rest of the mainland by extensive plains and rocky ridges, which south of Lake Taupo rise to a height of about 3,000 feet. In this eastern region the culminating point is Mount Hikurang (5,550 feet), which is situated not far from East Cape. The short Kaimawana chain, whose wooded slopes are often snow-clad to the summit, belongs to the same orographic system in its general disposition and the character of its old rocks, schists, sandstones, and quartz interspersed with veins of diorite. The crests of

Kaimawana, which lies near the centre of the island, attain an altitude of 5,900 feet.

West of these uplands the rest of the island is occupied by volcanic masses, disposed for the most part without apparent order and separated from one another

Fig. 186.—COOK STRAIT.

Scale 1 : 3,000,000.



by lakes and deep valleys. Mount Ruapehu, highest in North Island, forms a whole cluster of cones whose common base, resting on a plateau over 3,000 feet high, has a circuit of no less than 60 miles. From the two snowy points of the loftiest pyramid, nearly 9,000 feet high, the eye sweeps over a vast horizon

embracing nearly the whole island away to the easternmost headlands. The western slopes of the extinct volcano are finely timbered, while on the other side stretches the uninhabitable Onetapu desert thickly strewn with the ashes and scorix ejected from the Ruapehu craters at some unknown epoch. But at one time even this dreary solitude was covered with large forest trees, whose charred stems are found beneath the overlying refuse.

A level space of about 5 miles separates the base of Ruapehu from that of the still active Tongariro volcano, which rises farther north on a pedestal about 3,000 feet high. But the deep trough encircling the mountain seems to show that perhaps at one time there stood on this spot a vast crater, from which gradually rose the Tongariro cone, a perfectly regular pile of ashes and scorix, whose terminal crater according to Nicholls is now about 8,200 feet high. The volcano, nearly always in a state of eruption, was till recently strictly "tabooed" by the natives. Nevertheless it has been scaled, its summit affording a superb view of the great crater and smaller lateral mouths vomiting forth dense clouds of sulphurous vapours. Across the wreaths of smoke waving on the breeze the observer detects a few pools of blue water flooding the terminal depressions of the parasitic volcanoes. Farther north Mount Ketotahi also discharges dense vapours, while the regular cone of Mount Pihanga, commanding the south side of the great Lake Taupo, has long been extinct. A Maori chief recently deceased has bequeathed the volcanic masses of Ruapehu and Tongariro to the New Zealand people as a "national park," to be guarded for ever from the encroachments of private property.

Lake Taupo, occupying almost exactly the geographical centre of North Island, also belongs to the New Zealand volcanic system; the hypothesis has even been advanced that it was formerly a crater of prodigious size. This view is certainly not justified by the irregular form of the basin, which, however, is bordered by volcanoes, whence have been discharged enormous quantities of lava, pumice and scorix. The first eruptions probably took place beneath the sea, the ejected matter gradually separating from the ocean a large inlet, which in course of time became transformed to a saltwater and then to a freshwater lake by the action of rain, snow and other agencies.

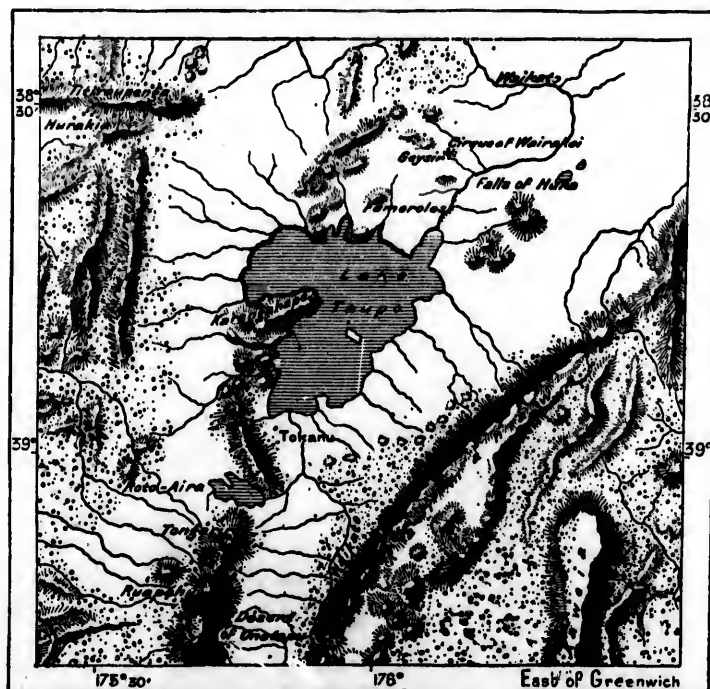
It is a remarkable coincidence that the Maori word Taupo has the meaning of "Formerly Flooded Rock," as if the natives had a tradition about the gradual upheaval of the land. All the central part of the island west of the old formations dominant along the main axis consists of pumice several hundred yards thick and covered with humus partly derived from disintegrated trachytes. The mountains in the east, the volcanoes in the west and the ashes and scorix in the intermediate space, have pent up the central reservoir, thereby raising its level to the convex surface of the shield-shaped plateau which occupies the central part of North Island. Taupo stood at one time even at a higher level, as shown by the clear lines of the old beaches along the face of the surrounding slopes. But it has been partly emptied by the emissary, which has gradually eroded the heaps of pumice confining the lacustrine basin on the north side. At present the level of the lake

is 1,200 feet above the sea, while its superficial area exceeds 300 square miles; in some places it is shallow, but towards the centre has a depth of several hundred yards. Of its seventeen affluents the largest is the Waikato, which skirts the foot of Mount Pihanga, and is now slowly encroaching with its sedimentary matter on the southern part of the lake. The Waikato, whose name simply means "Running Water," rises amid the upland snows of Ruapehu near another stream, which flows to Cook Strait.

The river through which Taupo sends its overflow northwards to the Pacific

Fig. 187.—LAKE TAUPO.

Scale 1 : 1,100,000.



also takes the name of Waikato, and, like the Rhone, the upper and lower Waikato are popularly supposed to form a continuous stream traversing the lake without intermingling their currents. Like the Rhone the Waikato also plunges into deep gorges cut through successive layers of pumice rising one above the other in perfectly regular terraces. At several points the base of these crumbling cliffs is lined by fissures emitting smoke, suggesting from a distance the fires kindled by fishermen. The waters of Waikato are of a lovely opalescent colour, said to be due to the silica with which they abound. Within six miles of the outlet the river is crossed by a ledge of hard trachyte, over which it plunges some



50 feet into a wide basin of eddying waters. Farther down it receives on its left bank a broad thermal stream descending from the Wairakei Cirque, where numerous geysers with silicious margins jet up in all directions amid the surrounding forest. Here and there fallen stems may still be recognised beneath the crystalline incrustation by which they have been gradually coated. At the foot of a hill a jet of hot vapour at a temperature of 252° F. rushes with a ceaseless hissing sound through the air. This geyser may at times be detected from a distance of 50 miles round about, and the Maoris navigating Lake Taupo study its varying phases as trustworthy weather forecastings.

Below its confluence with the thermal stream, the Waikato describes a great bend to the east across the pumice-strewn plateau, beyond which it trends north-westwards to the west coast, where it enters the sea through a wide estuary south of the Auckland Peninsula.

Between the Waikato valley and the Bay of Plenty on the north-east seaboard, the plateau is occupied by another group of volcanoes and of lakes, either old craters or reservoirs formed by barriers of eruptive matter. Roto-rua, that is, the "Second Lake," largest in this region, lies to the west of the other basins at the east foot of Mount Ngongotaha (2,530 feet). Roto-rua, about 30 square miles in extent, presents a charming view with its green islets, the hills and headlands rising above its margin, the forests and thickets fringing the river banks. But the whole of this region is a veritable land of wonders, conspicuous amongst which are the springs and fountains which burst through the ground on the west side of the lake, and which are endlessly diversified in their form, size, periodicity and chemical composition. The district in a constant state of tremor occupies a zone 3 or 4 miles long, and about a mile broad, along the margin of the basin. Within this narrow space are concentrated the most varied igneous phenomena, intermittent fountains, erratic jets disappearing in one place to reappear in another, tranquil pools of clear water scarcely ruffled by a few bubbles, cold, tepid, hot, or boiling springs, some sulphurous, others saline or acidulated, solfataras, fumeroles, geysers, and the like. One of the geysers rises to a height of 60 feet above a silicious cone 50 feet high, the vapour escaping with a hissing noise, and the water bursting out with a roar as of thunder. The thermal and mineral waters, whose curative properties had formerly attracted the natives from all quarters, are now visited even by the European settlers, who have erected a sanatorium on the banks of the lake.

East of Roto-rua follow other lacustrine basins, such as Roto-iti, or the "Little Lake," Roto-ehu, the "Muddy Lake," and Roto-ma, the "White Lake," all of whose short emissaries flow northwards to the Bay of Plenty. Farther south, at a mean altitude of 1,000 feet, are grouped other lakes, the largest of which is Tarawera, dominated eastwards by the volcano of like name. This "Burnt Rock," as the word is interpreted, has the form of a truncated cone of formidable aspect, whose red and black taluses rise 1,000 feet above the lake.

Tarawera was supposed to be extinct till the year 1886, when one winter's night it suddenly awoke. The whole region was shaken by a tremendous shock,

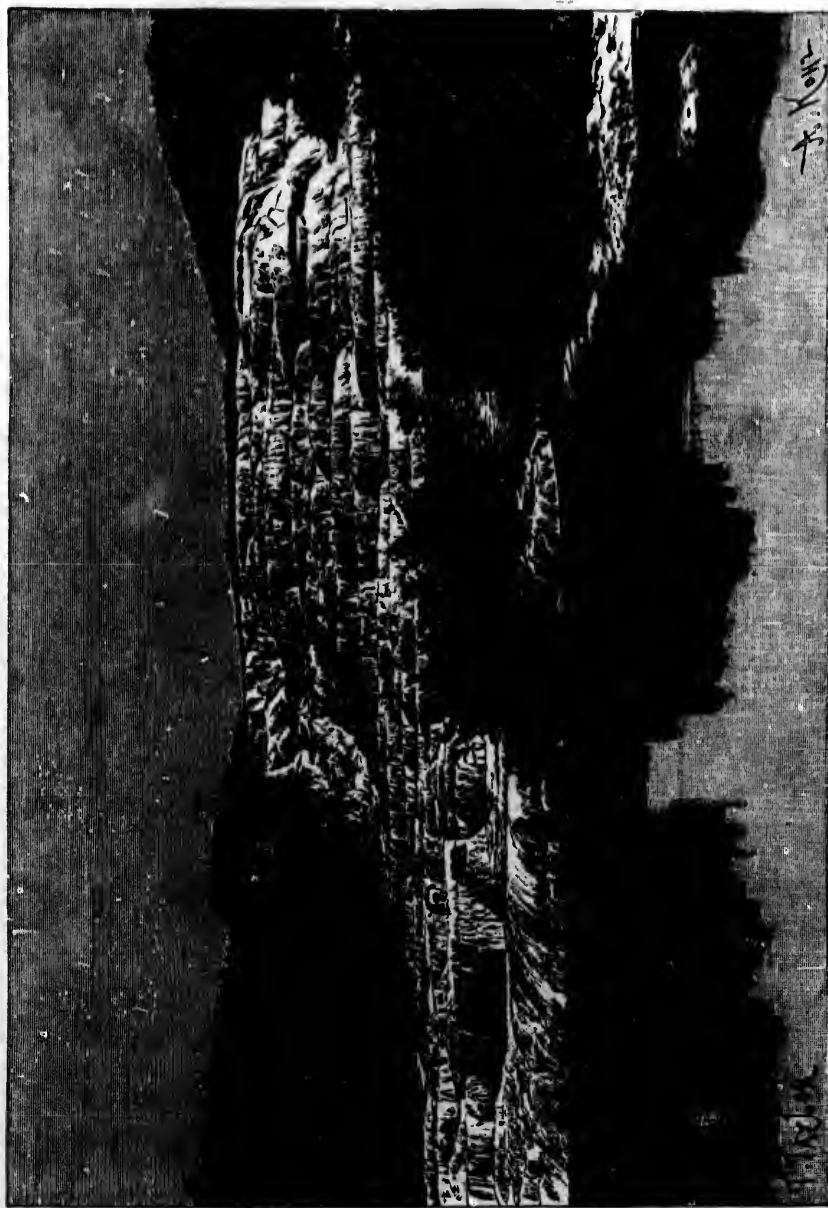
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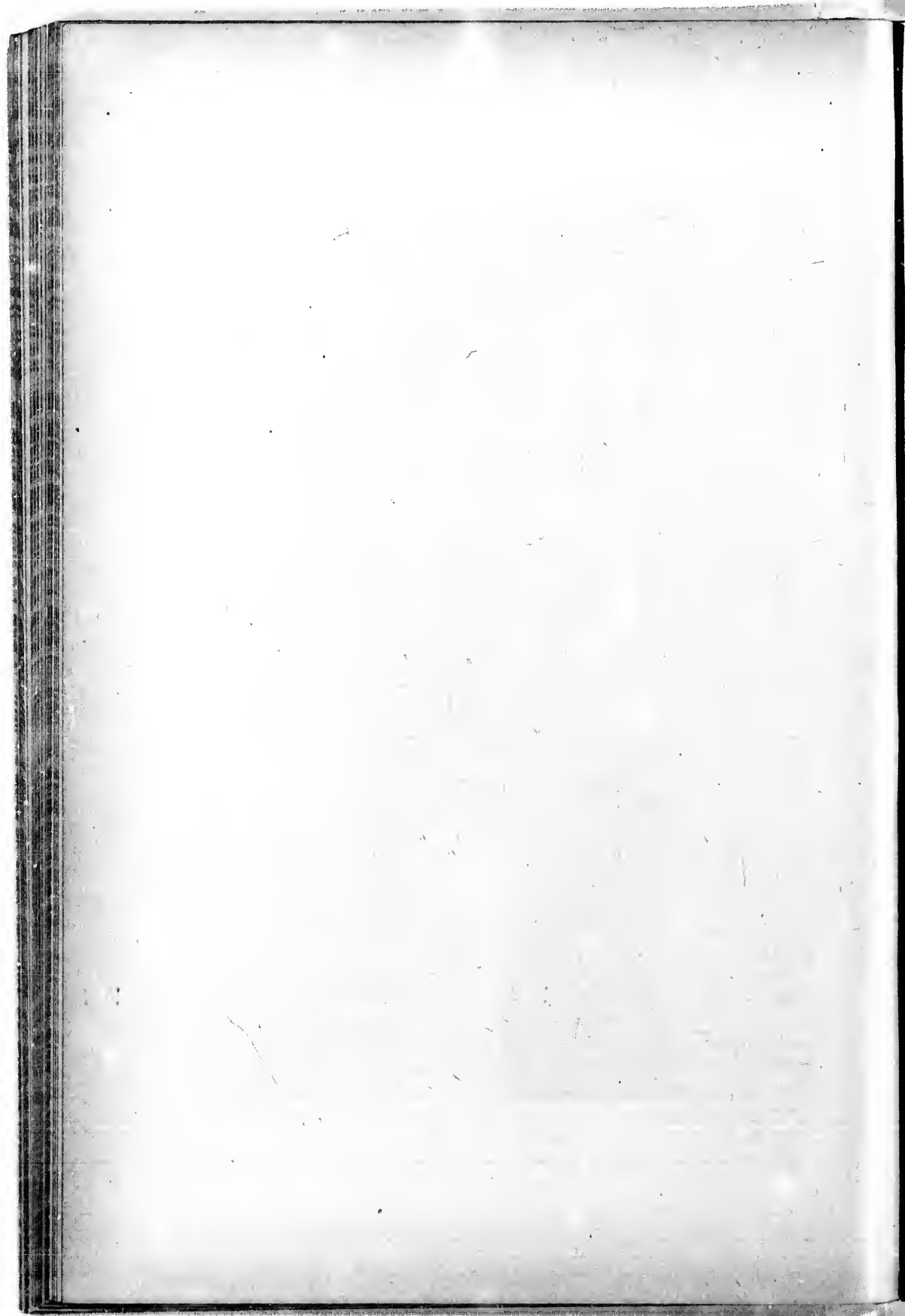
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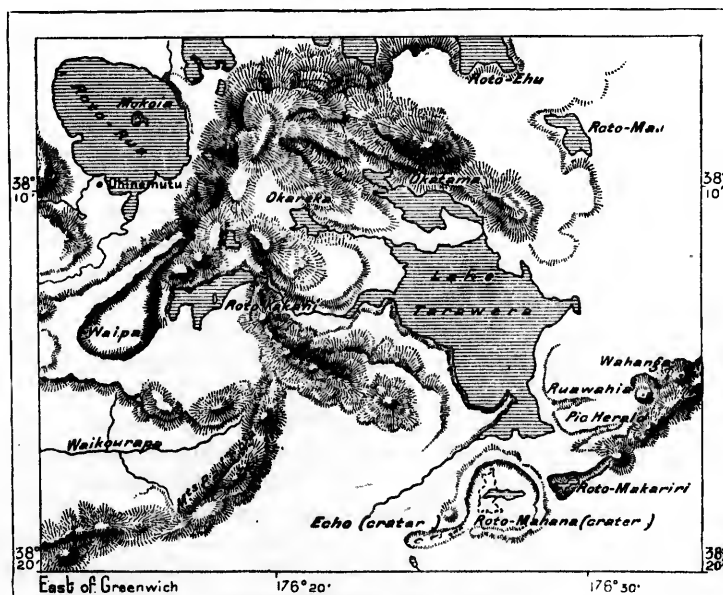
THE PINK TERRACE OF ROTO-MAHANA BEFORE THE ERUPTION OF 1884



crevasses opened on the flanks of the volcano, whose summit, reduced to ashes, was hurled into the air in the form of a column of vapours and flaming scoria. The ejected matter, which was visible over 150 miles off, rose to a height of 20,000 feet and fell in dense showers on the surrounding district. Whole villages were crushed beneath the weight of the dry ashes, or changed to heaps of mud by the raging storm that had gathered round the burning mountain. When people could again venture to approach Tarawera, they found the whole aspect of the land transformed, and in some places buried beneath a uniform layer of volcanic dust. No trace was left of the "Wonder of Wonders," the famous

Fig. 188.—LAKE TARAWERA.

Scale 1 : 300,000.



Roto-mahana before June 10, 1886.

6 Miles.

mineral spring of Te-Tarata, on the site of which there appeared a mud volcano over 500 feet lower than the level of the old lake. Before the explosion the waters falling into Roto-mahana, or the "Hot Lake," rose in intermittent jets in a flooded crater about 650 feet in circuit and 80 feet above Roto-mahana. After filling this crater the waters overflowed its transparent, alabaster-like silicious margin, falling in thin azure sheets from basin to basin, all with perfectly semicircular white rims due to the regular undulation of the water circulating in uniform eddies round the cascades. As its temperature fell the water, saturated with silica and sulphurous substances, gradually changed in colour from the

sapphire tints of the upper basin to the turquoise hue lower down and a slightly azure shade at its entrance into the lake. At present these "white" and "pink terraces" are shrouded beneath a heap of scoria. But the hidden forces are coming to the surface at other points, and if vulgar speculators are prevented from manipulating the mineral springs and converting them into "rare shows" with charges for admittance, the phenomena of this volcanic region will always continue to rank amongst the most remarkable spectacles of Nature's laboratory.

The Awa o te Atua, or "River of the Gods," as the lacustrine emissary is called, flows at first north-eastwards, and then, after sweeping round the extinct Putauaki volcano, unites with the Rangitaiki, the chief watercourse of this slope, which falls into the Bay of Plenty. But the volcanic region is still continued beyond the mainland, and in the middle of the bay rises the cone of Whakari, or White Island, which although only 850 feet high, at times ejects sulphurous vapours over vast spaces. The crater, which tilts a little to one side, is one and a-half mile in circumference, and the interior is completely filled with fumeroles, solfataras, jets of vapour and hot springs. Whakari may be regarded as the northern extremity of the volcanic axis, of which the south-west end is occupied by the superb Ruapehu volcano. According to a Maori legend the Whakari crater is connected with that of Tongariro by an underground passage, and it was through this passage that the messengers of the gods brought the sacred fire to the central volcano of North Island.

New Zealand has no other still active volcanoes; but some of those now extinct are of imposing grandeur. Taranaki (Mount Egmont), which fills a whole peninsula at the south-west angle of North Island, was formerly an island, whose base became gradually attached to the mainland by the accumulating deposits of scoriae. Its supreme crest, nearly 8,300 feet high, is overtopped in the northern island by Ruapehu alone. Other cones, some exceeding 3,000 feet, are disposed in chains to the north-west of Lake Taupo, and Perongia (3,150 feet), rising on the south side of the Waikato estuary, has discharged westwards vast lava-streams, which have formed long headlands enclosing deep marine inlets.

In the Auckland Peninsula, which projects far seawards in a north-westerly direction, the volcanoes are low, but very numerous, being counted by the dozen at the narrowest part of the peninsula. Some rise 300 or 400 feet above the sea, while others are flush with the surface, forming perfectly regular little havens along the coast. Off Auckland on the east coast the oval-shaped Rangitoto, that is, "Blood-red Sky," seems from a distance to close the entrance to the harbour. Farther north the long peninsular horn of North Island is indented by numerous shallow inlets, which appear to be the remains of half-obliterated fiords. Such is the Bay of Islands on the east coast, which is studded with islands and islets of pyramidal form; one, however, which with its truncated cone and eroded argillaceous cliffs resembles a huge "sou'wester" floating on the surface, has accordingly been named the "Old Hat." On the shores of the Bay of Islands occur some thermal and sulphurous springs.

Earthquakes are frequent in every part of New Zealand, and in many places

geologists have observed modifications of the coastline due to former convulsions or other underground phenomena. The hypothesis has even been advanced that the whole of the archipelago is subject to oscillations of level analogous to those of the Scandinavian Peninsula. While the northern part of North Island would appear to be slowly subsiding, the rest of the land is said to have been perceptibly upraised even within the short period of British colonisation. Sudden upheavals caused by violent igneous disturbances account for the withdrawal of the marine waters in some places, and especially in the harbour of Wellington on the north side of Cook Strait. But elsewhere the movement appears to have been much slower, and unattended by perceptible shocks, as attested by deposits of pumice occurring at different elevations along the seaboard. In 1847 there was discovered in South Island nearly 650 feet inland from the coast and far above highwater mark the hulk of a vessel supposed to be the *Active*, which had been shipwrecked in 1814, that is, only thirty-three years previously.

## CLIMATE OF NEW ZEALAND.

The climate of the archipelago has been compared to that of Great Britain, although the mean temperature of the tracts occupied by the British settlers is considerably higher than that of their native land. Great climatic contrasts, however, are presented between the extreme sections of New Zealand, which stretches for a space of over 900 miles across nearly 14 degrees of latitude. Thus the peninsula of North Island enjoys an Italian climate, while the southern regions recall that of Scotland, and Stewart Island that of the Orkney Archipelago.\* But in these oceanic lands the sudden shifting of the winds is attended by corresponding changes from heat to cold, from wet to dry, changes which are here everywhere abrupt. The temperature, however, is on the whole more equable along the western seaboard exposed to the least variable marine breezes. On the other hand the discrepancies are very great in certain parts of the east coast, and especially on the plains near the Banks Peninsula. But notwithstanding the great transitions from heat to cold the east side, being more sheltered by lofty ranges, enjoys a pleasanter climate than the windy opposite slope, where a whole year passes without a single calm day.

To the prevalence of westerly breezes the coastlands facing towards Australia are also indebted for their more abundant moisture, which falls as rain on the plains and lower slopes of the hills, as snow on the uplands. Amongst these winds that which sets from the north-west and which blows over the mountain ranges down to the eastern slopes resembles the Mediterranean scirocco in the phenomena accompanying it. This atmospheric current supplies an abundant rainfall to the side of the New Zealand Alps, which it strikes coming directly from the high seas; hence it reaches the eastern plains as a dry wind; during its prevalence the sky here assumes a deep blue colour, the heavy clouds that had gathered on the horizon

\* Climate of the chief New Zealand towns:—

	Latitude.	Mean Temp.	Highest.	Lowest.	Rainfall.
Auckland . . .	36° 50' S.	58° F.	85° . . .	28° . . .	33 inches.
Wellington . . .	41° 16' "	54° "	83° . . .	25° . . .	16 "
Christchurch . . .	43° 32' "	52° "	96° . . .	21° . . .	29 "
Dunedin . . .	45° 52' "	51° "	84° . . .	30° . . .	33 "

disappear as if by enchantment, and the streams fed by the melting glaciers suddenly become swollen torrents.

The "England" of the Austral seas has the advantage over the mother country of being exempt from fogs, enjoying a clear azure sky succeeded at regular intervals by rain-bearing clouds, without those long periods of unsettled weather which at times render a residence in Great Britain so unpleasant for strangers. It is mainly to this absence of fogs that physicians attribute the remarkable salubrity of the New Zealand climate, a salubrity which, with the magnificent scenery and abundance of all kinds of mineral waters, promises to make the archipelago one vast health resort. But the serene skies are purchased at the expense of frequent and fierce gales. Along the shores of Cook and Foveaux Straits these tempestuous gales prevail throughout a great part of the year, and in 1886 the approaches to the harbour of Wellington were swept by as many as fifty-seven successive storms.

#### FLORA.

The New Zealand flora varies with the climate from the temperate zone of the north to the cold southern region, while still preserving a certain general uniformity throughout the archipelago. Thanks to its isolated position in the ocean hundreds of miles from any other great extent of dry land, it possesses a flora very distinct from that of any other region in the Austral hemisphere; two-thirds of its plants, forming nearly thirty different genera, have absolutely no representatives elsewhere. The nearest allied forms occur in Australia and South America, and by a remarkable phenomenon the latter, although the farther removed of the two continents, seems to present the most numerous analogies. The eucalyptus and acacia, so pre-eminently characteristic of Australia, are not found in New Zealand, a fact of primary importance scarcely in harmony with the assumption of many geologists, that during recent epochs the archipelago was connected with the neighbouring continent by now submerged lands. New Zealand appears to have been an independent centre of plant life, whence numerous species have been dispersed throughout the surrounding insular groups.

The isolation of the archipelago had for necessary consequence a certain relative poverty of its flora, which in fact comprises only 960 indigenous species. The forests contain only a small number of distinct forms, and these forms are for the most part characterised by dull and inconspicuous flowers. Hence the thickets present a sombre and monotonous aspect compared at least with the lovely flowering woodlands of Tasmania and the Cape. Their gloom is intensified by the absence of animal life, and even of the song of birds. After wandering through these dense leafy thickets and returning to the sunlit open spaces, the traveller feels relieved as if from an oppressive sense of awe.

The characteristic plants are the 130 species of tree-ferns and others which in many districts hold exclusive possession of vast tracts. New Zealand has also some peculiar varieties of the pine family, amongst others the kauri (*Dammara australis*), which is at present restricted to the northern island. The magnificent stem of this conifer attains a height of 200 feet, and it yields a

gum much valued for the preparation of varnish. But it has been recklessly cut down, owing to the excellent quality of its timber as a building material; whole forests have been cleared in the construction of the new towns, and before measures were taken to re-plant the clearings, the species itself was in danger of being exterminated. The climate appears to have also contributed to reduce the range of this tree. Along the banks of the Molyneux, in the southern part of South Island, the ground contains large quantities of kauri gum, although at present the species is confined to the province of Auckland in North Island. The fossil resinous substance collected in the southern regions of New Zealand looks as fresh as that derived from living plants; yet long ages must have passed since the pines producing it have gradually receded some 600 miles northwards. The old gum, being more compact, is much more highly valued than that obtained from trees still standing, and trading companies have been formed for working the rich deposits in various parts of the country.

## FAUNA OF NEW ZEALAND.

The indigenous fauna is no less original than the flora, and is supposed by geologists to comprise only a single mammal, a species of otter, whose traces were seen by Von Haast, and which was pursued by other explorers, without, however, being captured. The Maori rat, now utterly exterminated by its European rival, appears, as the natives assert, to have been introduced by themselves, as was also the dog, which was nowhere found in the wild state. There are neither snakes nor tortoises in the archipelago, and even the batrachians are represented only by a single species confined to one locality on the east coast of North Island. Lizards, however, abound, and comprise as many as twelve species occurring in no other part of the world. One of these, the *hatteria punctata*, numerous in an islet in the Bay of Plenty, is of very peculiar form, somewhat intermediate between the ordinary lizard and the crocodile; hence, although quite harmless, it was regarded with a certain superstitious awe by the Maori.

Before the introduction of European species the New Zealand rivers were almost destitute of fish. Some, however, of the native forms are remarkable for the vast extent of their range. Such are an eel found also in China, Europe, and the West Indies, and a trout, which is likewise met in the streams of Tasmania and South America. One of the great curiosities of the New Zealand biological order is a species of caterpillar (*aphaeria Robertsi*), which burrows a hole at the foot of a tree, and in which a tall fungus then takes root and grows above the surface of the ground.

Of the New Zealand fauna the most remarkable class is that of the birds, which is very rich, comprising altogether about 150 species. One-third of these are peculiar to the archipelago, and constitute seventeen or eighteen absolutely distinct genera, some presenting some very curious features. Such is the *huia*, a kind of starling (*heterolocha Gouldi*), the male and female of which have entirely different beaks, the one straight, the other curved quite round like a sickle. But the essentially characteristic bird is the famous *kiwi* (*apteryx*), absolutely wingless



and tailless, of which three or four species still survive. Being covered with a hair-like plumage, and as large as an average fowl, the kiwi is helpless against dogs, and would soon be exterminated even in the remoter districts but for its nocturnal habits. But it must nevertheless disappear, as analogous species have disappeared in the Mascarenhas Islands, and as in New Zealand itself have disappeared the fifteen varieties of the *moa* (*dinornis*), a bird of varying size belonging to the ostrich family. The fossil remains of the moa, one species of which was over 10 feet high, have been discovered in the bogs beneath alluvial deposits and in caves encrusted with stalagmites. But skeletons have also been found, as well as an enormous egg 10 inches long, besides fragments of skin and feathers, in the Maori graves and amongst the kitchen refuse. Hence there can be no doubt that the natives hunted these birds, which were doomed by their defenceless state to rapid extinction. According to the local tradition the moas were decked with a brilliant plumage.

Amongst the types in course of extinction or already gone, are included the *moho* (*notornis*), the *coturnix*, a sort of quail remarkable as the only indigenous representative of the gallinaceous family, the *anarhynchus*, distinguished by the lateral twist of its beak, the *thinornis*, another bird of the same group, and the *kea* (*nestor*), an owl-like parrot still common in the lower valleys, where it is much dreaded by the farmers since it has acquired a taste for the flesh of sheep and lambs.

Since the arrival of the British settlers the gaps made in the local fauna have been gradually filled up by new wild and domestic species. Sportsmen have introduced the deer, roebuck, hare, and rabbit, of which the last named has proved specially disastrous to the prospects of agriculture. The pig has reverted to the wild state in some districts, and thousands are now annually killed in the thickets. The streams have also been stocked, chiefly with salmon, trout, and other species from the mother country. But the extinct forms of bird life have been replaced mainly from Australia, Europe, and America. Thus the indigenous quail has been succeeded by the Californian variety, which has multiplied to a surprising extent, and by the grey partridge and pheasant from China. Starlings, sparrows, blackbirds, thrushes, crows, larks, finches, introduced at great cost from England, have become acclimatised, and often produce on the colonist the impression that he has scarcely changed his home in migrating to the Austral world. He finds himself surrounded by fields, woodlands, buildings similar to those of the old country; he meets the same wild and tame animals, and hears the same birds warbling in the thickets.

#### INHABITANTS OF NEW ZEALAND.

The natives found in the archipelago by the white immigrants compare their destiny to that of the indigenous plants and animals, and believe themselves doomed to perish with them. "Our rat," they say, "is eaten by the European rat; our fly yields to yours, and we ourselves will be replaced by you." Yet these Maori, who thus foresee their extinction, were amongst the most intelligent, the noblest, and most cultured Polynesian peoples. If their disappearance is inevitable, it must still be regarded as a common calamity for mankind.

The Maori, that is, the "Line," or "Descendance," in the sense of "Indigenous," are unquestionably a branch of the eastern Polynesian race. Their legends, full of precise details, are unanimous in recording their migration to the archipelago, and even give some approximate idea of the epoch when this event took place. The children were carefully instructed in all these oral traditions, and taught the history and genealogy of the national heroes, as well as the succession of events and ages by means of inscribed tablets. These sources of information, collected by Grey and other ethnologists, relate how some four or five centuries ago the chief Te Kupe first landed on Aotea-roa, the North Island, and that, astonished at his discovery, he returned to his native land of Havaiki for his fellow-countrymen. He then returned with a flotilla of seven war-canoes, each containing about a hundred warriors, priests, stone idols, and sacred weapons, as well as native plants and animals. To this tradition of the first immigration the descendants of the Maori add legends of marvellous deeds, the severance of Aotea-roa into two islands, the emergence of islets, rocks, and reefs, the appearance of springs and of flames bursting from the ground. But, according to Huxley, Quatrefages, and other authorities, skulls presenting all the characteristics of the Papuan type would seem to indicate the previous existence of an aboriginal race apparently exterminated or partly absorbed by the Maori intruders.

This island of Havaiki, whence came Te Kupe and his followers, cannot now be clearly determined. The resemblance of names suggests the island of Sāvaii in the Samoan Archipelago, and the same island of Savaii is also supposed to have sent out other kindred tribes to colonise Havaii in the Sandwich Group. The marked analogy between the peoples, languages, customs, and legends of New Zealand and Polynesia certainly leaves no doubt that migrations have taken place from some region of equatorial Polynesia towards the more remote archipelagoes. Nevertheless, there is nothing beyond a vague resemblance of names to identify the Samoan Savaii with the legendary cradle of the Maori people. It even seems more probable that they came from Tonga, that is, the group of islands lying nearest to New Zealand. The distance between the two archipelagoes is not more than 1,200 miles, and here the marine current sets in the direction of New Zealand. So great is the affinity of the Tonga and Maori languages that the natives of both regions soon understand each other, and the very word *tonga* is of frequent occurrence in the Maori dialect, as well as in the geographical nomenclature of the archipelago.

The Mori-ori inhabitants of the Chatham Islands, now reduced to a few family groups and Maori half-castes, are certainly Polynesians of the same origin, who, according to their traditions, arrived from the north about the fifteenth century. They are of smaller stature, but more robust and stronger than the Maori, with very marked features and the aquiline Jewish nose. This little song- and myth-loving community lived happily in their island home of Warekauri when a Maori sailor of Taranaki, serving on board an English vessel, happened to visit one of their villages either in 1832 or 1835. On his return he spoke to his friends about these islanders, "peaceful and good to eat," and his report was soon followed by a

warlike expedition to Warekauri. The unhappy Mori-ori, suddenly attacked, were easily captured, and the conquerors immediately selected those to be eaten. The victims had themselves to fetch the wood and to prepare the fire on which they were roasted. The population of Chatham was thus reduced from fifteen hundred at the time of the conquest to no more than thirty-six, practically slaves, despite

Fig. 189.—TATTOOED MAORI CHIEF.



the official decrees of emancipation. Their reserved holdings comprise little more than 600 acres.

The Maori are amongst the finest islanders of the Oceanic world. Some are very tall, and the majority above the average European height, strong and well-built, with very broad chest, but with trunk proportionately longer and lower extremities shorter than amongst the whites. The features are as a rule sufficiently regular, with slightly prominent cheekbone, high forehead, piercing and haughty glance. Formerly the men were carefully depilated, in order to increase

the surface to be covered with ornamental tattooing, while for young women the operation was limited to the lips, whence the term *Blue-lips* applied to them by the English. No Polynesian nation rivalled the Maori in this art of embellishing the human form with harmonious designs following the contours of the body and bringing its proportions into fuller relief. The Maori artist knew how to give endless variety to the curves of his drawings; all was calculated so as to produce a happy blending of the lines; the natural furrows, the movements of the countenance, the play of muscles, everything was made to enhance the charm of the design, and a hale young man certainly presented a fine sight, draped only in this delicate network of blue lines on the ruddy brown ground of his skin. Whoever refused to undergo the protracted tortures of tattooing required at every important event of his life was regarded as a person by his own consent foredoomed to slavery. On the other hand the tattooed native could never be enslaved. "Liberty or Death" was his motto.

Proud and skilful pleaders, the Maori have always commanded the respect of the English; in the political conferences they have even frequently proved themselves superior in logic and eloquence, just as in field sports, such as cricket, they excel in strength and skill. Even in the schools they stand at least on a level with their masters, and when called upon to defend their native land, they proved themselves fully as valiant as their *pakeha* (European) invaders. Near the present town of Tauranga a farmstead occupies the site of the great *pa*, or fortress of earth and palisades, which General Cameron at the head of four thousand British troops failed to reduce, the siege ending in the utter rout of the assailants. At the same time this warlike spirit was associated with cannibalistic and other ferocious practices. The Maori ate the heart and eyes of the foe in order to acquire their courage and intelligence. In the old kitchen middens occur human remains associated with those of dogs and birds, and tradition speaks of a memorable victory celebrated by a banquet of one thousand of the fallen enemy.

In their few national industries the Maori displayed remarkable skill. They tilled the soil with extreme care; as carvers and decorators they were unrivalled in the Oceanic world, and displayed great originality in the design and perfection in the execution of the rock-paintings and in carving the ornamental figures of their dwellings, their boats, and sacred enclosures. Many of these objects are still carefully preserved in the local museums, or in places still regarded as tabooed by the natives.

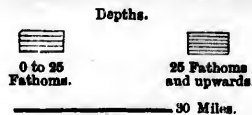
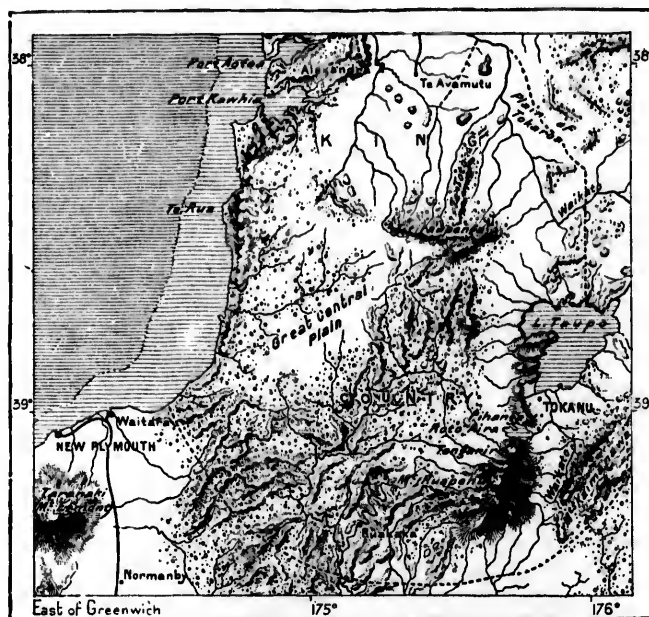
Like that of other Polynesians the Maori religion was concerned with the worship of the natural forces, always associated in their mind with the spirits of their ancestors. The memory of their forefathers was so interwoven with their everyday life that friends on meeting, instead of saluting each other with signs of joy, gave way to groans and lamentations over the departed. All are now at least nominal Christians, and have forsaken the stone idols brought with them from Havaiki at the time of the exodus. One of these effigies was given by the people themselves to Governor Grey, and the other, which had been buried in the sacred lake Roto-rua in the island of Mokoia, formed the subject of a law-suit between

two tribes in 1884. During the revolt of 1864 many renounced Christianity, and founded a new religion in which Christian mythology and ancestral worship were strangely blended. The Hau-hau sect, as it was called from the cries of grief or ecstasy uttered at the public prayer-meetings, has not yet entirely disappeared, and a few of its adherents are still found in scattered groups in the King's Country.

This region, some 10,000 square miles in extent, comprises a large part of North Island, west of Lake Taupo. The two lofty mounts, Ruapehu and Tongariro, were till recently included within its limits, together with the board between Port Aotea and the north foot of Mount Taranaki. Alarmed by the incessant

Fig. 190.—King's Country.

Scale 1 : 2,000,000.



encroachments of the white squatters, the natives assembled in congress in 1854, and resolved thenceforth to sell no land at any price, and even prevent the Europeans from penetrating into their domain. Since that time conflicts have taken place, British troops have crossed the frontier, and sundry tracts have been detached from the territory. Nevertheless this Native Reserve still constitutes a well-defined region, till recently almost inaccessible to explorers unprovided with

safe-conducts. The tribes, formerly without any bond of union, are now grouped in a sort of political state ruled by a "king," whence the name of King's Country. This potentate has hitherto refused to become a colonial functionary by accepting the heavy pension and administrative power offered him by the crown. Nevertheless the days of the Maori nation are numbered. The white population is increasing at the rate of at least twenty thousand annually, and its influence on the still independent territory increases in the same proportion. On the other hand the Maori grow continually weaker in numbers, in physical force and moral energy.

Owing to the refusal of the natives to allow any official census to be taken within their domain it is impossible to form an accurate idea of their present numbers, although the summary estimates made at various times are generally accepted as sufficiently trustworthy to place beyond doubt the steady decline of the race. At the first arrival of the whites they numbered at least one hundred thousand, but in 1874 they were already reduced to less than forty-six thousand, and according to the returns for 1886 they appear to have lost three thousand more at that date. The most serious fact, well authenticated in those districts where both races live side by side, is the higher rate of mortality amongst the women. Nor have the young Maori the same vigour as their forefathers, and about half of the deaths is attributed to consumption. Nevertheless the decay of the race appears to have been partly arrested, and in some districts, notably that of Kaipara north of Auckland, some excess of births over the mortality has been observed amongst the half-castes.

On the other hand the white population rapidly develops, not only by immigration but especially by the great increase of births over deaths. This increase, at present estimated at nearly three to one, is almost unparalleled elsewhere. Moreover, the loss and gain are invariably balanced in such a way as to increase the proportional number of females, and thus reduce the disparity caused by the much larger immigration of males. Already more than half of the colonists are native born; nearly all come from the British Isles, the English and Scotch being greatly in excess of the Irish. The Germans number not more than five thousand, and some Scandinavian communities have been established in the North Island. Some thousand Chinese have also been introduced by employers of labour, but here, as elsewhere, unaccompanied by their women. The competition of the white labourers has required Parliament to pass some prohibitive measures against Chinese immigration analogous to those taken by the Australian Assemblies.

During the early years of colonisation methodic steps were taken to reproduce in New Zealand as perfect a copy as possible of the English social system regarded as an ideal standard. Efforts were made to reproduce at the Antipodes an image of the mother country, with its powerful clergy, its territorial aristocracy, its industrious middle classes, its submissive and religious working communities. In accordance with this plan the capitalists, who in the North Island had obtained possession of the land from the natives under the protection and suzerainty of Great Britain, sold it at prices beyond the means of small holders, and the sums thus obtained were employed to introduce day labourers on the large estates.

Nevertheless, financial difficulties and conflicts with the government prevented the complete realisation of this social scheme. The projects of other companies that had secured concessions of extensive domains in the southern island proved more successful. The province of Canterbury, so named by zealous Anglicans from the primatial see of England, was at once constituted under the direct spiritual and partly temporal control of the Anglican clergy, and was divided into parishes and "flocks." On the other hand the Scotch immigrants of the Free Kirk, who had settled in the southern part of the same island, and who had given to their capital the Gaelic name of Dunedin, synonymous of Edinburgh, also possessed their religious constitution intended to maintain them in a distinct community. But the discoveries which suddenly attracted thousands of gold-hunters to this rigid Presbyterian settlement soon broke up the narrow organisation of the young colonial churches, and New Zealand no longer differs from the other British colonies in its social religious constitution. Sects of all denominations are now as numerous as elsewhere. The majority, however, are still members of the Anglican Church.

From the very first agriculture has been the chief industry of the colony. Since the first sale of public lands down to the end of March, 1888, planters and others had acquired an extent of 11,500,000 acres at a total cost of £13,000,000, to a very large extent secured by a limited number of capitalists. Seven proprietors possess each over 100,000 acres, while two hundred and fifty-nine own domains each exceeding 10,000 acres. The regions still available for tillage are at least as extensive as those already disposed of; but the uplands, especially in South Island, can scarcely be utilised except for their forests and pasturage. North Island is the more fertile of the two, thanks to its decomposed volcanic tuffas, and it also enjoys a milder climate; hence in former times the Maori were concentrated chiefly in this region, which however is the smaller in extent; and here also the settlers have a far less extent of land at their disposal.

The 33,400 farms which existed in 1887 in the archipelago were all under precisely the same crops as those of Great Britain, the only perceptible difference being a few fruit trees in North Island, where the fruits of Italy ripen side by side with those of England. New Zealand is less favourably placed than Australia for stock-breeding; nevertheless, the livestock is already considerable, and wool is now exported to the annual value of over £3,000,000. Meat-preserving is also a flourishing local industry, and New Zealand has recently turned its attention to the preparation of butter for the home market.

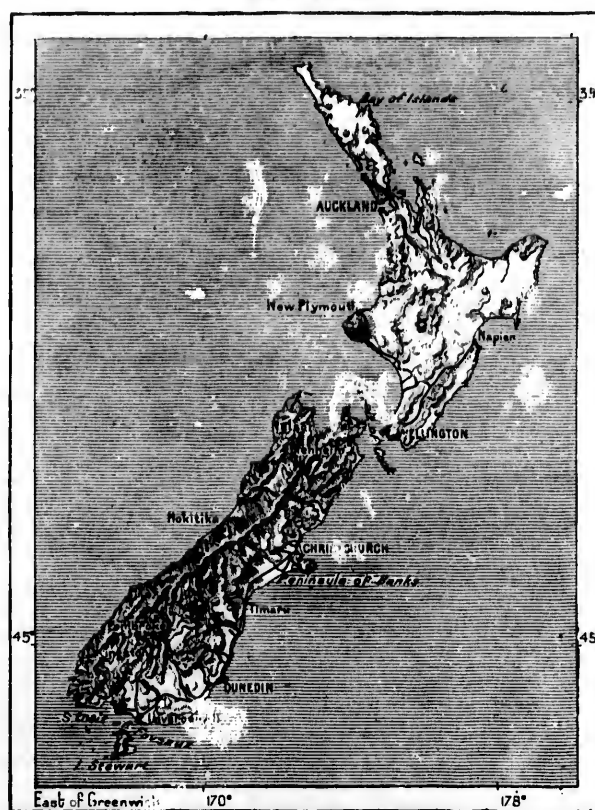
Both islands abound in minerals, although the gold mines alone have hitherto been actively worked; in 1887 nearly twelve thousand miners, of whom one-fourth were Chinese, were engaged in extracting the precious metal from the quartz rocks and auriferous sands. Between 1857, when the gold-fields were discovered, and 1887 the total yield was over £44,000,000, and in the single year 1886, the produce was no less than £28,000,000. The decrease in the exportation of gold will probably be followed by greater activity in the coal mines, which already employ over a thousand hands, with a total yearly output of more than 500,000

tons. New Zealand has already developed some large manufacturing industries and now turns out her own ships, locomotives, and other rolling stock.

The archipelago has an extensive network of roads and railways, and it will soon be possible to travel by rail from one extremity to the other of both islands. Except a few provincial branches, nearly all the lines have been constructed and are owned by the Government. Steamers also ply regularly between the seaports round the coast, and maintain rapid communication with Australia, America, and Europe.

Fig. 191.—RAILWAYS OF NEW ZEALAND.

Scale 1 : 18,000,000.



The foreign trade is relatively greater than that of European countries, for it already exceeds £22 per head of the white and Maori population. The proportion of letters forwarded through the post is also higher than in France, and the colony enjoys a more developed system of primary instruction. The periodical press is represented by 200 journals, of which one is issued in the Maori language.



## TOPOGRAPHY OF NEW ZEALAND.

*Auckland* is one of the "old" cities of New Zealand, its foundation dating from

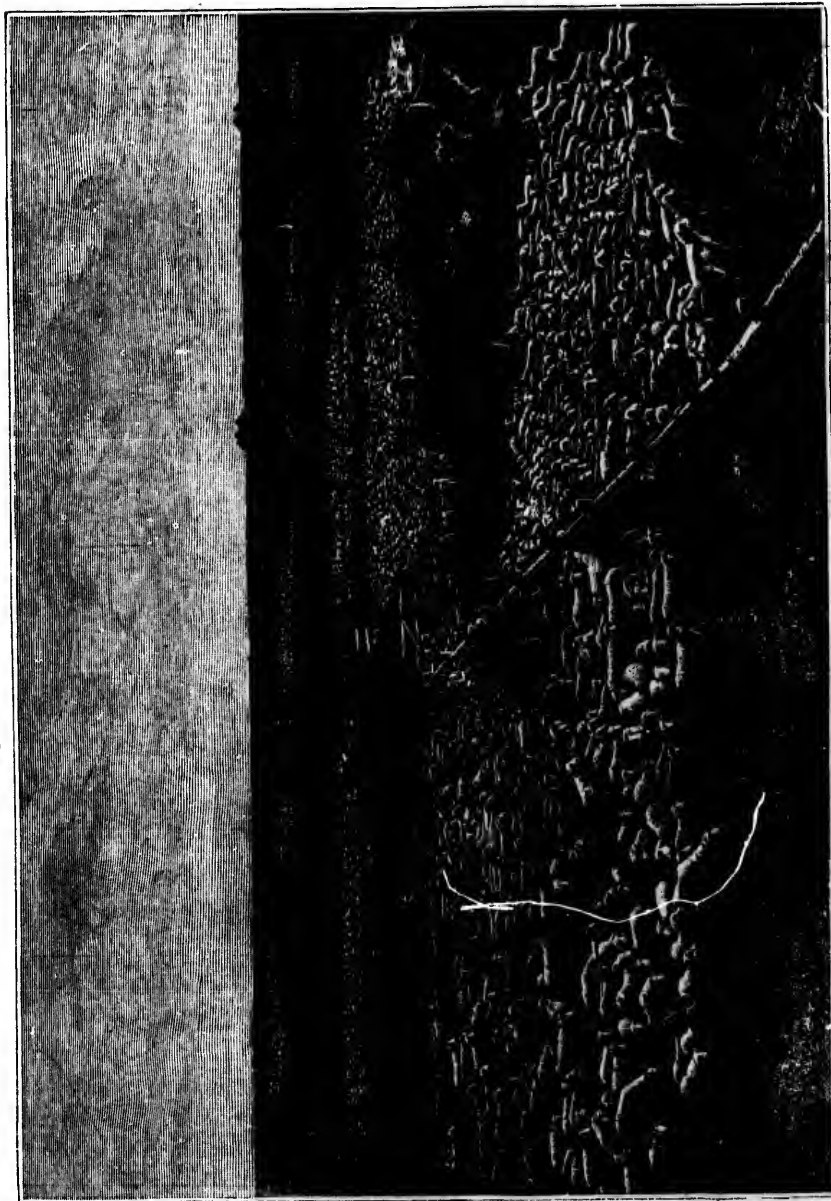
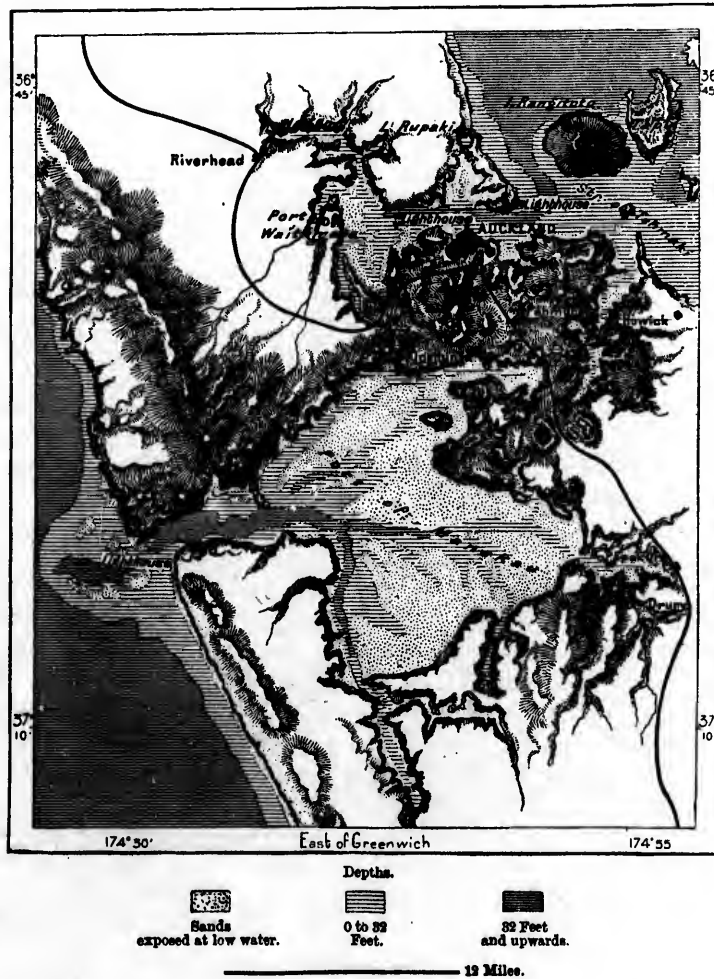


Fig. 192.—A SHEEP PEN, NEW ZEALAND.

1840, that is, a few years after the establishment of the station of *Kawa-Kawa*, or

*Russell*, on the Bay of Islands. It was originally chosen as the capital of the whole archipelago, and although deprived of this dignity, it has remained the largest city, with a population of over sixty thousand, including the suburbs; here is also the chief university in the colony. Auckland owes its importance to its

Fig. 193.—AUCKLAND.  
Scale 1 : 550,000.



admirable position on the south side of the excellent and thoroughly sheltered port of *Waitemata*, at the narrowest point of the isthmus connecting the northern peninsula with the rest of North Island. Its suburb of *Onehunga* lies seven miles farther south on the great inlet of *Manukau*, which comprises a group of havens also open

dating from

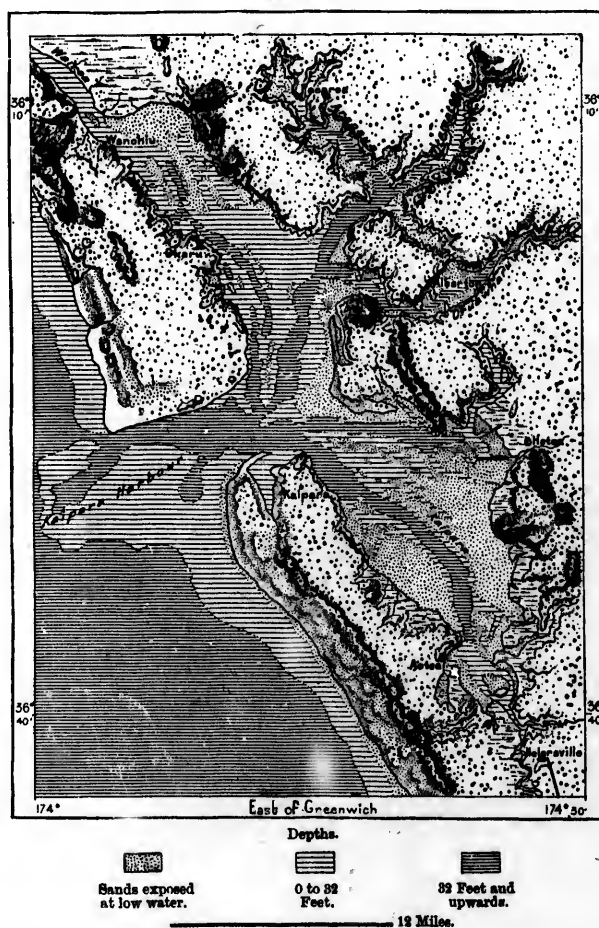


*Kawa-Kawa*, or

to navigation. Thanks to these maritime advantages, to the density of the population in the surrounding district, and the fertility of the land, Auckland exceeds all other New Zealand seaports in commercial activity; it enjoys a monopoly of the export trade in kauri wood and the valuable gum of that tree. Being encircled by several small extinct volcanoes, Auckland is the centre of one of the most interesting regions

Fig. 194.—KAIPARA.

Scale 1 : 580,000



on the globe for the study of plutonic phenomena. In the neighbourhood are no less than sixty perfectly regular cones, each in former times the scene of igneous eruptions.

North of Auckland the only trading places are the small stations on the Bay of Islands, and the villages dotted round Kaipara Harbour, whose numerous branches

wind in all directions amid the surrounding forests and recent plantations. *Kaipara* has been called the "Eden of New Zealand." South-east of Auckland are the twin towns of *Shortland* and *Grahamstown*, which are now united under the name of *Thames*, and which lie on the east side of the inlet improperly called the Firth of *Thames*. Farther south is *Tauranga Harbour*, the landing-place for travellers proceeding to Lake Tarawera and "Wonderland." South of the little haven of *Gisborne* on Poverty Bay, the only coast town on the east side is *Napier*, capital of the province of Hawke Bay. *Napier* is well situated on a peninsula between a winding estuary and a semicircular bay which, like so many others, has been compared to the Bay of Naples. Although its port, the *Ahuriri* of the natives, is of difficult access for large vessels, the yearly export trade of *Napier* in wool, preserved meat, and cattle already exceeds £800,000.

*Wellington*, capital of New Zealand, dates from 1840; it occupies a central position on *Port Nicholson*, on the north side of Cook Strait, and holds frequent communication with *Blenheim* on the opposite side. *Wanganui*, another busy seaport in the same province, lies at the mouth of the navigable river of like name south of the King's Country. North-west of *Wanganui* the coast railway is deflected inland by the peninsular Mount Egmont (*Taranaki*), and thus reaches *New Plymouth*, which is probably destined to become a flourishing seaport when the construction of the neighbouring *Moturoa* breakwater will enable skippers here to ship the produce of the "Garden of New Zealand."

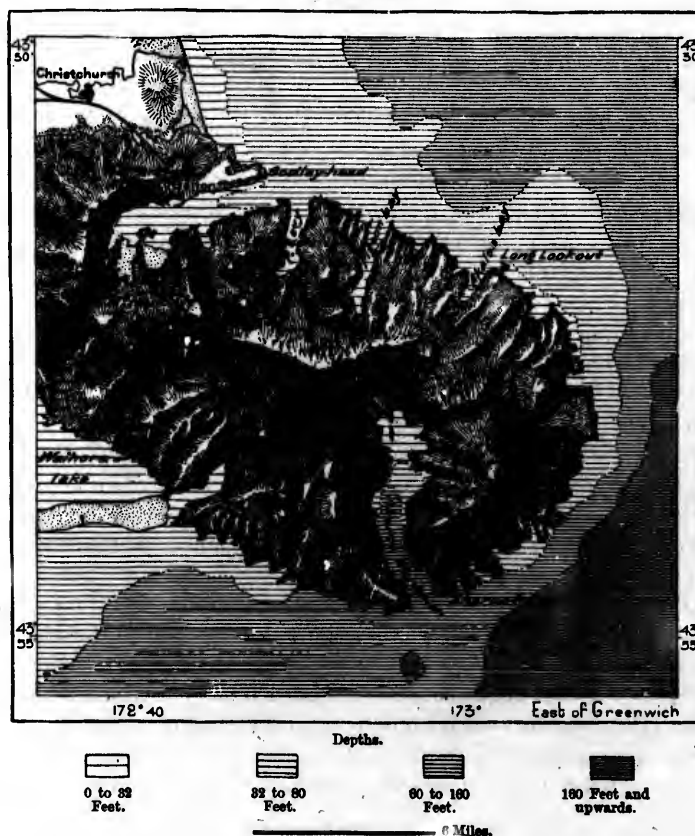
In the South Island *Blenheim*, over against *Wellington*, is still a small place although capital of a province and converging point of two railways. On this south side of Cook Strait the most commercial town is *Nelson*, which lies at the head of the hill-encircled *Tasman Bay*. Farther on the north coast presents nothing but villages and hamlets; but on the west side a few little towns have sprung up in the neighbourhood of the gold and coal mines. *Westport*, sheltered by Cape Foulwind, has the advantage of possessing a safe and deep harbour, whereas the more southerly ports of *Greymouth* and *Hokitika*, capital of the province of Westland, were of difficult access before the construction of jetties and other harbour works. *Greymouth*, formerly a centre of gold-mining, is now the "New Zealand Newcastle," and in 1886 no less than 120,000 tons of coal were shipped at this place. *Hokitika*, the town lying nearest to the regions of snows and glaciers, still retains some importance, thanks to the neighbouring gold-fields, which in 1866, the year following the discovery, yielded over £1,300,000 of the precious metal.

The east slope of South Island being more gently inclined, presents by far the greatest extent of arable and fertile lands, with the largest centres of population and most flourishing seaports. Here are found the two chief cities, *Christchurch* and *Dunedin*, the former of which lies not on the coast but in an extensive plain watered by the river *Avon* and about eight miles from its port of *Lyttleton*, formerly *Port Cooper*. *Christchurch*, capital of the province of Canterbury, is the most English in aspect of all the New Zealand cities, and as the see of the Anglican primate, it also contains the most sumptuous religious edifices. In its museum is a

very remarkable collection of the remains of extinct birds. With the surrounding suburbs Christchurch ranks as the second city in the archipelago for population, while its port owns the largest mercantile fleet, although the general movement of the shipping is inferior to that of Auckland. The neighbouring Banks Peninsula with *Akaroa Harbour*, where still survive some descendants of the early French settlers, are pleasant retreats, much frequented by the inhabitants of Christchurch.

Fig. 195.—CHRISTCHURCH AND AKAROA PENINSULA.

Scale 1 : 700,000.



A railway, connecting the city with its port, passes in a tunnel through a thick bed of lava—the finest work of the kind in New Zealand.

South of Christchurch follow along the east coast the seaports of *Timaru*, *Oamaru*, and the flourishing city of *Dunedin*, metropolis of the south, which lies on the west side of Otago Harbour under shelter of an eastern volcanic headland. Since the deepening of the channel ships of average size are able to ascend as far as the town; but larger vessels are obliged to anchor in *Port Chalmers* at the mouth of

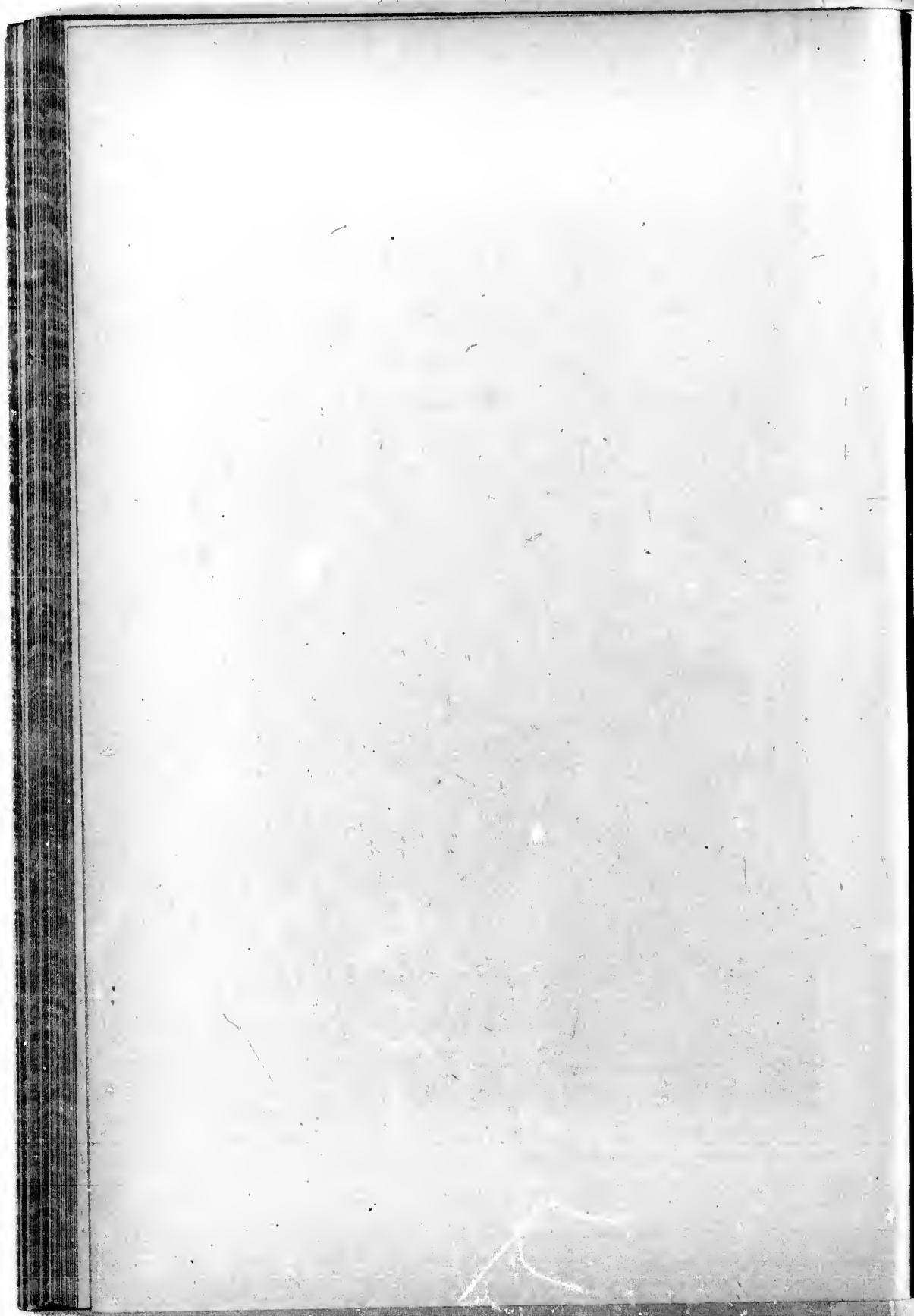
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QUEENSTOWN AND LAKE WAKATIPU.

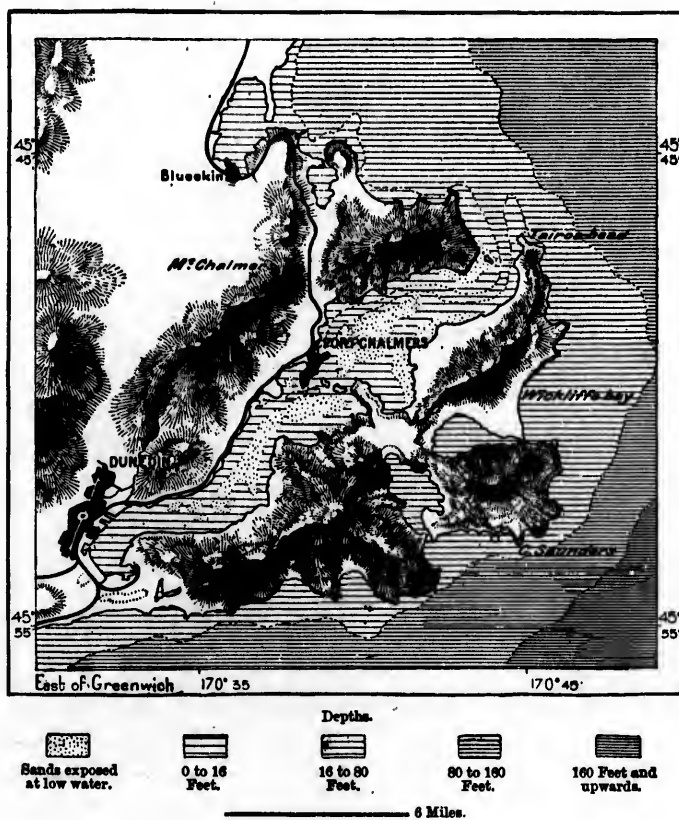


the estuary, about eight miles north of the city. During the flourishing period of gold-mining, Dunedin, which from an obscure village had suddenly been transformed to a populous town, became the busiest commercial centre in New Zealand, and even still holds the second rank in this respect. This place is the usual starting point for travellers visiting the region of the lakes in the New Zealand Alps.

On the southern seaboard, washed by the Antarctic Ocean, the most flourishing place is the recently founded *Invercargill*, converging point of all the roads and

Fig. 196.—PORT CHALMERS.

Scale 1 : 350,000.



railways radiating towards the interior. Unfortunately this seaport lies at the head of a shallow estuary without any outer port, so that the large steamers are obliged to stop at *Campbelltown* on Foveaux Strait. A railway runs from *Invercargill* towards *Kingston*, a pleasant little inland town delightfully situated at the southern extremity of Lake Wakatipu. *Queenstown*, at the foot of Ben Lomond on the east side of the same lake, is a still more romantic place, originally founded

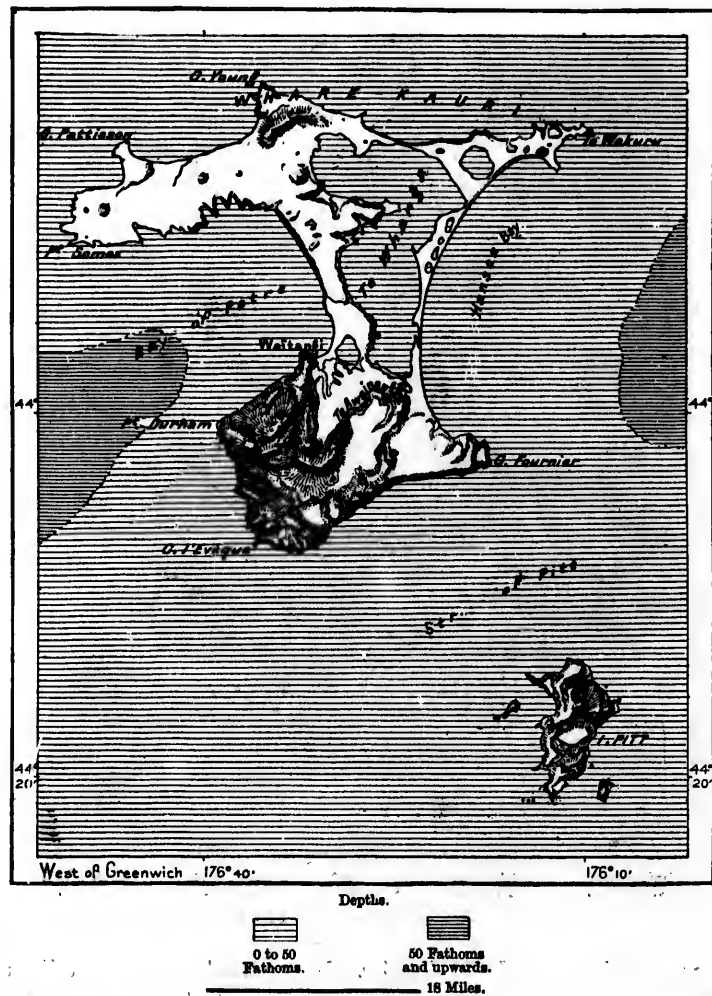


by the miners, but now a much-frequented rural retreat. The few travellers bound for the almost uninhabited Stewart Island embark at Invercargill.

The small groups of islands not subject to the administrative system of the mainland have a collective area of 1,170 miles, with a total population of about

Fig. 197.—CHATHAM ISLAND.

Scale 1 : 900,000.



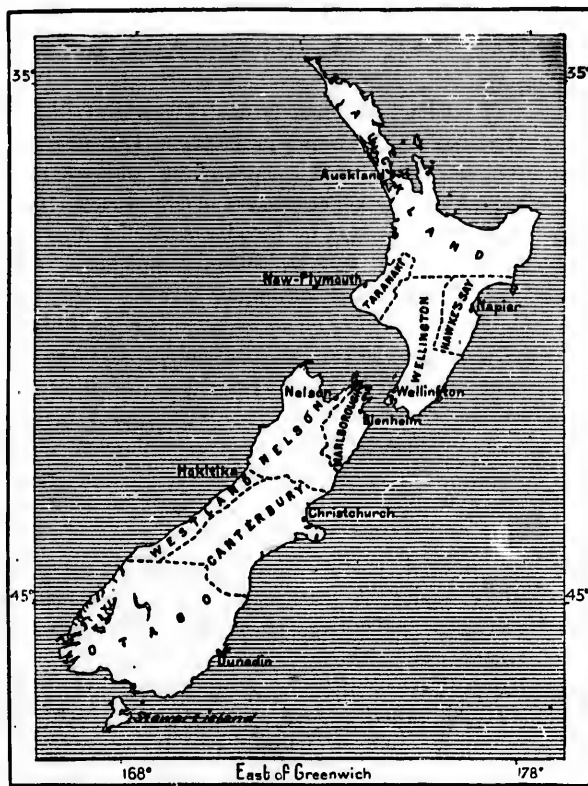
six hundred souls. Of these groups the largest is *Chatham*, or *Warekauri*, whose capital, *Waitangi*, lies on Petre Bay, an inlet on the south-west side; here are the headquarters of the Maori invaders of the island. *Pitt*, or *Butaritari*, south of the larger island, is a basalt table 600 feet high, mostly overgrown with scrub and

nearly uninhabited. The other more southerly groups—*Bounty*, *Antipodes*, *Auckland*, *Campbell*, *Macquarie*—were never occupied except by temporary visitors, shipwrecked crews, or whalers. In 1874 Campbell was the station chosen by the French astronomers for observing the transit of Venus across the solar disc. On the same occasion the German expedition occupied Auckland, which is permanently inhabited only by a single family of graziers.

The *Kermadec* islands, lying some 600 miles north-east of New Zealand on the

Fig. 198.—PROVINCES OF NEW ZEALAND.

Scale 1 : 12,000,000.



submarine bed connecting this archipelago with the Tonga group, were formally annexed to Australia and to the British colonial empire in 1887. When discovered in the last century by Watts and d'Entrecasteaux they were uninhabited, and have remained in nearly the same state ever since. At present the large island of *Raoul* (*Sunday Island*) has a little village at the foot of its wooded volcanic cone 1,600 feet high. A *dépôt* of supplies for shipwrecked sailors has here been estab-

lished by the British Government. The other two smaller islands are also of eruptive origin, and have collectively an area of about 20 square miles. Formerly the Kermadec group was probably a station for Polynesian emigrants, as they now form a connecting link between the British colonies of New Zealand and Fiji. They lie within the New Zealand vegetable zone.

Since the year 1853 New Zealand has ceased to be a Crown colony, and is now self-governed by a Parliament of two Chambers and a minister, besides the Governor appointed by the Queen. The Legislative Council, that is the Upper Chamber, consists of forty-seven members also appointed by the Queen; amongst them are two Maori. The Chamber of Representatives comprises ninety-four elected members, of whom four are Maori. All resident citizens twenty-one years of age and upwards are electors and eligible. The members of Parliament receive a grant of £200 for travelling expenses.

The department of public instruction is one of the most liberally endowed branches of the public service. According to the law of 1877 education is at once obligatory, gratuitous, and secular, and comprises the rudiments of the sciences, besides drawing, vocal music, domestic economy, and military exercises. Secondary and university instruction are provided for by a large number of colleges, of which those of Auckland, Christchurch, and Dunedin are affiliated to the University. These high schools are richly endowed with public grants of many hundred thousand acres of land. The body of examiners constituting the University confers the same degrees as Cambridge and Oxford. But despite the large sums voted for educational purposes about one-fifth of the population is still illiterate.

In 1886 the defensive forces numbered over 8,000, all volunteers, besides a corps of 1,667 cadets. A division of the Australian fleet comprising two men-of-war and a few torpedoes protects the seaboard, while the approaches to the four chief towns—Auckland, Wellington, Christchurch, and Dunedin—are defended by fortifications.

The New Zealand budget is enormous compared with the population, and the public debt is relatively heavier than that of all other civilised states, France not excepted. The Government undertakes the charge of life insurances and the administration of the public domains.

In the Appendix will be found a table of the provinces, formerly little autonomous and confederate states, now simple electoral and administrative districts:

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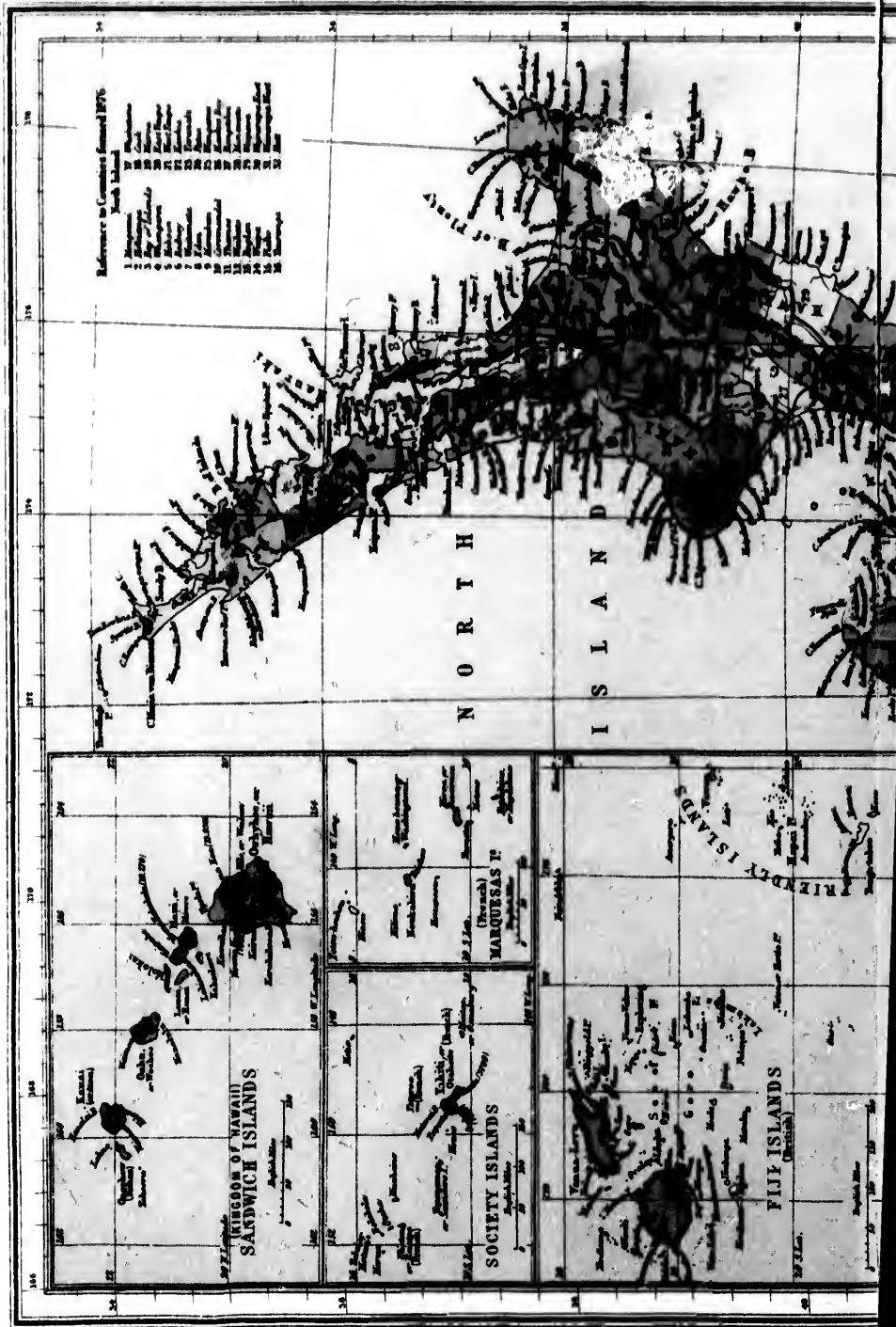
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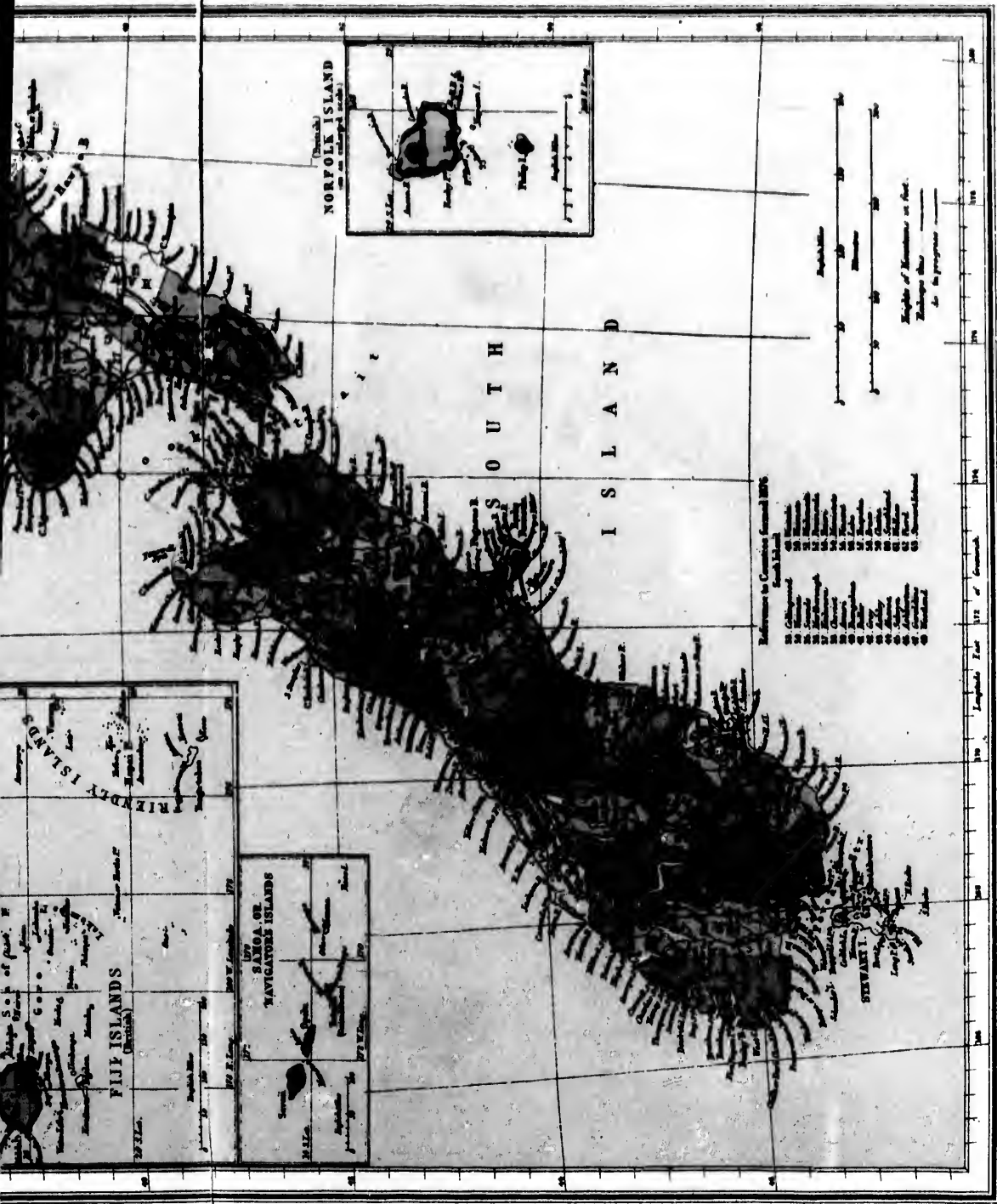
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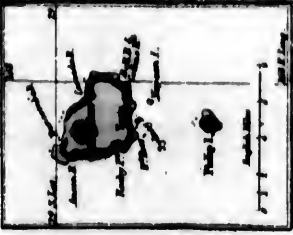
NEW ZEALAND AND THE SMALLER POLYNESIAN GROUPS.

34





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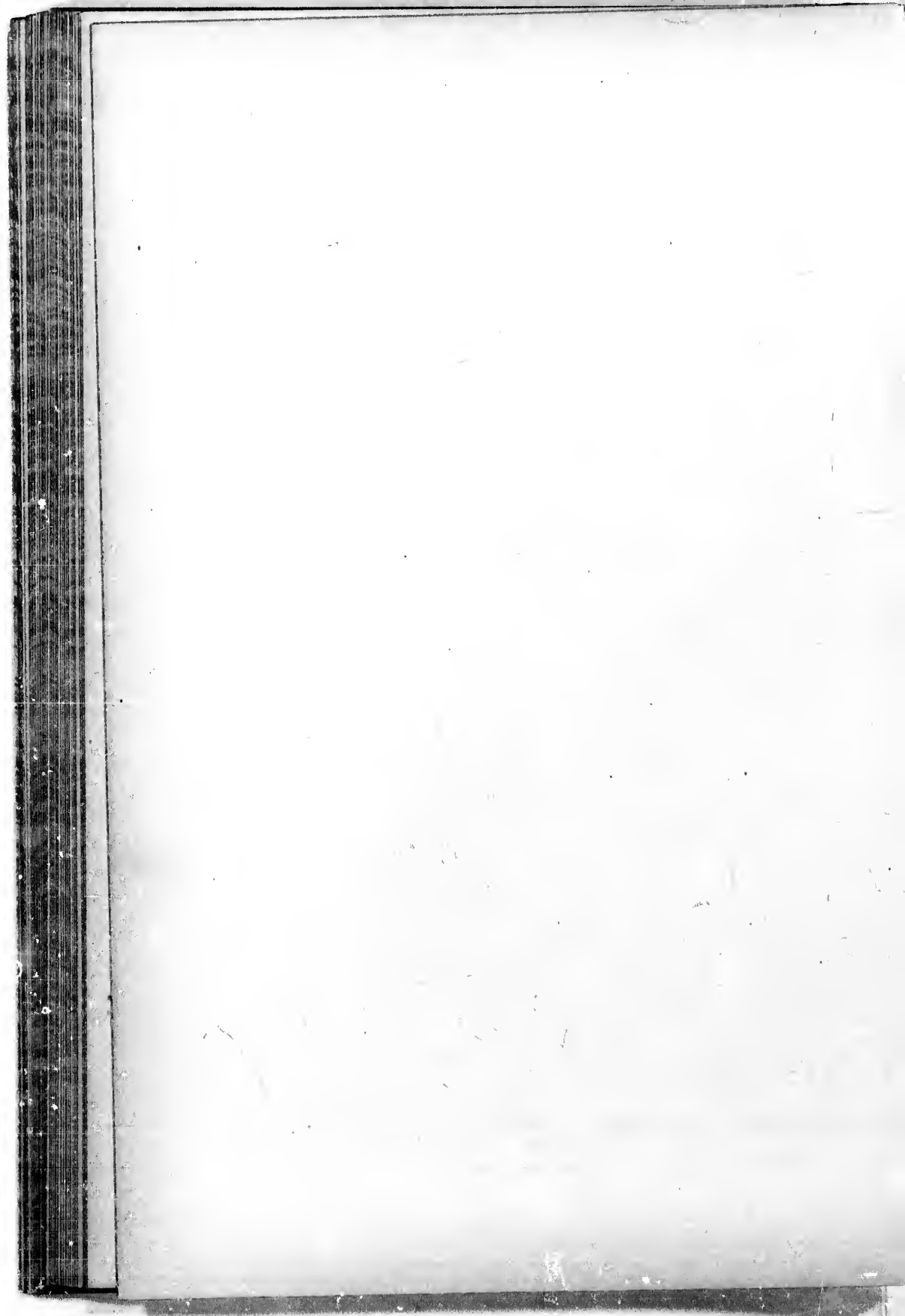
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## CHAPTER X.

### THE FIJI ISLANDS.



HIS large archipelago of the south equatorial zone is not even officially designated by the name given to it by the inhabitants themselves. The term Fiji is simply a Tonga mispronunciation of the native word Viti, these islands having thus lost the very right to name themselves, while entering by a constitutional fiction into the number of the independent Australasian states. In point of fact Fiji is a simple political possession of Australasia, belonging to a limited number of planters, who cultivate their lands by coolie labour introduced from the surrounding islands and even from India, while the natives themselves perish in the villages of the interior. Yet the archipelago occupies a considerable area, and is so favoured by a fertile soil and genial climate that it might easily support a population of two millions.

Tasman first discovered the eastern part of the group, which he named in a general way "Prince Willem Islands." In 1774 Cook merely sighted Turtle (Vatua) Island, and in 1789 the Fiji waters were traversed by Bligh, when, abandoned by most of his crew and perishing of hunger and thirst, he made his way to the Eastern Archipelago. Fiji was again visited in 1797 by Wilson, after which time numerous trading vessels opened relations with the natives, chiefly for the purchase of trepang and sandalwood. But the scientific exploration was not begun till 1827 with Dumont d'Urville's first expedition; in 1838 the same navigator resumed the survey of the archipelago, which was continued in 1840 by the American Wilkes, accompanied by Dana and other men of science. Then came the missionaries and isolated travellers, and Fiji was one of the best known oceanic groups when it was annexed to the British colonial empire in 1874. The hydrographic survey of the coasts, begun by Dumont d'Urville and Wilkes and extended by Denham and Hosken, was completed in all its details by Moore, who, during his three years' expedition, coasted every part of the group.

The chief island, Viti-Levu, that is, "Great Viti," is of oval form, its main axis being disposed in the direction from west to east. Viti-Levu, one of the largest islands in equatorial Polynesia, is entirely mountainous, with densely wooded extinct volcanoes 4,000 and even 5,000 feet high. The argillaceous soil, of a yellow or dull red colour, consists of decomposed scoriæ, which are extremely productive wherever exposed to a copious rainfall. The plains themselves are

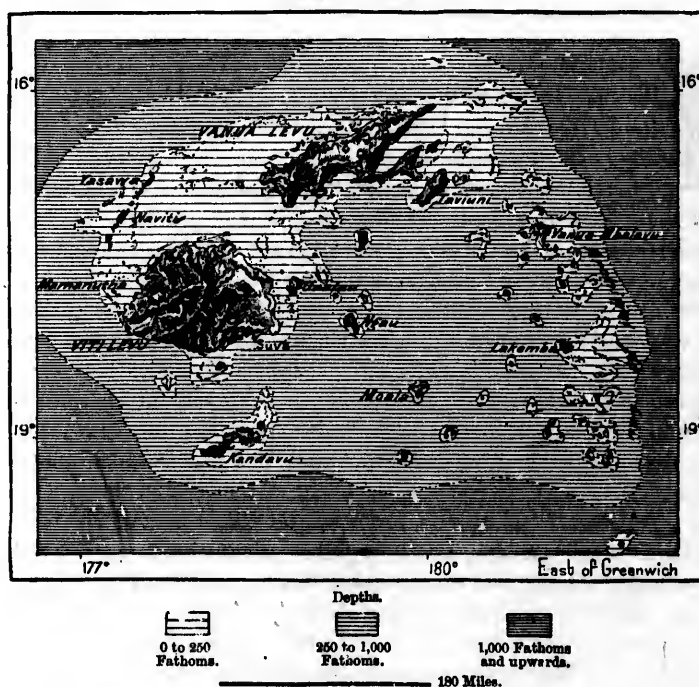


naturally watered by hundreds of streams and brooklets, and even rivers accessible for some distance to steamers. One of these, the Wai-Levu ("Great Water"), commonly called Rewa-Rewa, embraces in its catchment basin over one-third of the island, and forms a considerable delta at its mouth on the south-east coast; the tides ascend 26 miles and boats 50 miles farther inland.

Vanua-Levu, or "Great Island," the second in extent, lies north-east of Viti-Levu, and encloses between its two eastern peninsulas the extensive Nateva Bay, also called the "Dead Sea," owing to the stillness of its waters. This island is also

Fig. 199.—FIJI ISLANDS.

Scale 1 : 16,000,000.



volcanic, sending down from its hills numerous thermal rivulets. It is connected with Viti-Levu by barrier reefs, which may perhaps indicate a former coastline, and above which rise several other islands. The large outer reef, whose long convex curve is pierced by an opening in the north-west, supports the little Yasawa and Mamanutha archipelagões; on the inner reef stand the islets of Mbau and Ovalau, famous in Fiji history as political centres of the whole group at various epochs.

Besides the two large islands there are two others of average size, the volcanic Kandavu in the south-west, important as the nearest land to New Zealand and Australia and encircled on the north by a long fringing reef; and in the north-east Tavuni, dominated by a volcano with flooded crater 2,500 feet high, and separated

from Vanua-Levu by the narrow picturesque Somo-Somo Strait. Of the other members of the group not one has an area of 60 square miles, all being for the most part mere fragments of atolls or low hills fringed with coral reefs. The main chain of these islets, sweeping round the east side of the archipelago from north to south, is designated by the general name of Lau; it resembles the rim of a submerged cone open towards the sea on its right side, and enclosing a few reef-fringed islets. Altogether Fiji comprises 225 islands, of which about a hundred are inhabited.

CLIMATE.—FLORA.—FAUNA.

The windward and leeward sides of all the islands present remarkable contrasts due to the moist south-east tradewinds, which prevail throughout the year and support a luxuriant vegetation on the south and east slopes, while the drier opposite sides are mostly under grass, with here and there a few odoriferous pandanus trees. Here the settlers find the more favourable tracts, already prepared by nature for tillage and stock-breeding.

The mean temperature is somewhat lower than that of the continental lands lying under the same latitude; but although the extreme heats are tempered by sea breezes, the whites still complain of the fiery solar rays on the plantations of the interior. There are two seasons, one relatively cool, from May to October, the other warmer and more humid, for the rest of the year. This is essentially the "wet season," when the moisture especially in March is precipitated in tremendous downpours, and at times accompanied by fierce gales and hurricanes. In 1871 Mbuva received in a single day 15 inches of rain, as much as South Australia in a whole year.

A tropical vegetation prevails in Fiji, where the outer fringe of cocoanut palms and, in the few swampy districts, mangrove thickets, are succeeded higher up by tree-ferns, various species of palms and other equatorial plants partly covered with parasitic orchids. In some places the flora is essentially Australian, with casuarinas, acacias, and other forms, such as those occurring along the shores of the Gulf of Carpentaria. Towards the altitude of 2,000 feet the seaboard vegetation is replaced by other plants, amongst which no Alpine forms have yet been found. The botanist Horne, who has himself discovered over 300 new species, assigns 1,086 flowering plants and 245 ferns and allied forms to the Fiji flora.

Like the other Pacific islands the archipelago is extremely poor in higher animal life, the only mammals being a rat, some bats and the cetaceans of the surrounding waters. But all European domestic animals have been introduced and thrive well, both the pig and cat having already reverted to the wild state. Berthold Seeman has reckoned 46 species of birds, and reptiles, snakes and lizards are still more numerous; a few varieties of the frog in the eastern parts are the last representatives of the batrachian family in the Oceanic world. The neighbouring seas are inhabited by about 125 species of fishes, several of which are venomous and their flesh poisonous. Sharks also are numerous, and some of these formidable animals are confined exclusively to the estuaries.

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## INHABITANTS OF FIJI.

The Fijians present affinities both with the western Melanésians and eastern Polynésians, and are at least partly of mixed descent, although the majority approach nearest to the former group. They are tall and robust, very brown or coppery, sometimes even almost black, with abundant tresses intermediate between hair and wool. Half-breeds are numerous and are often distinguished by almost European features. Till recently they went nearly naked, wearing only the loin-cloth or skirt of vegetable fibre, smearing the body with oil, and dyeing the hair with red ochre. The women passed bits of stick or bark through the pierced lobe of the ear, and nearly all the men carried a formidable club; now they wear shirts, blouses, or dressing-gowns, or else drape themselves in blankets, and thus look more and more like needy labourers dressed in the cast-off clothes of their employers. They display great natural intelligence, and according to Williams are remarkable for a logical turn of mind, which enables Europeans to discuss questions with them in a rational way. Their generosity is attested by the language itself, which abounds in terms meaning *to give*, but has no word to express the acts of borrowing or lending. Compared with their Polynesian neighbours, they are also distinguished by great reserve. Their *meke* or dances, always graceful and marked by great decorum, represent little land or sea dramas, sowing, harvesting, fishing, even the struggles between the rising tides and rocks.

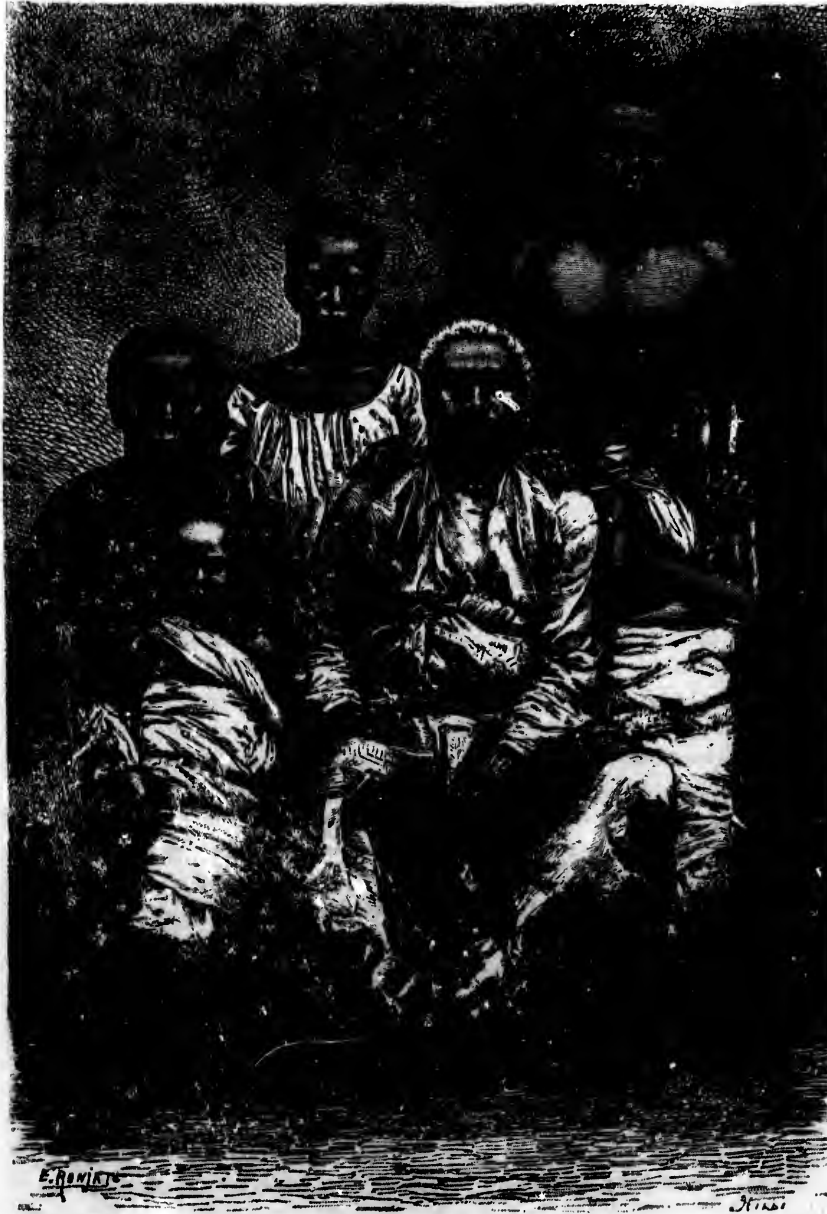
At present all the Fijians are nominal Christians. The first missionaries, who settled at Lekemba in the eastern group of islands so early as 1835, gradually extended their influence, founding other stations in various parts of the archipelago and even acquiring a share of authority with the chiefs. For the last fifty years the history of the natives has been a record of endless rivalries and alliances between the missionaries and planters, who are henceforth associated under the protection of the British Government. The dominant religion is that of the Wesleyans, comprising over 100,000 faithful; some thousands have also become Roman Catholics, while the Anglican Church, enjoying a considerable revenue, yearly increases the number of its adherents.

At first a great obstacle to the progress of Christianity was a mistake made by the missionaries, who, in the ignorance of their language, adopted as the name of the Deity the word *Kalu*, which is applied by the people only to the secondary gods, the patrons of the social classes, family groups, and professions. A better term would have been *Ndegei*, the name of a mysterious being, who under the form of a great serpent hidden in the deep caverns created and still preserves the universe.

Ancestry worship formerly prevailed; the forefathers of the race had been raised to the rank of gods, and some, renowned during life, had become potent divinities invoked by the whole nation. As in most Polynesian islands, the exact spot was shown where the dead started on their long journey to the unknown world whence none return, and which lies far away in the region of the setting sun. This Vanua-Levu, or "Land's End," lies at the extreme western headland of Naikobokobo, whither the natives made frequent pilgrimages. They had also powerful priests, who were able to hold commune with the souls of the dead and

even with the gods, making them open their mouths before the assembled multi-

Fig. 200.—THE ROYAL FAMILY, FIJI.



tude. These priests also consulted all living things, for not man alone but every-

thing possesses a soul, animals, plants, even the houses, canoes, weapons, and implements of labour. The temples stood for the most part on natural or artificial terraces, and consisted generally of an ordinary cabin erected on a square base or else on a pyramidal pedestal. A magic wand, probably intended to ward off evil influences, was placed horizontally above the roof made of branches and foliage.

Cannibalism entered largely into the religious system of the Fijians. The names of certain deities, such as the "God of Slaughter," and the "God eater of human brains," sufficiently attest the horrible nature of the rites held in their honour. Religion also taught that all natural kindness was impious, that the gods loved blood, and that not to shed it before them would be culpable; hence those wicked people who had never killed anybody in their lifetime were thrown to the sharks after death. Children destined to be sacrificed for the public feasts were delivered into the hands of those of their own age, who thus served their apprenticeship as executioners and cooks. The wives of the chiefs had to follow him to the grave, and on certain occasions the sons consented to be buried alive in their father's tomb, "happy victims highly acceptable to the gods." All protest against their fate would have been regarded as an outrage, and it is related of a woman rescued by the missionaries that she escaped during the night and delivered herself up to the executioners. The aged and invalids frequently asked to be despatched, and were then usually strangled in their graves.

The banquets of "long pig," that is, human flesh, were regarded as a sacred ceremony from which the women and children were excluded, and while the men used their fingers with all other food, they had to employ forks of hard wood at these feasts. The ovens also in which the bodies were baked could not be used for any other purpose. Notwithstanding certain restrictions human flesh was largely consumed, and in various places hundreds of memorial stones were shown which recalled the number of sacrifices. Near Namosi, in the interior of Viti-Levu, there was a tribe, the Nalocas, who happening to offend a neighbouring kinglet, was condemned to systematic extermination. Every year a single household was put to death and served up at the chief's banquet. After the feast the cabin was burnt, and the place planted with taro and the *solanum anthropophagum*, to serve as the future accompaniment of the next family. Flight would have been immediately punished with death, and the wretched victims had to remain on the spot while the plants sprang up, blossomed, and ripened. On the harvest day the ministers came to prepare the table, to cut the taro, and heat the great pot; then seizing the victims by the arms and legs they carried them off and dashed out their brains against a sacred stone. When most of the community had thus perished, the rest were reprieved and an old woman, last of the tribe, died a natural death in 1860.

Thakumbau, who later became "a fervent Christian," and who was accepted by the English as the "legitimate king" of the whole archipelago, was wont to indicate with his club the person he should like prepared for his evening meal. If any wretch dared to sue for pardon the king had his tongue torn out and devoured it

raw. He also amused himself by setting up a "tree of forbidden fruit," on the branches of which were hung up the more choice pieces of human flesh reserved for the royal table. Yet when the missionaries and English residents called on the chiefs to put an end to cannibalism, the "conservative party," sticklers for the old usages, energetically defended the national "institutions," maintaining that it was due to society to uphold the system of terror over the lower classes. But the "radicals" triumphed, and even before the British occupation human sacrifices had everywhere ceased, as had also the atrocious custom of launching war canoes over the bodies of prostrate captives.

A great inducement to accept the sovereignty of England was the dread of the Tonga immigrants, who might overrun the archipelago, just as Tonga itself had formerly been reduced by the Samoan ancestors of the Tongans. At first these islanders dared not venture to land without special permission, but, thanks to the ever-increasing commercial relations, they gradually obtained a footing, especially in the eastern islands lying nearest to Tonga, and at last became numerous enough to form independent communities in Lakemba and elsewhere. One of their chiefs converted to Christianity took the missionaries as allies in extending his conquests, and at every treaty of peace required the vanquished Fijians to burn their temples and join the *lotu* of oil, that is to say, the Wesleyan Church, whose ministers were paid in cocoanut oil. In 1859, this victorious chief, who claimed to be merely a lieutenant of the king of Tonga, found himself at the head of three thousand victorious troops; all the eastern islands together with Vanua-Levu had already been reduced, and he was preparing to invade Viti-Levu when the British consul Pritchard interfered and compelled the Tonga intruders to desist from all further military or political intervention in the affairs of the archipelago.

The terror of the Tonga invasion was followed by the danger of extermination by American or Australian whites. Some United States seafarers, having suffered some real or fancied wrong at the hands of King Thakumbau, demanded enormous damages, which he would have been unable to pay had not a company of Australian speculators advanced the money in return for 200,000 acres of arable land in the most fertile parts of the archipelago. Henceforth the white planters were masters, and those natives who refused to work on the plantations with the coolies from the New Hebrides, Samoa and India, were fain to withdraw to the remote valleys of the interior.

Even the annexation was at first followed by disaster, over thirty thousand natives having perished in a few weeks from a frightful outbreak of small-pox, accidentally introduced from Australia in 1875. The population still continues to decrease, and although the number of inhabitants at the arrival of the whites is uncertain, the decay of the race is placed beyond doubt by the ruined villages, the deserted islands, and more recently by the more or less accurate returns of the regular census. Of late years the whites themselves have become less numerous, owing to the fluctuations of trade. An indication of the unhappy social conditions now prevalent is afforded by the fact that the women are in a minority both amongst the natives and the strangers, either arriving voluntarily or else intro-

duced as labourers on the plantations. Every year the mortality is also greatly in excess of the births.

A great variety of plants are cultivated in the archipelago. A species of yam supplies the staple of food for the natives, who also raise large crops of the taro or dato; but the sandalwood so largely exported at the beginning of the century is nearly exhausted, while the *dakua*, or Fiji pine (*dammara Vitiensis*), resembling the New Zealand kauri, has become very rare. The shores are fringed by hundreds of thousands of cocoanuts, owned, however, not by the natives, but by the planters, who export the oil and copra to Europe and Australia. One of the plants most utilised for the local industries is the malo (*broussonetia papyrifera*), the bark of which is pounded by the women to the consistency of a stout pliant fabric used as a loin-cloth or toga, and even for making fancy paper. Naturally of a pure white colour, this cloth is dyed in various designs by a process which resembles printing, by means of carefully prepared bits of bamboo charged with pigment.

The natural or acclimatised flora abounds in plants valuable for their fruits, edible roots, drugs, spices, fibres, colours, gums or resins, and if the plantations have hitherto proved little remunerative, the fact must be attributed not so much to the destructive cyclones as to the evils associated with the prevailing system of contract labour. During the first years of the colonisation the American Civil War rapidly enriched the planters by the sudden impulse given to cotton growing. But since that time labour has become too dear to allow this industry to compete with the growers of the Southern States, and Fiji now exports only a few bales of cotton. Tobacco is raised exclusively by the natives, and at present the chief agricultural industries are the preparation of cocoanut oil, copra, and sugar. Up to the year 1882 the public lands sold to planters had a total area of over 280,000 acres. The foreign trade is mostly in the hands of the English and Australians, although some Hamburg houses are also represented by a few local agents.

*Levuka*, the former capital, being inconveniently situated on the east side of Ovalau Island, the centre of government was removed to the new capital, *Suva*, near the southern extremity of Viti-Levu between the deltas of the two largest rivers, and not far from *Reuca*, the largest village of the interior. But the port of call for ocean steamers lies in *Ngalao Bay*, south of Kandava Island, where the waters are deeper and less obstructed by reefs. *Savu-Savu Bay*, south of Vanua-Levu is also frequented by skippers. Near the port copious thermal springs bubble up on the beach.

The natives take no part in the administration of the archipelago, which is a Crown colony, with a Governor and executive council named by the Queen, and a legislative council of thirteen members, seven *ex officio* and six chosen by the Governor. Fiji is divided into twelve districts under paid chiefs.

The yearly budget has fallen off with the decrease of the population, while the public debt grows from year to year. Fiji has, in fact, disappointed the expectations of the first white settlers, and the local traders have already several times petitioned the Victoria Parliament to undertake its administration. In 1881 the volcanic island of Rotuma, lying 300 miles to the north-west, was formally

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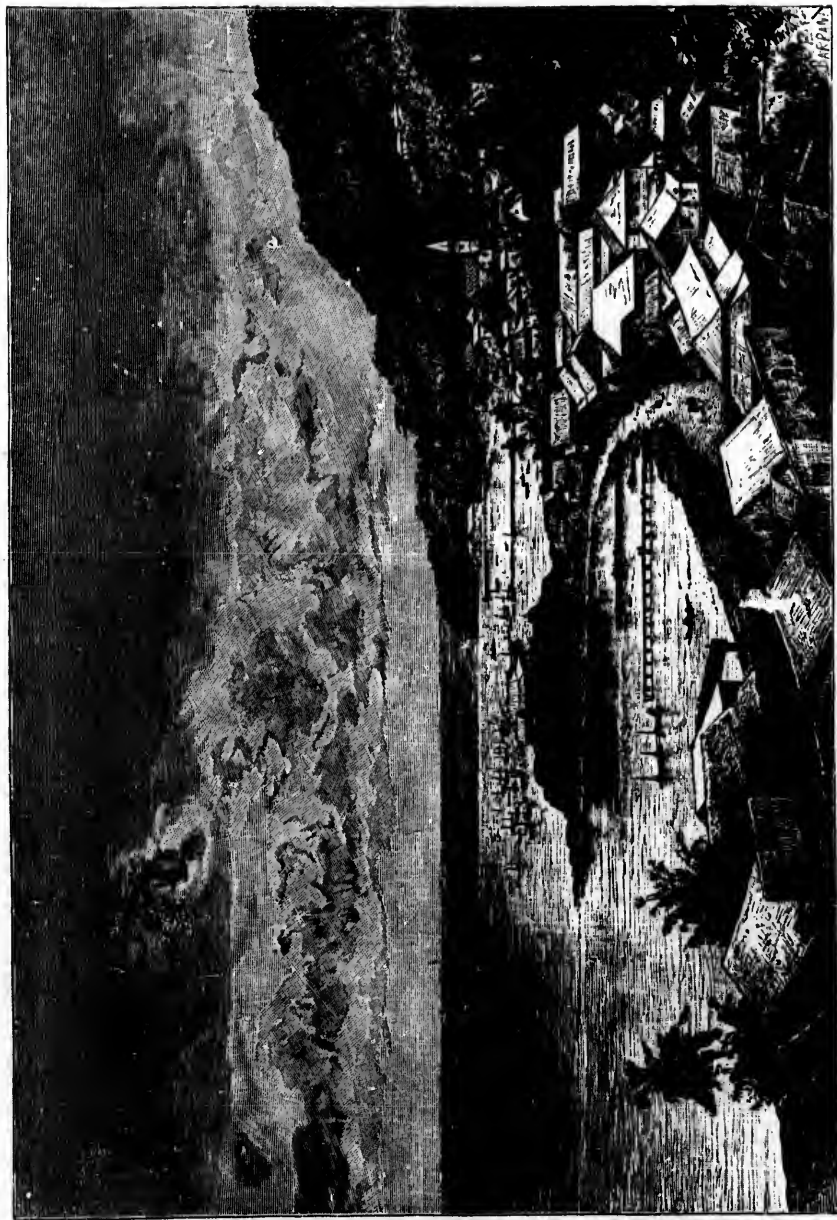
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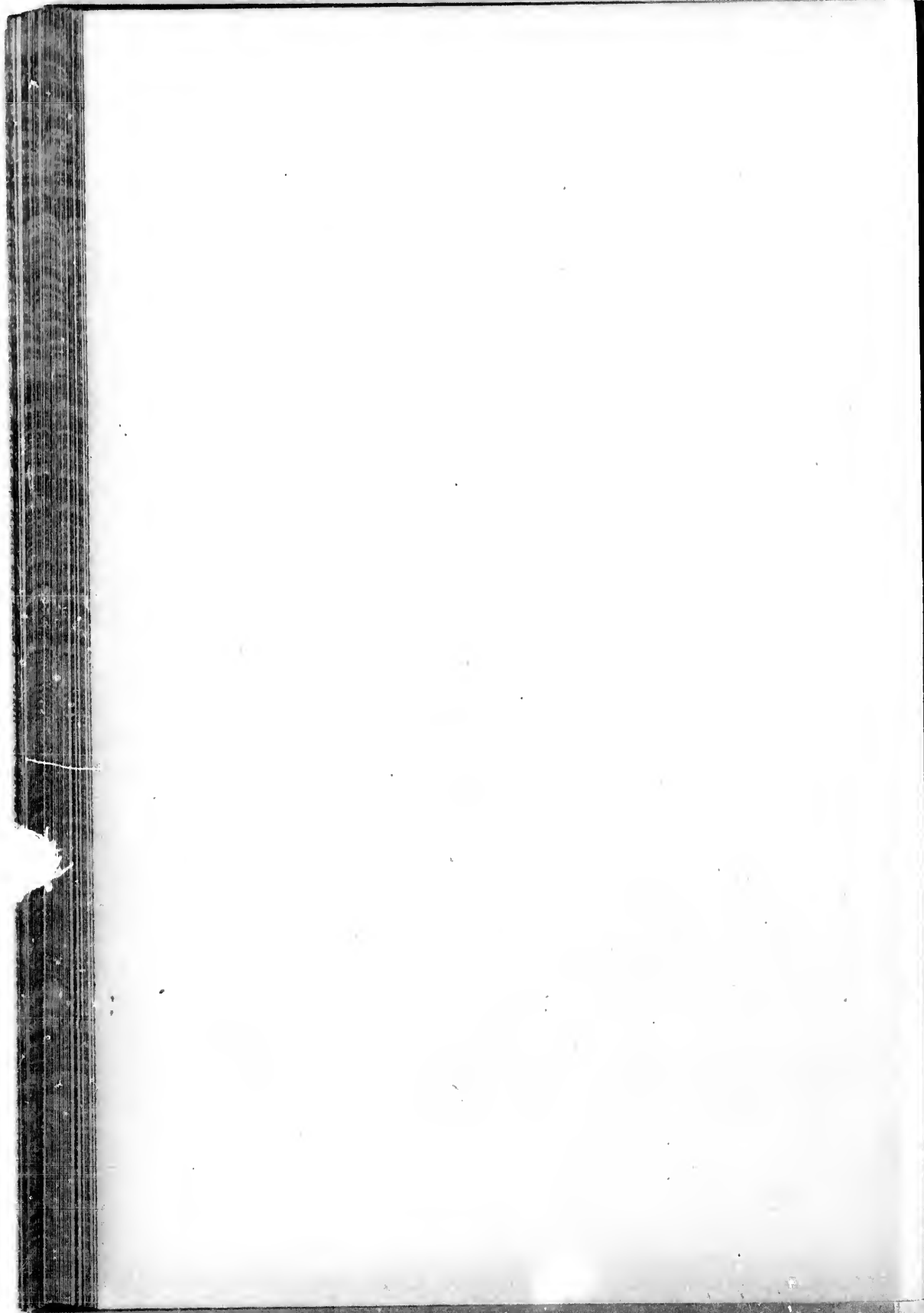
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GENERAL VIEW OF LEVUKA, FIJI ARCHIPELAGO.

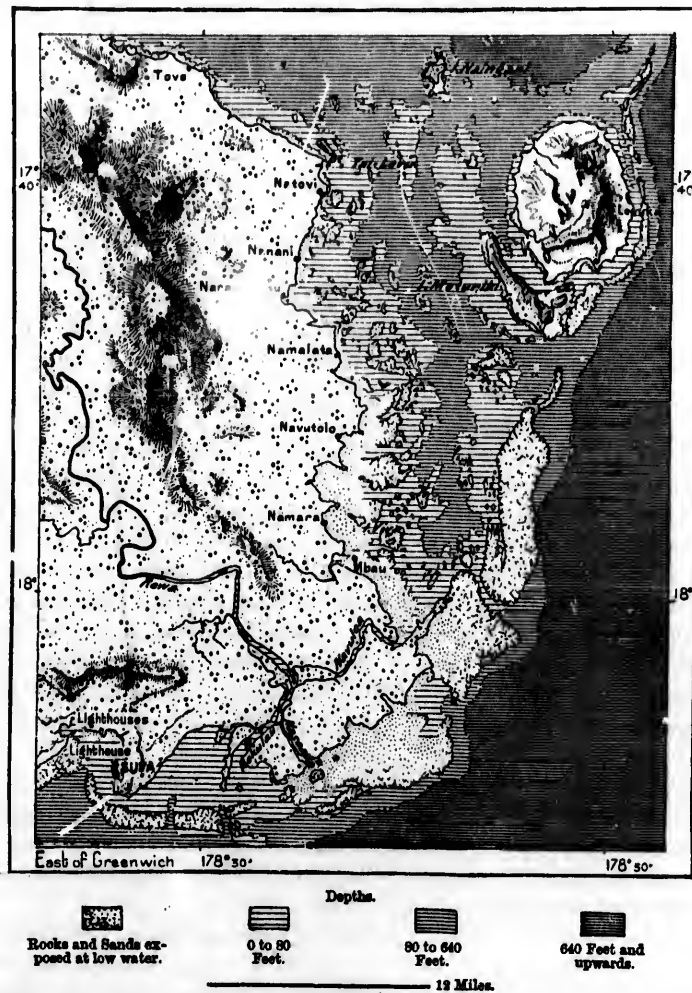




annexed by England to Fiji. The interior of this hilly islet, scarcely 14 square miles in extent, has been transformed to an enclosure for wild pigs, which with palm groves and gardens constitute its chief wealth. Like the Fijians, the Rotumans, skilful and daring seafarers, have been subjected to the influence of

Fig. 201.—SUVA AND LABUKA.

Scale 1 : 570,000.



the Tongans, who, even before the arrival of the English missionaries, had converted most of them to Wesleyan Christianity; but the natives, like so many other Polynesians, are dying out.



## CHAPTER XI.

### EQUATORIAL POLYNESIA.



OLYNESIA is one of those vague geographical terms which have been variously applied to more or less extensive aggregates of oceanic islands. From the purely geographical standpoint these are insular groups of small extent, scattered over the Pacific east of the great archipelagoes and continental regions of the Philippines, New Guinea, and Australia. But ethnographically considered Polynesia, that is, the "Many Islands," consists of the east oceanic clusters inhabited by the light brown race allied to the Malays in speech, but differing greatly from them in physical appearance, usages, and traditions. Hence, from the ethnical point of view, both New Zealand in the Antarctic hemisphere and Hawaii in the northern hemisphere would form part of Polynesia. But these outlying regions, so far removed from the equator, are so clearly distinguished by their climate and geographical constitution from the other Polynesian groups, that they have to be studied apart. The Ellice Archipelago, also, whose inhabitants are likewise Polynesians, belong to the same insular chain as the Marshall and Gilbert Islands.

Within its restricted limits Polynesia, properly so called, lies almost entirely between the equator and the tropic of Capricorn. But even within these limits it still presents a considerable extent of land scattered over about 1,200,000 square miles of oceanic waters, and disposed in eleven chief groups, with here and there little clusters in twos and threes, or even solitary islands of every form, with a collective area estimated at nearly 4,000 square miles. Of the several islands, about two hundred and twenty have an area of at least half a mile and upwards; but it would be impossible to number all the thousands of distinct islets and reefs, which form the rings of countless atolls, and which are awash with the surface, appearing and disappearing with the alternation of the tides.

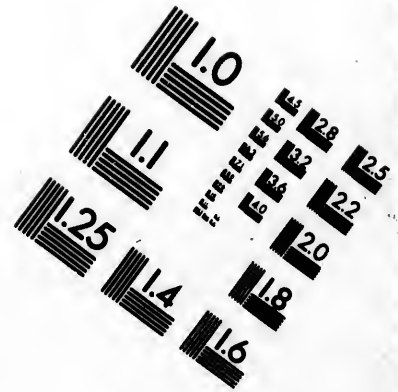
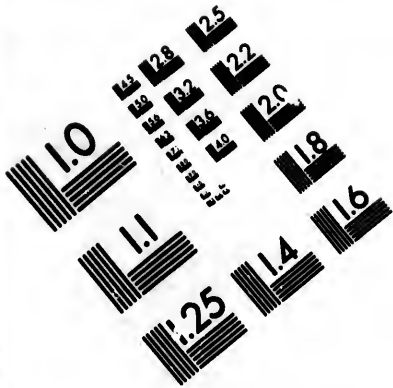
Like most other oceanic lands, the East Polynesian Islands are disposed in certain uniform directions. With the exception of Tonga, which belongs to the New Zealand system, and is connected with that archipelago through the Kermadec group, all the Polynesian islands are arranged in the direction from north-west to south-east in parallel chains, whose true form is shown more distinctly by that of the submerged banks revealed by the sounding-line. Excluding the less important prominences, six main ridges follow with striking regularity from the Niue

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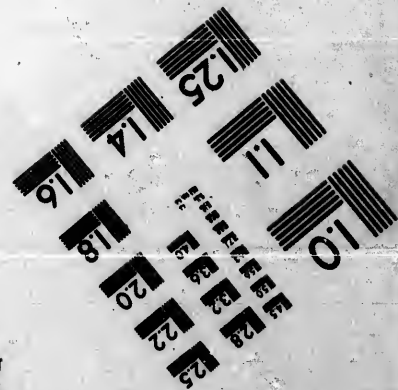
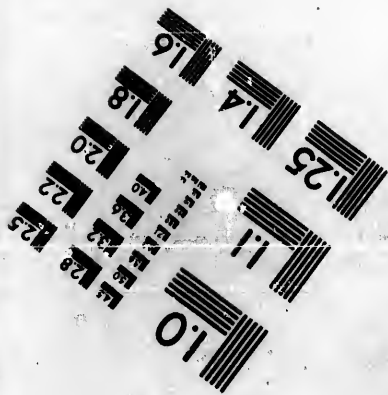
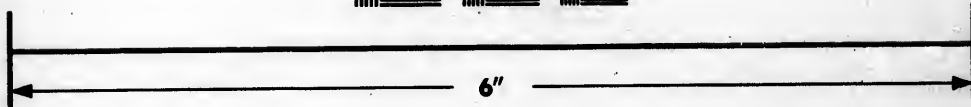
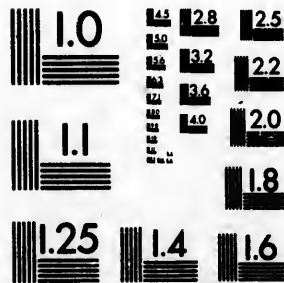
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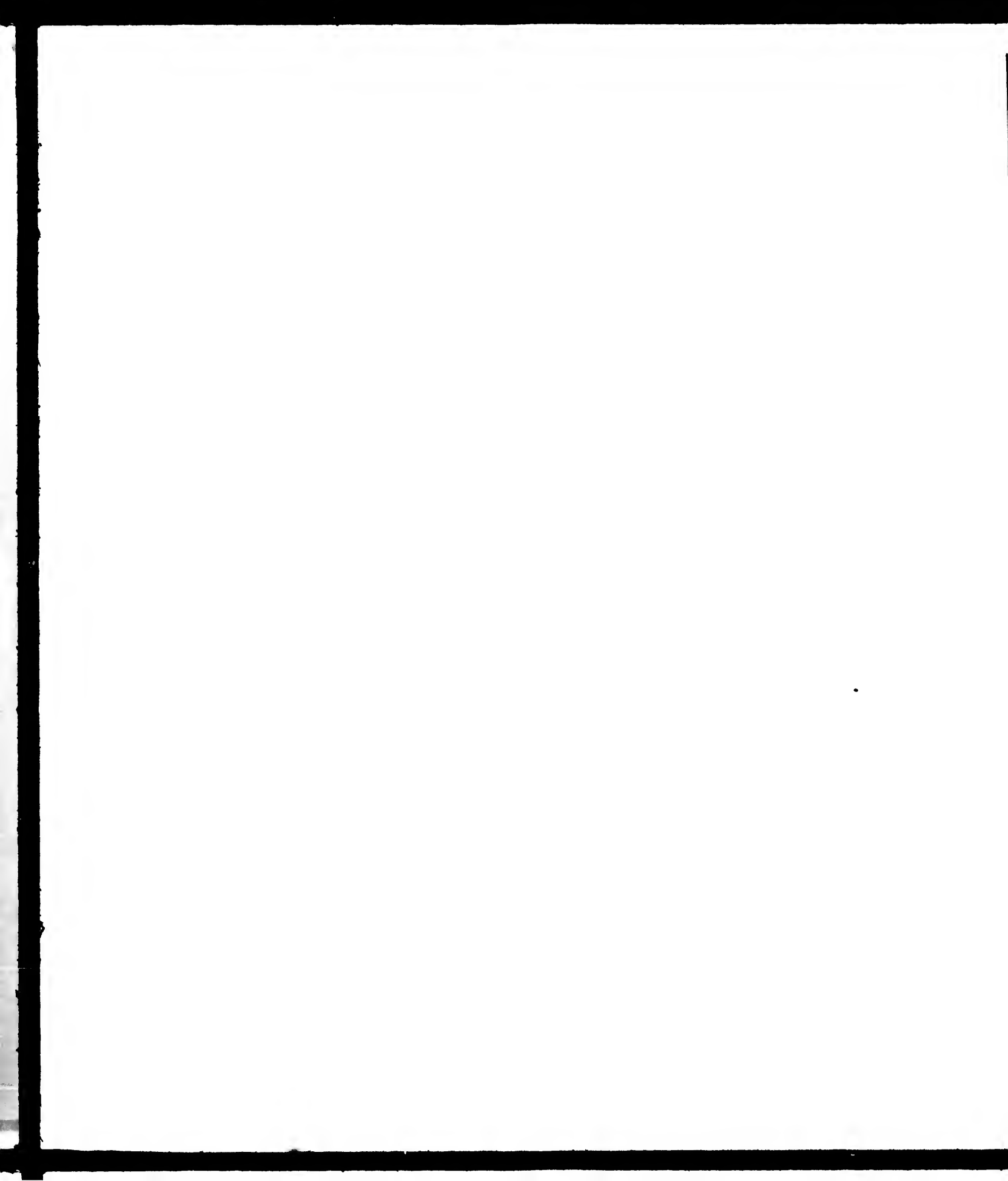
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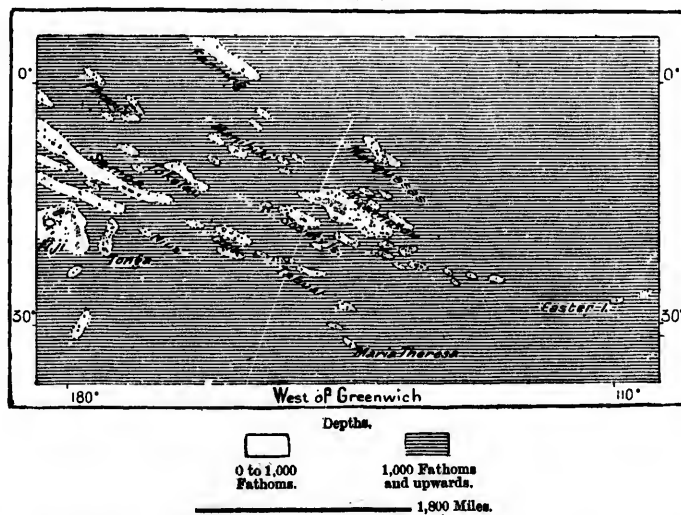


(Inui) to the Marquesas group, all separated one from the other by profound chasms, with a mean depth of 2,000 fathoms. The first and least clearly defined of these ridges is attached to the north-east angle of the Tonga Archipelago immediately to the east of the deepest trough yet measured in the southern waters, where the *Egeria* recorded 4,500 fathoms in 1888.\* Niue is the only inhabitable land presented by this first chain, which has nevertheless a total length of 1,800 miles. The other prominences along this line are mere rocks, reefs, shoals, or sandbanks, all terminating in the islet of Maria Theresa, which rises amid deep waters at the south-east extremity of the submarine bank.

On the other hand the second parallel range is marked by a large number of

Fig. 202.—TREND OF THE POLYNESIAN ISLANDS.

Scale 1 : 90,000,000.



upraised lands, beginning in the north-west with Samoa, one member of which is the largest in Polynesia. Then follow the little Palmerston and Cook clusters, the whole terminating with the more scattered Tubuai Archipelago. The third line, less regular in its general disposition, but still clearly traced by the submarine soundings, runs from the Tokelau group through Pukapuka and Suvarov to the Society Islands. Beyond this point a few islets, usually assigned to the Tuamotu Archipelago, might be equally well regarded as belonging to the same system as the Tahiti (Society) group. Although isolated by abyssal depths, such as those of Hilgard and Miller, west and east, the Phoenix cluster is disposed in the same direction as Tahiti, as are also the Penrhyn Islands (Manahiki) forming the north-west extremity of the fourth range. This range, running south-east through the main axis of Tuamotu, curves slightly round so as to present its convex side to the equator. To the same range belong Pitcairn and Easter, as well as Sala y Gomez,

\* In 24° 37' S. lat. ; 175° 8' E. long.



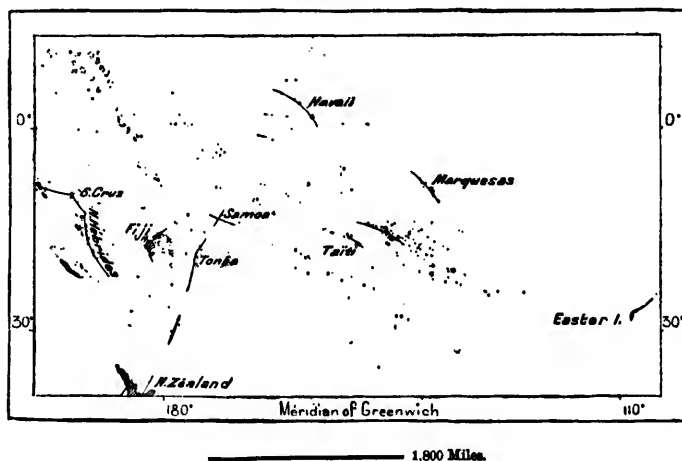
the last Polynesian land in the direction of Asia. Farther east the Pacific is entirely free of islands for a space of about 1,600 miles, and Juan Fernandez, although in a line with Tuamotu and Easter, must be regarded as a geographical dependency of the American continent.

North of the Central Polynesian axis follow two other ranges, one comprising Malden, Caroline, and the northern chain of the Low Archipelago, the other beginning north of the equator with Samarang, New York, Christmas, and Fanning, often collectively named America Islands, and terminating with the isolated swarm of the Marquesas, still 3,000 miles from the Californian peninsula, and even 2,000 from Hawaii.

Like other oceanic populations, the Polynesians have been brought under the

Fig. 203.—VOLCANIC ISLANDS OF EASTERN POLYNESIA.

Scale 1 : 100,000,000.



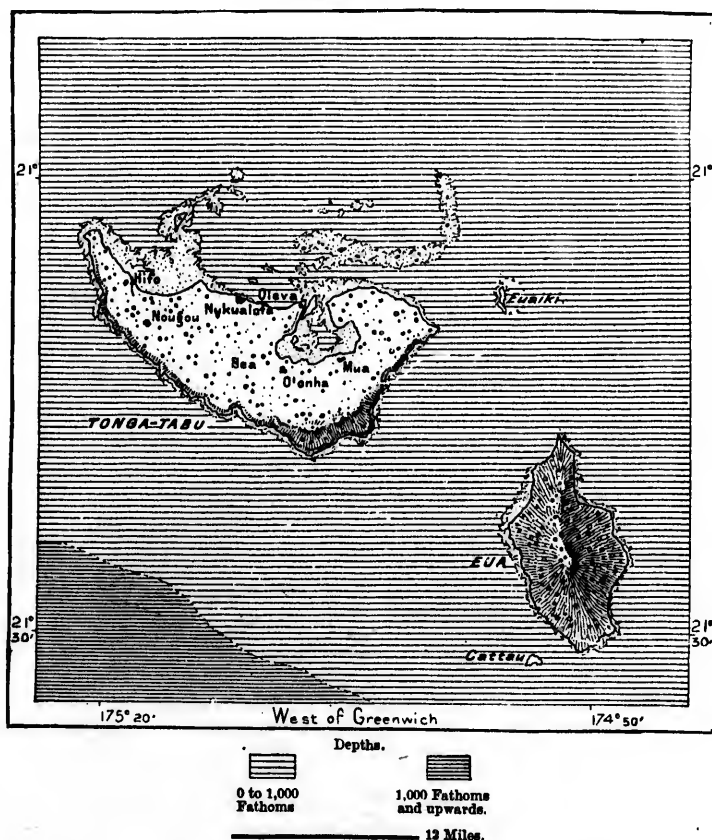
influence of the European missionaries and traders, and the clash of national and religious interests has resulted in the official annexation of most of the archipelagoes. England is supreme in the western parts, where Tonga and Tokelau come within the political attraction of her Australian possessions. Owing to its central position in the mid-Pacific Samoa forms a bone of contention between the rival British, American, and Germanic powers, and to their diplomatic conflicts are due the civil wars that have long raged in the archipelago. The less important Phoenix, Fanning, Enderbury, Malden, and other guano producing islands, though often attributed to the United States, have hitherto remained unoccupied. But Tahiti, together with the Low and Marquesas groups, are henceforth recognised as belonging to France, which is thus paramount in the easternmost parts of Polynesia.

Geologically this region differs in no respect from Micronesia. The volcanoes, extinct in the east, are now confined to Tonga and Samoa, the former group

continuing the igneous system of New Zealand. Here Tofua (2,800 feet) was the scene of an eruption in 1885, and Kao (5,000 feet) has been frequently disturbed during the historic period. Laté, west of the Vavao group, emitted flames in 1854, and its northern neighbour Fonualai (Amargura) was nearly blown away by a terrific explosion in 1846. Niua, which stands in a line with the volcanic axis,

Fig. 204.—TONGA-TABU.

Scale 1 : 700,000.



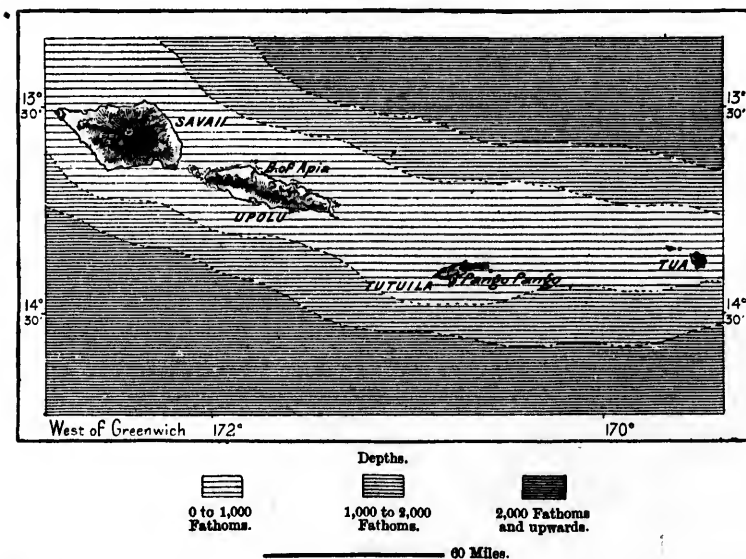
presents a remarkably regular oval shape, with a lake of like form within the circuit of its vast crater. Tonga really comprises two distinct chains, a western with several lofty isolated cones, and an eastern consisting of low islands. Here the large island of Tonga-Tabu itself is merely a level plain of coralline sands underlying a thick layer of extremely fertile vegetable humus. The whole island is covered with a rich vegetation of bread-fruit trees, palm-groves, and bananas. Other coralline islands, such as the picturesque Vavao group and Niue farther east have been raised to a certain height above sea-level.

Samoa, which is regularly disposed in a long chain, is entirely volcanic, presenting nothing but basalt rocks, either still compact or reduced to tuffas and scoriæ, and differing greatly in age. Some are completely weathered on the surface, while others appear to have little changed since the time when the lava streams overflowed from their fiery furnaces. Tutuila, easternmost of the three large islands, has no longer a central crater, all the cones having been obliterated by weathering, while profound ravines have been opened in the flanks of the mountains, whose original outlines can no longer be recognised. Upolu, farther west, presents a somewhat similar aspect, though the volcanoes have preserved their regular slopes, scoriæ, and craters in some districts.

Lastly, the large island of Savaii, in the extreme west, forms a single igneous

Fig. 205.—SAMOA.

Scale 1 : 3,500,000.



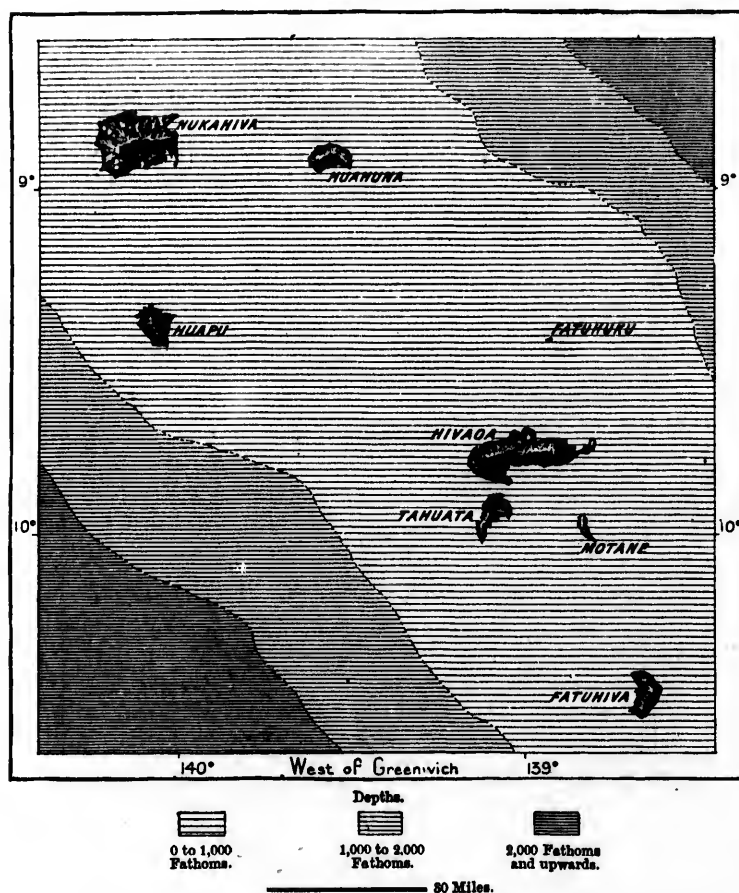
mass, an Etna with central crater, with gently inclined slopes dotted over with numerous parasitic cones. A continuous forest clothes the central summit and the zone of secondary crests, while every crater is embowered in verdure. Of all the Samoan islands Savaii has the narrowest fringe of coral reefs, which Dana attributes to the shorter period that has elapsed since the extinction of its volcanoes. The eastern islets also present the same coralline formation, relatively larger in proportion to the longer time they have been quiescent. Rose, last link of the chain, is probably an atoll built up by the polyps on the summit of an igneous crest. Even on the reefs are seen here and there fragments of basalt, perhaps deposited by the floating trunks of trees, or thrown out by passing boats as useless ballast.



tropical vegetation. Of more symmetrical form is Taiti Nui ("Great Tahiti"), whose regular cone occupies the centre of the island, which is connected on the south-east by a narrow tongue of land with Taiti Iti, or "Little Tahiti." Komo, highest peak of the latter (3,700 feet), is nearly doubled in height by the superb Orohena (7,335 feet), which springs from the centre of Great Tahiti. The neigh-

Fig. 207.—THE MARQUESES.

Scale 1 : 2,000,000.

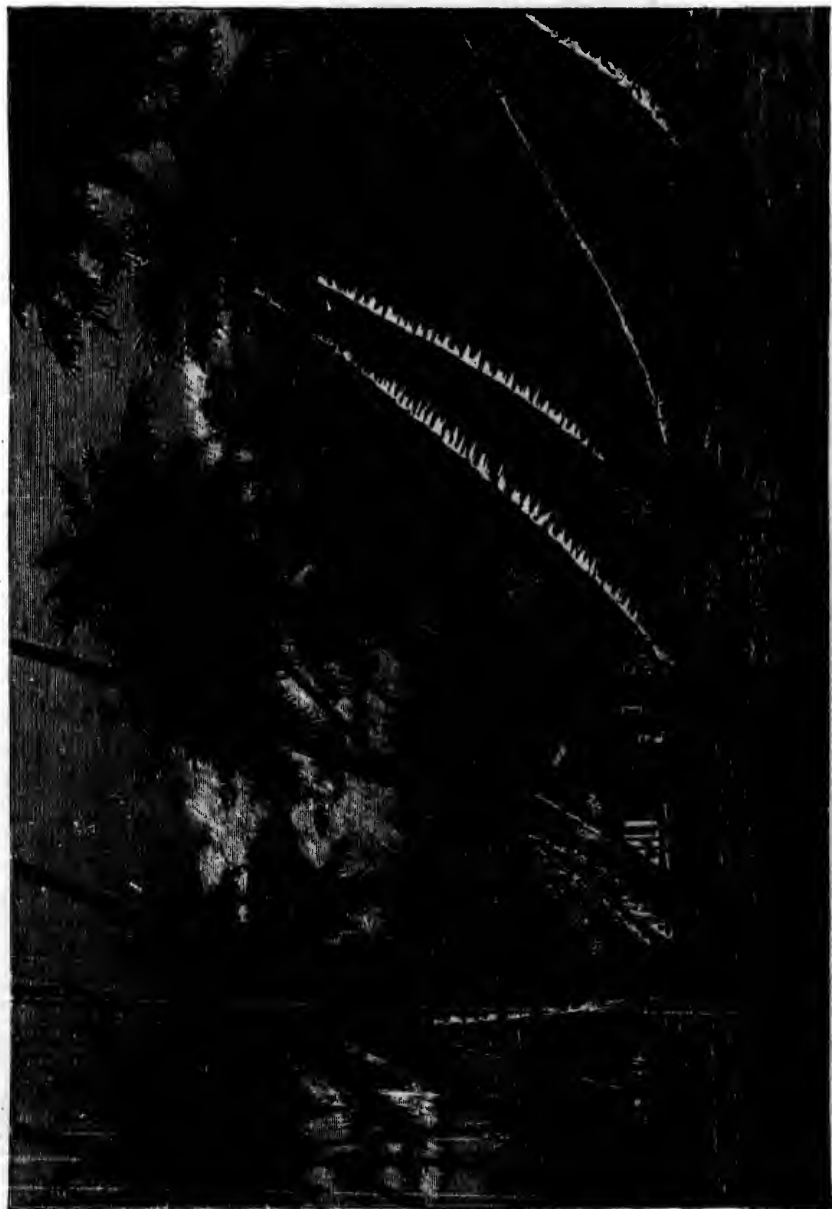


bouring Aorai is nearly as lofty, while several of the surrounding satellites of these two monarchs attain an altitude of 5,000 feet. Orohena, that is, "Soil of the Gods," terminating in a cluster of vertical basalt columns, has never been scaled, and even the more accessible Aorai was only ascended for the first time in 1882. Some hundred and fifty streams or rivulets rushing in cascades over the basalt terraces have gradually deposited the rich detritus of the eruptive rocks on the narrow

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LANDSCAPE IN THE TUAMOTU ARCHIPELAGO.

zone of plains encircling the island with a fringe of verdure about two miles deep; the deposits are prevented from being carried seawards by an outer barrier of reefs.

The Manahiki islets, scattered to the north-west of Tahiti, are all "low," like those of the great archipelago specially designated by that name. This Low Archipelago, formerly known as Pomotu ("Lands of Night" or "Mystery"), and at present as *Tuamotu* ("Remote Lands"), might well have retained the name of "Dangerous" given to it by Bougainville. Nearly all the visible islets are atolls or mere reefs extremely perilous to navigators. Before the introduction of the cocoonut the only arborescent plants were the pandanus and a species of box called mikimiki. Of the 78 islets composing the archipelago properly so called 74 appear to be under 14 feet high, and the few that attain an eminence of 120 feet look like veritable mountains. Possessing no lagoons of smooth water they are avoided by skippers. The atolls are generally of a regular oval shape disposed in the direction of the archipelago itself, that is, north-west and south-east.

South-east of Tuamotu the relatively large island of Mangareva forms with a few elevated islets a distinct volcanic group, known as the Gambier Archipelago, and memorable in connection with the researches of Darwin on the oscillations of the terrestrial crust. The whole group is enveloped in an outer coral reef apparently indicating the ancient coastline of now submerged land, which, according to the illustrious naturalist, slowly subsided, while the exterior rim was kept near the surface by the coral builders. But whatever is to be said of this theory, which has recently been contested by Guppy, Murray, and others, it is certain that Gambier consists essentially of an igneous nucleus round which the polyps have raised their coral structures. Duff, the central eminence (1,200 feet), is an extinct volcano, as are all the other heights scattered over the inner waters.

Apart from a few atolls and coral reefs the Marquesas are all old volcanoes, or groups of volcanoes, probably extinct for many ages, and no longer anywhere presenting the regular form of cones with terminal craters and lava sheets. Nukahiva, largest member of the archipelago, shows on its west side nothing but steep cliffs and stony plateaux almost destitute of vegetation; but the central part, source of the largest stream, is enclosed by a circle of hills culminating in a peak 3,860 feet high. Hiva-oua has better preserved its primitive architecture, still forming an amphitheatre of volcanic hills, one of which is the highest point in the archipelago (4,140 feet).

The solitary Easter Island, on the eastern verge of Polynesia, is a huge block of lava, terminating in a volcano ruptured at the three corners of its triangular mass. The highest summit at the north-west angle rises 1,640 feet sheer above the surface of the water.

#### CLIMATE.—FLORA.—FAUNA.

Equatorial Polynesia is almost entirely comprised within the zone of the south-east trade winds, the groups north of the equator being alone exposed to north-east breezes, which in summer veer round to the north-west, or become variable



currents. In these waters hurricanes are rare, although they blow at times with extreme violence, especially in the Low Archipelago and in Samoa. In 1878 a cyclone passing over Tuamotu swept away Anaa, the capital. Another tremendous typhoon visited Samoa in March, 1889, and almost completely wrecked the American and German fleets riding at anchor in the harbour of Apia. The British cruiser Calliope alone escaped uninjured by making for the open sea in the teeth of such a gale as had not been known in the archipelago for nearly thirty years.

The hilly islands, such as Nuka-hiva, Tahiti, Raratonga, Upolu, and Savaii, lying along the track of the trade-winds, receive an abundant rainfall at least on their windward slopes. But the low insular groups, which are unable to arrest the moist atmospheric currents, are much drier, and at times never receive a single downpour for years together. The islands lying within this almost rainless zone were, till lately, covered with thick deposits of guano, and some are even still worked with profit. Such are Baker, the neighbouring Howlands, and farther east Jarvis and Malden.

In its flora and fauna Equatorial Polynesia is essentially Melanesian. Although American forms occur, nearly all its plants and animals have come from the west, which would seem to imply that these archipelagoes are not surviving fragments of a submerged continent. Tahiti, Samoa, and other lands enjoying a copious rainfall are clothed with an exuberant tropical vegetation, but distinct animal and vegetable species are everywhere few in number. In the Low Archipelago Gray failed to discover more than 28 or 30 indigenous plants, and before the arrival of the whites a species of rat, said to have been half domesticated in Mangareva, was the only mammal found in equatorial Polynesia. Here also a centipede 6 inches long is the only venomous animal.

#### INHABITANTS OF POLYNESIA.

From the ethnical standpoint Polynesia forms a distinct domain in the oceanic world, although its inhabitants do not appear to be altogether free from mixture with foreign elements. The vestiges of older civilisations differing from the present even prove that human migrations and revolutions have taken place in this region on a scale large enough to cause the displacement of whole races. The curious monuments of Easter Island, although far inferior in artistic work to the wood carvings of Birara and New Zealand, may perhaps be the witnesses of a former culture, no traditions of which have survived amongst the present aborigines. These monuments may possibly be the work of a Papuan people, for skulls found in the graves differ in no essential feature from those of New Guinea. The "statues" are enormous basalt rocks, one no less than 23 feet long, representing the head and bust of persons with uniformly low forehead, prominent superciliary arches, long nose, wide nostrils, large mouth, thin lips, and stern expression. According to Clements Markham they resemble the Aymara (Bolivian and Peruvian) more than the present Polynesian type. Most of them are erected on basalt ledges in the interior of a crater, and some have been left unfinished or not com-



The various idioms current in Eastern Polynesia all spring from one stock and are still closely related to each other both in structure and vocabulary. More distantly akin to the Malay family, they represent an older period of development, and would seem to imply greater racial purity on the part of the Polynesians themselves. They are poor in sounds, but soft and harmonious, no syllable ending in a

Fig. 209.—TATTOOED NATIVE OF THE MARQUESSAS ISLANDS.



consonant, and the vowels everywhere predominating. Till lately almost uninflected, they have in recent years been considerably modified by the missionaries ignorant of their true genius, and are now largely affected by English words and expressions.

Tattooing was widespread, and so highly developed that the artistic designs

covering the body served also to clothe it ; but this costume is now being replaced

Fig. 210.—SAMOAN WOMEN.



by the cotton garments introduced by the missionaries. In certain islands the

operation lasted so long that it had to be begun before the children were six years old, and the pattern was largely left to the skill and cunning of the professional tattooers. Still traditional motives recurred in the ornamental devices of the several tribes, who could usually be recognised by their special tracings, curved or parallel lines, diamond forms and the like. The artists were grouped in schools like the Old Masters in Europe, and they worked not by incision as in most Melanesian islands, but by punctures with a small comb-like instrument slightly tapped with a mallet. The pigment used in the painful and even dangerous operation was usually the fine charcoal yielded by the nut of *aleurites triloba*, an oleaginous plant used for illumining purposes throughout Eastern Polynesia.

The Polynesians are wrongly supposed to have been unacquainted with the bow and arrow. In Tonga and Samoa these weapons were used in the battle-field, and in the eastern archipelagoes they figured at the civil or religious feasts, or as mere playthings. Except where anthropophagy formed part of the mythical ceremonies, the only animal food was fish, shell-fish and pork, and even this diet was generally forbidden to the women, sometimes under pain of death. In most of the groups fruits, grains, edible roots and leaves, sometimes fermented and pounded to a paste, sufficed to nourish the natives, and were mostly yielded by bountiful nature with little labour on their part. At every repast the never-failing beverage was *kava*, which the young women prepared by masticating the slightly pungent leaves and fibre of the *piper methisticum*, still cultivated in the gardens for this purpose. After fermentation the liquor becomes clear, pleasant to the taste, very refreshing and but slightly intoxicating. Indulged in too freely, however, it is said to cause general debility and skin diseases. Since its interdiction by the missionaries, it has been almost everywhere replaced by the more dangerous brandy distilled from orange juice.

In Samoa the women were much respected, and every village had its patroness, usually the chief's daughter, who represented the community at the civil and religious feasts, introduced strangers to the tribe, and diffused general happiness by their cheerful demeanour and radiant beauty. But elsewhere the women, though as a rule well treated, were regarded as greatly inferior to the men. At the religious ceremonies the former were *noa*, or profane, the latter *ra*, or sacred, and most of the interdictions of things tabooed fell on the weaker sex. The women never shared the family meal, and they were regarded as common property in the household of the chiefs, where polygamy was the rule. Before the arrival of the Europeans infanticide was systematically practised; in Tahiti and some other groups there existed a special caste, amongst whom this custom was even regarded as a duty. Hence doubtless arose the habit of adopting strange children, almost universal in Tahiti, where it gave rise to all manner of complications connected with the tenure and inheritance of property.

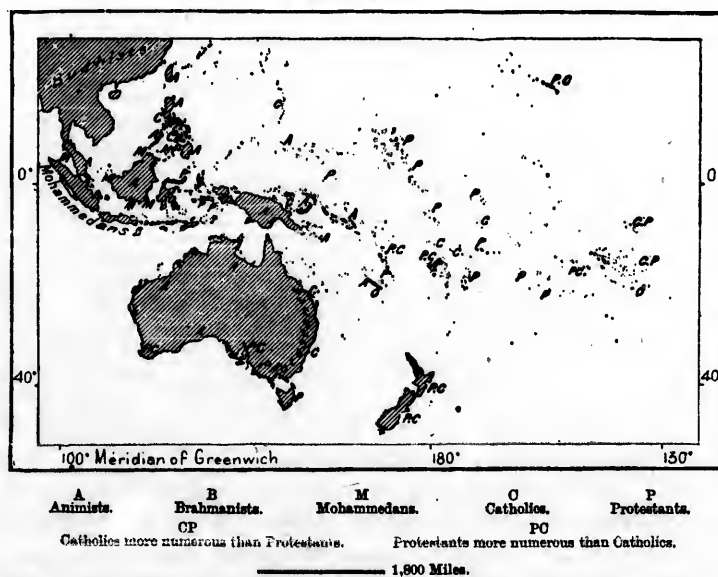
In Polynesia the government was almost everywhere centred in the hands of powerful chiefs, against whose mandates there was no appeal. A vigorous hierarchy separated the social classes one from another, proprietors being subject to the chiefs, the poor to the rich, the women to the men; but over all custom reigned

supreme. This law of taboo, which regulated all movements and every individual act, often pressed hard even on its promulgators, and the terrible penalties it enforced against the contumacious certainly contributed to increase the ferocity of the oceanic populations. Almost the only punishment was death, and human sacrifices in honour of the gods were the crowning religious rite. In some places the victims were baked on the altars, and their flesh wrapped in taro leaves was distributed amongst the warriors.

Yet despite the little value attached to human life, the death of adult men gave rise to much mourning and solemn obsequies. Nor was this respect for the departed an empty ceremonial, for the ancestors of the Polynesians were raised to the rank

Fig. 211.—RELIGIONS OF OCEANIA.

Scale 1 : 150,000,000.



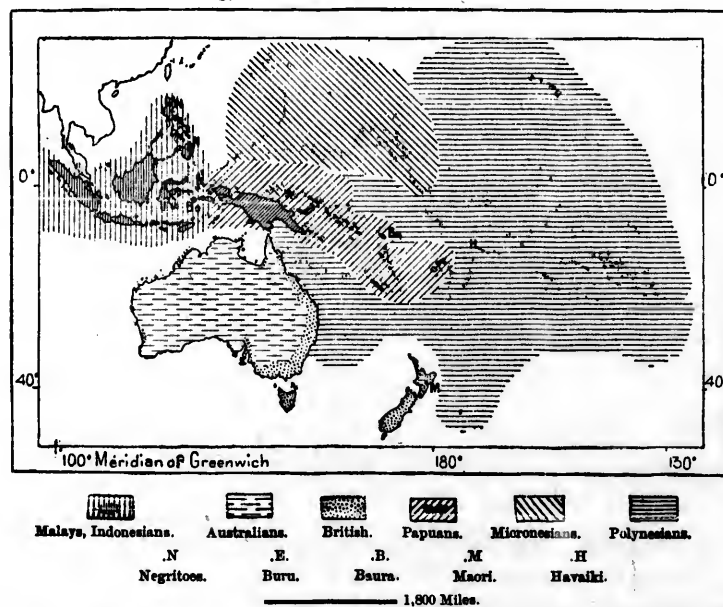
of gods, taking their place with those who hurled the thunderbolt and stirred up the angry waters. A certain victorious hero thus became the God of War, and had to be propitiated with supplications. But the common folk and captives were held to be "souless," although a spirit was attributed to nearly all natural objects.

But for about half a century nearly all the Polynesians have practised some form of Christianity. The work of conversion was begun in 1797 by the establishment of the Protestant station at Tahiti, whence the missionaries gradually spread their influence throughout Polynesia. They were followed by the Catholics, who though less numerous and possessing smaller revenues, have everywhere made proselytes; in some places, and especially in the French possessions, they even already outnumber the Protestants. Civil strife has often been stirred up by the friction of the rival religions. Where the priests hold undisputed sway theocratic

governments have been constituted, and in Gambier a Catholic missionary attempted to transform the island of Mangareva into a vast monastery. On the other hand the English Protestants in the Cook Islands and for a time even in Tahiti deprived non-communicants of all civil and political rights, and regulated social customs, attitudes, salutations, and the whole conduct of the natives.

In their institutions, myths, religious rites, and many other respects the Polynesians betray diverse affinities to all their western neighbours, Papuans, Indonesians, Malays, and even Japanese. They also present numerous analogies with the natives of North and South America, and more especially with the Araucanians of Chili. It seems therefore possible that the Americans have had their share in

Fig. 212.—INHABITANTS OF OCEANIA.  
Scale 1 : 150,000,000.

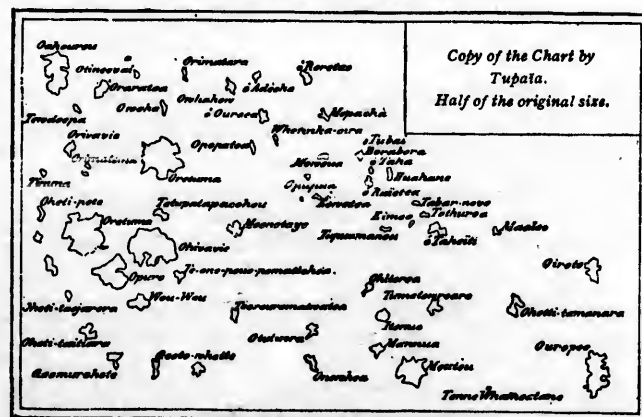


the interminglings that have taken place throughout the eastern archipelagoes, the more so that the normal winds and currents set in the direction from east to west. Recent historical facts show that migrations from the mainland to the islands and from one archipelago to another may often take place under certain favourable conditions. Thus in 1832 a Japanese junk with nine fishermen drifted for ten months with the winds and currents, finally landing at Oahu in Hawaii. About the same time another Japanese bark was stranded on the American coast, and similar unwilling voyages have frequently been made between the Philippine, Caroline, and Marshall groups. The Tahitians and seafarers returning from the Low Archipelago also speak of numerous migrations made even in the contrary direction to the normal winds. Similar cases are attested by the unanimous tradi-

tions of the natives, so that interminglings could certainly have taken place at various times throughout the vast Pacific basin.

But although migrations may evidently have occurred in all directions, physical resemblance, speech, usages, and traditions all point to the western lands near Asia as the region whence most of the Polynesian islanders reached their present homes: Ethnologists have also shown that the general eastward movement must be referred to a very remote epoch, certainly prior to the spread of Hindu influence in Malaysia, for no trace of Sanskrit can be found in the Polynesian languages. According to Hamy their nearest kindred should be sought amongst those tall, light-complexioned Indonesians, who have been driven into the interior by the intruding Malays, and who under the common name of Alfurus are often confounded with the Negrito or Papuan populations. Attempts have been made to fix the point of

Fig. 213.—EQUATORIAL POLYNESIA, BY TUPAIA.



dispersion eastwards at Buru between Celebes and Ceram, or at Baura in the Solomon Archipelago, merely because a vague Samoan tradition speaks of a certain Pulotu (Burotu), an island in the west, as the cradle of their race.

More probability attaches to the conjectures regarding the second point of dispersion within the Polynesian area itself. The Maori, Hawaiian, Raratongan, Tahitian, Marquesas, and Tuamotu traditions point uniformly to an island Savaiki, Havai, Avaiki, Havai, Havaiki, as their ancestral home,\* and other traditions describe the migrations from this island to the various oceanic archipelagoes. Savaii, largest of the Samoan group, is regarded by most ethnologists as the Savaiki of the Polynesian legends, and the resemblance of names gives some weight to this view, although in Samoa itself Savaii is regarded as having been colonised by immigrants from Upolu and other parts of the archipelago. According to others Havaiki would simply mean "Fire," so that the tradition would merely refer vaguely to some active volcano or burning mountain as the starting-point of the migrations.

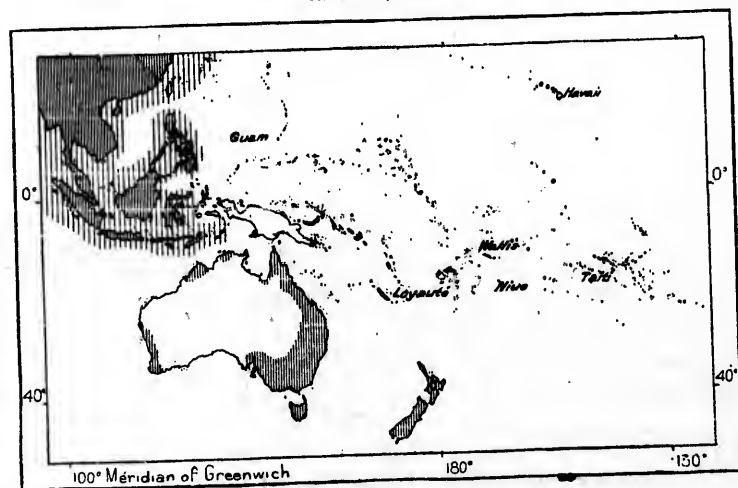
\* A. H. Keane, *The Inter-oceanic Races and Languages*.



East of this mysterious land the dispersion took place from island to island, and essays have been made to trace the very order of the migrations by the aid of the map of Tahiti and surrounding islands prepared by the Tahitian Tupuaia, who accompanied Cook on one of his voyages. But this map itself, correct enough for Tahiti and neighbouring lands, has probably little more than a mythical value for the more western regions.

Meanwhile, the race itself seems to be almost everywhere hastening to its extinction, as shown by the accurate returns made at different times during the present century. In 1774 Cook estimated the population of Tahiti at about two

Fig. 214.—MOVEMENTS OF THE OCEANIC POPULATIONS.  
Scale 1 : 150,000,000.



■ Lands in which the population is increasing.  
The population increases also in the islands inserted on the map. In all the others it diminishes.  
— 1,800 Miles.

hundred and forty thousand, reduced to one hundred and fifty thousand by Forster, who assigned six hundred and fifty thousand to the whole of Polynesia. At present the Polynesians number scarcely more than one hundred and ten thousand, but while they are thus disappearing at a rapid rate they still remain physically one of the finest races on the face of the globe. In this respect there appears to be no deterioration, and the decrease in numbers must be attributed in great part to numerous external causes, such as former massacres, the contract labour system, especially before it was regulated by government control, the sale of strong drinks, and above all the epidemics introduced by the white traders and seafarers. In 1778, immediately after Cook's visit, Hawaii was decimated by this scourge, and what the Hawaiians assert all their Polynesian kindred repeat, that disease and extermination were introduced by the Europeans.

Even the adoption of European clothes, rendering them more susceptible to

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changes of temperature, and still more the suppression of their national pastimes, boisterous rejoicings, feasts and dances, interdicted by the missionaries, have co-operated towards the extinction of the race. The people become weary of a too placid, aimless existence, and die out through sheer inanition. Nevertheless, there are exceptions to the general law of decadence and in certain favoured localities, such as Lukunor in the Carolines, Futuna in the Wallis group, and Niue north of Tonga, the population normally increases by the natural excess of births over deaths. Elsewhere the natives become more and more intermingled with immigrants from all quarters, and wherever any actual increase takes place, as for instance in Tahiti, it occurs almost invariably amongst the half-castes resulting from these crossings. The modern era has thus begun for the Polynesians, who can be rescued from ultimate extinction only by the sacrifice of their racial purity and gradual absorption in the surrounding populations.

The *Tonga* Archipelago lies somewhat apart from the chief ocean highways between Australia and the New World, its principal member, *Tonga-Tabu*, being over 420 miles south-east of Fiji, the natural station on the route from Melbourne and Sydney to Hawaii and San Francisco. Nevertheless, Tonga is visited by many skippers, mostly Germans, who here ship large quantities of copra, yielded by the vast palm-groves of these fertile islands. The capital and most frequented port of the little Tonga state is *Nukualofa*, on a roadstead well sheltered by reefs on the north side of *Tonga-Tabu*. On the east side *Mua*, the central Catholic station, lies near the old residence and the necropolis of the royal family.

*Lefuka*, in the Haabai group, and *Niua*, in the largest of the Vavao Islands, also trade in copra, chiefly with German houses. The port of *Niua*, although of somewhat difficult access, is one of the finest in the Pacific, forming an extensive basin 20 to 25 fathoms deep, sheltered from all winds by an amphitheatre of high escarpments.

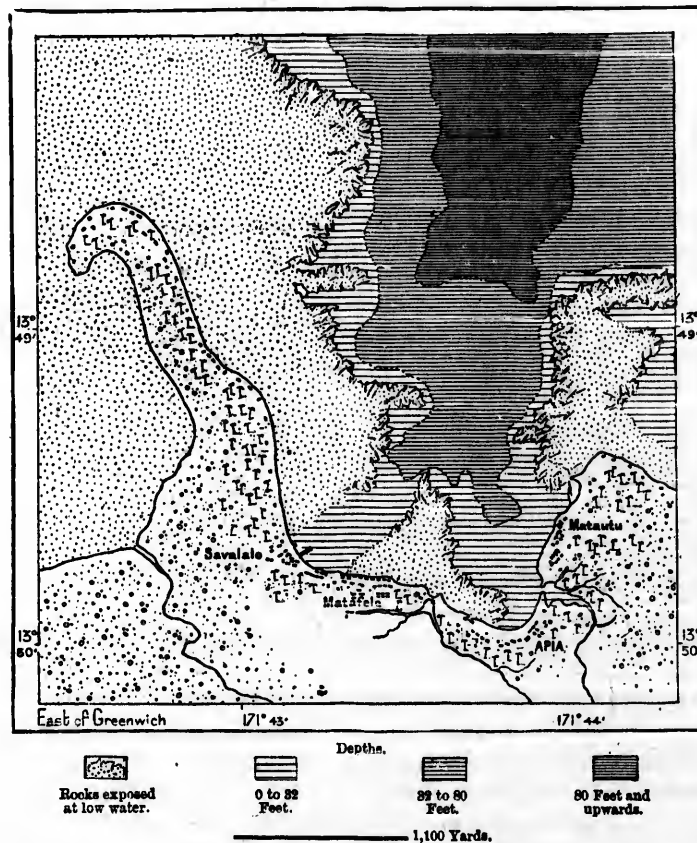
East of Tonga, *Savage Island*, so called by Cook from the rude welcome given him by the natives, has resumed its original name of *Niue (Inui)*, and has been declared neutral territory by a convention signed in 1886 between England and Germany. English influence, however, is paramount in this islet, one of the most fertile in Polynesia, and inhabited by Polynesians of Tonga speech and descent.

The few islets lying north-west from Tonga and north-east of Fiji, and collectively called Wallis from their discoverer in 1767, are disposed on a line which, drawn from Samoa, would pass through the British island of Rotuma to Anuda and Tukopia, the last western lands inhabited by Polynesians. The natives probably came from *Tonga-Tabu*, although *Uvea* or Wallis, properly so called, is regarded by them as the cradle of their race. *Futuna*, west of *Uvea*, was formerly inhabited by ferocious cannibals who devoured to the last man the eighteen hundred of the neighbouring island of *Alofi*, "Land of Love," and one of its chiefs is reported to have eaten his own mother. Wallis was annexed to the French Oceanic possessions in 1887.

*Samoa*, named by Bougainville the *Navigators' Archipelago*, is still a great

centre of Pacific navigation, *Upolu*, the most densely peopled island, being much frequented by English, American, and German skippers. The chief port, *Apia*, lies at the head of a semicircular bay on the north side of *Upolu*, which is sheltered on the west by a long wooded promontory fringed with reefs. Formerly a rendezvous for whalers, *Apia* now chiefly exports copra, although cotton, coffee, and tobacco plantations have also been laid out. But a protracted war of succession

Fig. 215.—*APIA*.  
Scale 1 : 37,000



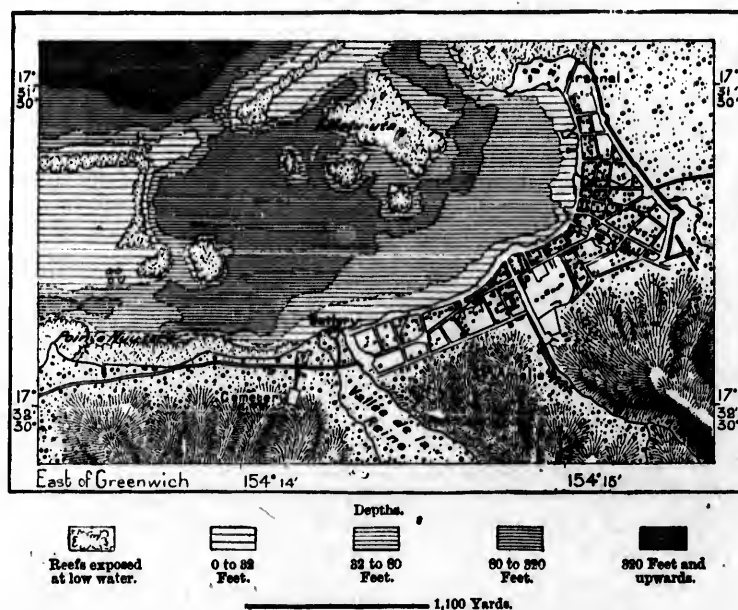
fomented by the Germans has well-nigh ruined its agricultural prospects. The fields and gardens have been wasted up to the very suburbs of *Apia*, which has itself suffered much from these deplorable rivalries. *Apia* might be replaced as a seaport by the much safer inlet of *Pango-Pango* on the south side of *Tutuila*, but for its remote position. At the bay of *Funga-sa*, on the opposite side of this island, Langle and three other companions of Lapérouse were murdered by the natives in 1787.



and American dealers, and next to their mother tongue, the natives are most familiar with English, originally introduced by the Protestant missionaries. The orange, first planted here by Cook, has become the chief agricultural resource of the Archipelago, while the guava, introduced in 1813, now runs wild, covering the slopes of the mountains with impenetrable thickets. The cotton, coffee, and sugar plantations of *Pimaono* and other districts have proved an utter failure since the dispersion of the 4,500 Chinese contract labourers employed by the

Fig. 217.—PAPEETÉ.

Scale 1 : 85,000.



speculators. About a thousand of these have settled down as petty dealers and gardeners.

About 50,000 acres, or one-fifth of the large island, are estimated to be available for plantations. All these lands lying on the seaboard or on the first slopes of the hills, are easily accessible by the highway, 115 miles long, which winds in a double circuit round the twin islands of Great and Little Tahiti. But at the south-east extremity of the latter this romantic route is interrupted by precipices, and here the surf, driven by the trade winds through a large opening in the fringing reefs, has to be crossed in frail outriggers. The western part of Great Tahiti, between Papeeté and the plantations, will soon be reached by a railway from the capital. A little fort has been erected on the isthmus of *Taravao*, which connects both islands, and which is the most convenient site for the centre of administration. *Port Phaeton*, in this southern district, is far more spacious and

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VIEW TAKEN AT MOOREA, UNDER MOUNT RUTUL, TAHITI



better sheltered than that of Papeet , and it has also the advantage of a better climate and a more fertile soil.

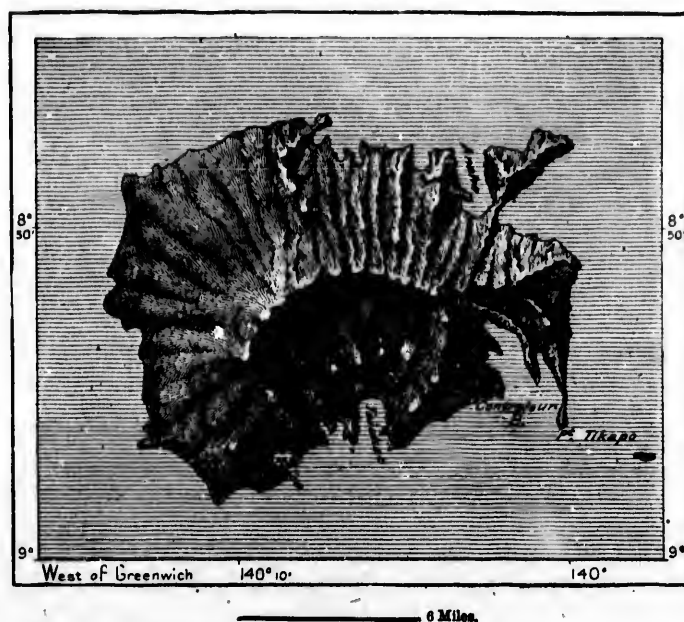
*Moorea* is a mere agricultural dependency of Great Tahiti; but *Raiatea*, one of the Leeward group, possesses one of the best harbours in the Pacific, thanks to which it has become the centre of a brisk trade, chiefly in the hands of the Germans.

Some 480 miles north of Tahiti lies *Caroline Island*, where the French astronomers made some remarkable studies of solar physics in 1883.

The eastern groups of *Tuamotu*, *Mangareva*, and the *Marquesas* have also some excellent havens, which might afford shelter to large fleets. But they are all thinly peopled, and the two capitals—*Tuio-ha * in *Nuka-hiva* and *Rikitea* in *Man-*

Fig. 218.—NUKA-HIVA.

Scale 1 : 360,000.



*gareva* are mere villages. In Tuamotu the administrative centre has been removed from *Anaa* to the more northern atoll of *Fakarava*. But the sparse population, dispersed over a space some 400,000 square miles in extent, renders all industrial and commercial development almost impossible. These remote archipelagoes, lying 3,500 miles from the nearest point of America, can never possess any natural resources beyond their palm-groves and pearl fisheries.

In 1813 Porter, an American, seized the Marquesas Islands in the name of the United States Government, which, however, did not ratify the procedure. But in 1835 the French adventurer, Thierry, proclaimed himself "King of Nuka-hiva," and he was followed by French Catholic missionaries, whose action led to

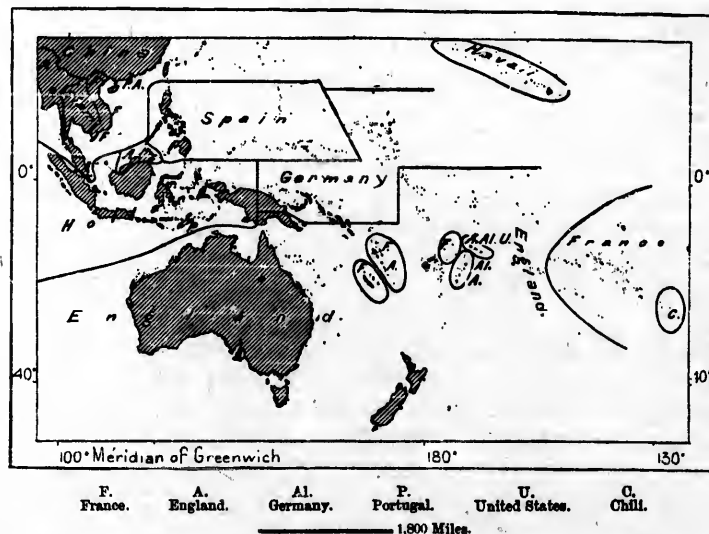


the gradual annexation of the archipelago by France. Here the French agent exercises absolute control, while till quite recently the Catholic priests governed on theocratic principles in the name of France. In 1880 the Tahiti group was declared a French possession, and is now administered by a Council General elected by all citizens speaking the French language.

South-east of Tuamotu the last inhabited land is *Pitcairn Island*, where the English crew of the *Bounty*, after the mutiny of 1789, finally settled with Tahitian wives. When this little republican "state" was discovered in 1808 it awakened a certain sympathetic curiosity in England. The revolt was forgotten, donations

Fig. 219.—POLITICAL DIVISIONS OF OCEANIA.

Scale 1 : 150,000,000.



flowed in, and the British Government even placed the fertile island of Norfolk at the disposal of the overcrowded community. Most of the islanders accepted this offer, but some have since returned to Pitcairn.

*Easter Island*, or *Rapa Nui*, that is "Great Rapa," famous for its monolithic monuments and hieroglyphic tablets, lies 1,300 miles east of Pitcairn. After its occupation by some Tahitian immigrants, it was regarded as virtually a French possession; but it has now been assigned to Chili, whose fleet dominates in these waters.

The guano islets lying near and north of the equator are considered as British territory, although their only residents have hitherto been Americans engaged in working the guano deposits. The group nearest to Hawaii has even been named *America Islands*. *Christmas*, a southern member of this group, is one of the largest islands in Polynesia proper.

A table of the chief Polynesian groups is given in the Appendix.

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## CHAPTER XII.

### HAWAII, OR SANDWICH ISLANDS.



THE Hawaiian group, better known by the name of Sandwich, given to it by Cook in 1778, forms the limit of the oceanic lands in the north-east Pacific. It forms a chain of islands, reefs, and banks running nearly 2,000 miles in the direction from north-west to south-east, parallel with the South Polynesian archipelagoes.

Hawaii is limited northwards by chasms ranging from 1,000 to 2,000 fathoms, and on the south side by abysmal depths exceeding 2,750 fathoms. It occupies a position of vital importance, being the most advanced region of the oceanic world in the direction of the United States. Yet its Polynesian inhabitants, who continue to diminish in numbers, have not yet been replaced by fresh immigrants, and the whole archipelago, with nearly 7,000 square miles of dry land, has a population of little over 80,000 souls.

Sighted by the early Spanish navigators, Hawaii appears to have been subsequently visited by passing European seafarers, and thirty-seven years before the arrival of Cook a Spanish vessel was wrecked on one of the islands. But the honour of having revealed the archipelago to the world still belongs to Cook, who twice visited it in 1778, on the first occasion discovering the three western islands of Niihau, Kauai, and Oahu, on the second perishing at the hands of the natives of Maui under circumstances that have not yet been satisfactorily explained. After Cook's voyage Hawaii was visited by Lapérouse and Vancouver, and in 1794 Brown surveyed the port of Honolulu, which has since become the commercial centre of the group. Missionaries, naturalists, and traders gradually settled in the islands, and the work of exploration was even prosecuted by the natives themselves. At present Hawaii is by far the best known of all Polynesian lands, and its bibliography comprises thousands of treatises of all kinds.

A native legend, referring the origin of the archipelago to an enormous egg suddenly bursting in mid-ocean, is probably a reminiscence of old eruptions, during which some lands really rose above the surface. The volcanic range reproduces in the inverse direction and on a far larger scale the formation of the Samoan group, for here also the leftmost mountains lie at one extremity, the islands thence decreasing in altitude until at the opposite end they are mere reefs rising little above the surrounding waters. The igneous forces diminish in the same direction,

for the highest volcanoes and vastest cauldrons of seething lavas are found in Hawaii, the largest member of the group, at its south-eastern extremity. The other islands are also studded with cones and craters; but here the fiery energy is much weaker, or is reduced to a few thermal springs. In the extreme north-west the long-extinct craters have been obliterated, and the heights are now clothed with an exuberant vegetation. Here also the coral reefs are far more numerous than off the coast of Hawaii, where the noxious gases prevent the development of coral life.

In the island of Hawaii the southern volcano of Mauna-Loa, or the "Great Mountain," rises to a height of 13,760 feet, or about 3,000 feet above the vege-

Fig. 220.—HAWAIIAN ISLANDS.  
Scale 1 : 6,500,000.

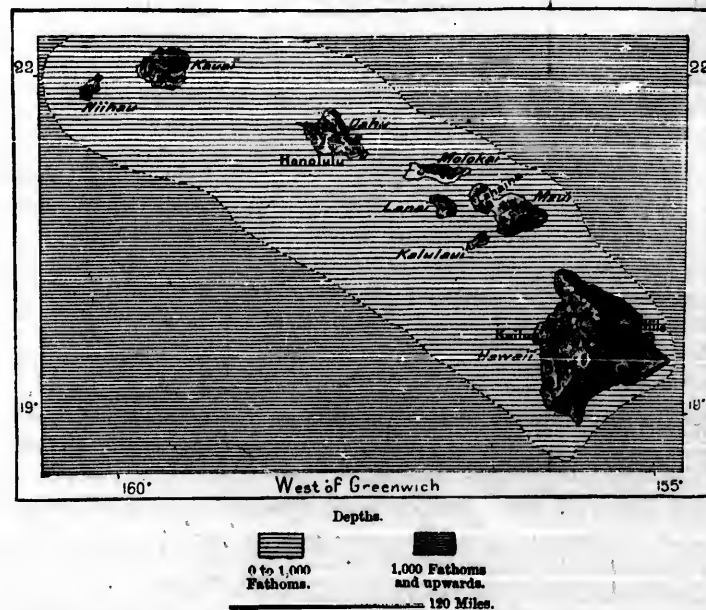
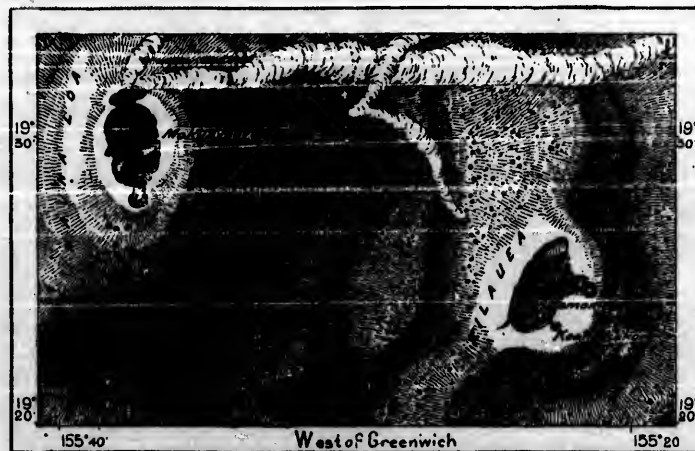


table zone. The crater, or rather group of craters, collectively named the Mokua-veveo, open on the very summit of the mountain, so as to form a symmetrical cavity disposed in the direction from north to south. In the centre lies the vast primitive crater, which has a mean diameter of about 2,200 yards and a depth of over 1,000 feet. Mounds of scorïæ, some in ignition, some extinct, rise from the bottom of this pit, north and south of which two semicircular terraces over 400 feet high represent two halves of a crater inscribed, so to say, on the periphery of the central opening. Vast lava streams have been discharged from the very rim of Mauna-Loa, as in 1880, when about 2,200,000,000 cubic feet of burning matter flowed down the slopes of the mountain. But the molten lavas mostly escape from openings far below the upper cone. Thus in 1855 such a stream over-

flowed from the north-east side, and after covering a space of 300 square miles reached the plain of Hilo close to the coast. Three years later another crater was opened six miles north of the central one, discharging a double stream which flowing west half filled up Kiholo Bay.

On the east flank of Mauna-Loa has been opened the vast lateral crater of Kilauea, at a height of about 4,000 feet above the sea. Kilauea, abode of the formidable goddess Pelé, is an almost circular chasm about nine miles round, and varying in depth with the movement of the boiling lavas at the bottom. During the present century there has been no direct overflow from Kilauea or from the other furnaces forming its eastern prolongation; but the underground heat has melted the rocks at a lower depth, and through these the fiery streams have found their way to the surface. In 1868 one of these, after flowing some sixty miles to

Fig. 221.—CRATERS OF MAUNA LOA AND KILAUEA.



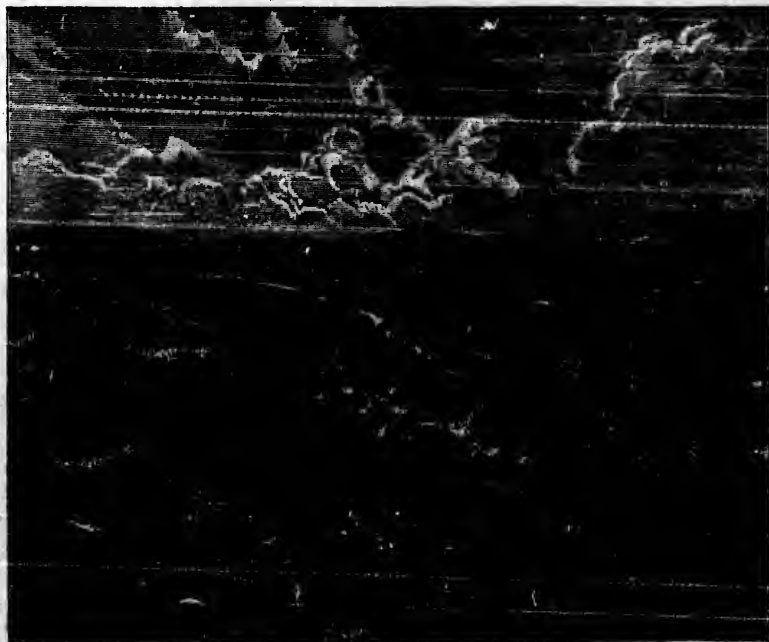
the south-west, poured in a flaming cataract over the cliffs into the sea, where it formed a pyramid of lavas which, by later accessions, has been gradually attached to the mainland under the name of Kalsé Point. Dana estimates at over fifteen billions of cubic feet the quantity of molten rock discharged on one of these occasions.

North-west of Mauna-Loa, which covers a space of nearly 2,000 square miles, the much less elevated Mauna-Hualalai (7,822 feet) is also occasionally active, but all the other cones in Hawaii Island are extinct. One of these is streaked or even covered with snow during a great part of the year, as indicated by its native name, Mouna-Kea, the "White Mountain." It even overtops Mauna-Loa, its highest peak rising, according to the official surveys, to an altitude of no less than 13,850 feet.

Hawaii is continued north-westwards by four mountainous islands and a few

islets, which constitute a secondary group within the archipelago itself. Each of these has its volcanoes, whose height bears a somewhat uniform proportion to the size of the island. The loftiest is Haleahala ("Abode of the Sun"), whose vast cone, 10,200 feet high, occupies the southern part of the island of Maui. Its crater, one of the largest on the globe, has a circuit of no less than 15 miles and a depth of over 2,000 feet. The two sections of Maui are connected by a strip of sand, six or seven feet high, which is incessantly destroyed and renewed under the conflicting action of winds and waves. Beyond Maui follow the islands of Oahu with several cones, Kauai, Niihau, and Kaula, terminating the chain of the Sandwich Archipelago towards the north-west. Then follows for 1,800 miles in

Fig. 222.—LAVA STREAMS OF KILAUEA.



the direction of Japan a range of reefs and islets, also probably volcanic, although lavas have been found on only a small number of these upraised lands. The traces of upheaval are everywhere conspicuous throughout the archipelago, and here and there are met ancient beaches at different elevations along the slopes of the hills. In one of the Maui group, a coral bank of apparently recent origin runs for a considerable distance at a height of 500 feet above the present sea-level, and a similar, though less distinct, formation fringes the great volcano in Kauai Island at an altitude of no less than 4,000 feet. Since 1794 the shoals at Honolulu have been upraised about four feet, to the great detriment of navigation.

Excluding the western reefs the whole of the Hawaiian archipelago lies within

the torrid zone, and although the temperature is lower than in Fiji or Samoa,



Fig. 223.—CRATER OF KILAUEA, HAWAII.

it is still very oppressive in the sheltered districts, where the atmosphere is not renewed by the north-west trade winds. The glass stands normally at 70° Fahr.

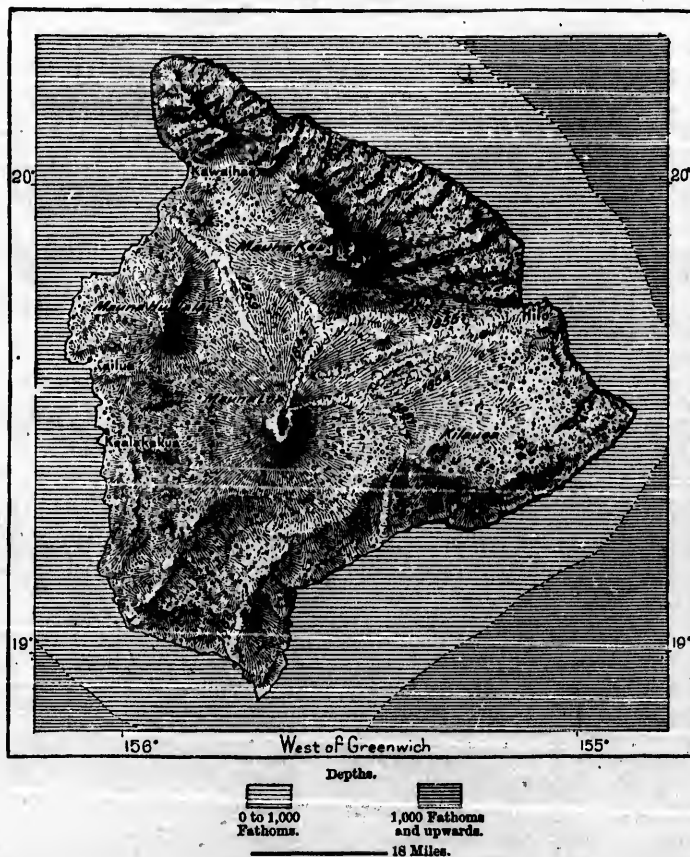
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in Honolulu, where, during a period of twelve years it never rose above  $90^{\circ}$  or fell below  $53^{\circ}$ , shewing an extreme range of under 40 degrees. Although less copious than in Indonesia, the rainfall is still abundant, averaging annually from 60 to 80 inches. The north-east trades, which blow with great regularity for nine months in the year, bring from time to time refreshing downpours, and the climate is altogether one of the most agreeable and salubrious in the world.

Fig. 224.—HAWAII.  
Scale 1 : 1,500,000.



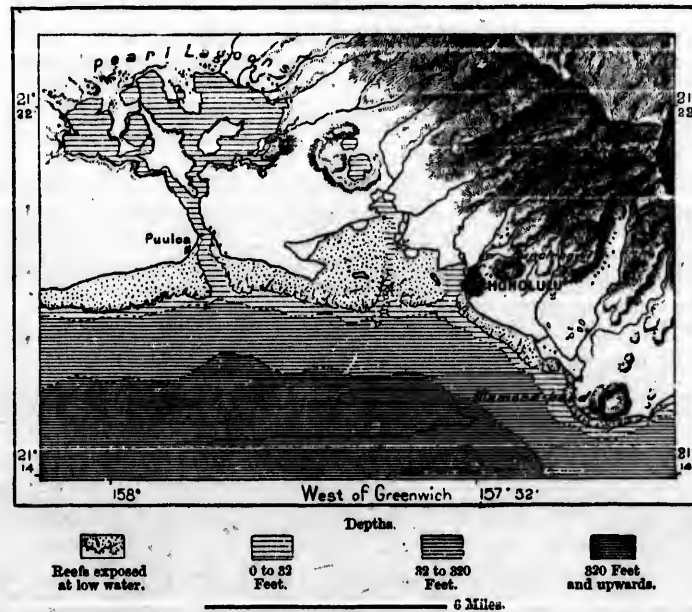
The indigenous flora is less varied than might be expected from the mean high temperature and the fertility of the soil. Along the narrow zone of the coast-lands little is seen beyond cocoanut groves and two other species of palms, the breadfruit tree, and a few other plants, such as the oleaginous kukui (*aleurites*) still used for lighting the houses. But in the well-watered upland valleys the vegetation is far more exuberant and diversified. Here flourishes the gigantic halapepe (*brenchleya*), with foliage like that of the pandanus, and in general the

Sandwich flora may be said to abound more in arborescent than in herbaceous forms. Even many plants which in Europe are annuals, here become perennial.

The native fauna is very poor in mammals, and before the arrival of Cook the only domestic animals were the dog, the pig, and poultry, all probably introduced within a few centuries previously. The only indigenous mammals are the mouse and a species of bat, while the reptile class was represented only by three small lizards. Of land and aquatic birds there are some 40 species, amongst which not a

Fig. 225.—HONOLULU.

Scale 1 : 250,000.



single songster is found. The most highly valued bird was the oo (*drepanis pacifica*), whose beautiful black plumage was varied with a few small yellow feathers in great demand for the decoration of the chiefs. The royal robe of Kamehameha I., which represented the labour of nine successive generations, was entirely made of these feathers attached to a ground of close netting. The streams are almost destitute of fish, while molluscs abound in prodigious quantities.

The Hawaiians have long lost their national usages, which resembled those of the kindred peoples in New Zealand and eastern Polynesia. They now regard the ruins of their ancient sanctuaries with as much religious indifference as the present generation of Britons do the Stonehenge monoliths. Even when the first missionaries arrived, in 1820, most of the natives had already ceased to believe in their national gods, and religious wars had broken out between the conservative and progressive parties. But after the official conversion of the chiefs all their subjects had to conform under the severest penalties. Then the rivalries between the



Anglicans, Methodists, and Catholics, followed by local revolutions and the intervention of foreign powers, kept the archipelago in a state of ferment for many years.

As in most other Polynesian groups the indigenous population is steadily decreasing, having fallen from perhaps three hundred thousand at the time of the discovery in 1778 to forty thousand in 1884. The natives are now being replaced by the immigration of foreigners of all nationalities, who already outnumber the aboriginal element, which must rapidly disappear by extinction and absorption amongst the new arrivals. To the other causes of decay was added in 1848 the terrible scourge of leprosy, here called *mai paké*, or "Chinese malady," which is absolutely incurable. When attacked by the loathsome disease the patients are removed to the island of Molokai, between Maui and Oahu, where about 800 are usually confined till relieved of their sufferings by death. Amongst recent victims was the heroic Catholic priest, Father Damien, who had voluntarily selected this island prison as the field of his religious administration.

In virtue of a reciprocity treaty with the United States the foreign trade of the archipelago is almost monopolised by North America. Even the exchanges with Europe are made chiefly by the overland route, by which Honolulu may be reached from London in about twenty-four days. In the islands of Hawaii and Maui a few short railways have been opened, while the postal, telegraph, and telephone services are more developed than in most European states. All the natives without exception can read and write, and at the Paris Exhibition of 1878 Hawaii was awarded the grand prize for primary instruction.

*Hilo*, the capital of the island of Hawaii, lies on a bay open to the north-east trade winds, and partly silted up with alluvial deposits. A more convenient position is occupied by *Lahaina*, chief town of Maui, on a roadstead sheltered by the islands of Lanai and Kalulaui. *Honolulu*, capital of Oahu, and of the whole archipelago, is well protected from the dominant winds by an amphitheatre of hills, and from the variable currents by a double line of fringing reefs. Since its discovery in 1794 Honolulu has completely superseded the old capital, *Kailua*, on the west coast of Hawaii, north of the bay where Cook was murdered. From the sea little is visible of the town, which is scattered over some square miles of gardens, orange groves, and forest trees. The roadstead is commanded on the east side by the extinct volcano of Diamond Head, and at the back of the city rises the perfectly regular cone known by the name of the "Punch-bowl." Honolulu is the centre of the intellectual movement in the archipelago, and here are issued nearly all the local English and native newspapers.

According to the constitution of 1887 Hawaii is a constitutional monarchy, with two chambers, both elected by all citizens whether native or foreign, the Upper House for six, the Lower for two years.

The official Kanaka (Hawaiian) language is being gradually replaced by English, already the chief medium of intercourse throughout the Pacific Ocean. The schools are constituted on the model of the American system, the schoolbooks, weights, measures, and currency are American, and the group itself is practically

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VIEW OF WAIMEA, KAUAI ISLAND, HAWAII.



a province of the great republic. The very harbour of Honolulu is an American

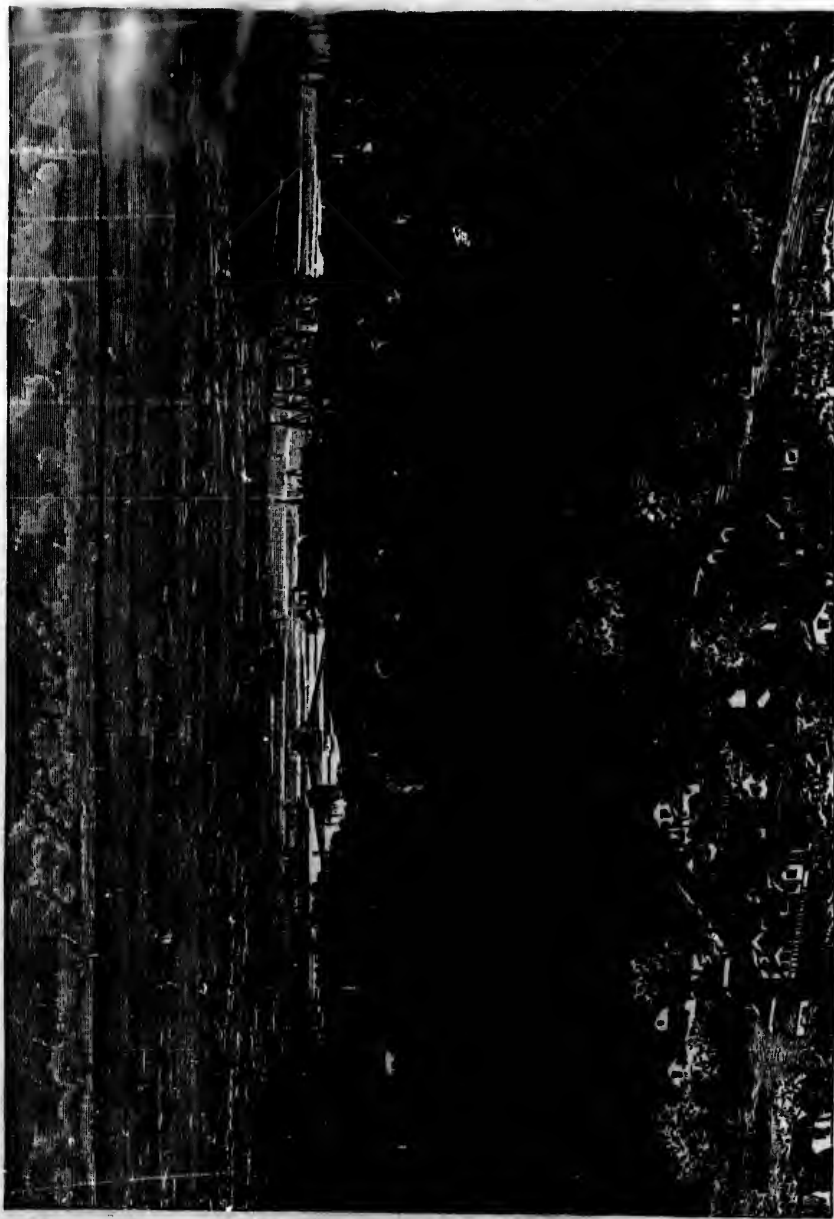


Fig. 226.—GENERAL VIEW OF HONOLULU.

naval station, and the political independence of Hawaii may be regarded as a legal fiction sustained by the personal interests of the American planters.



## APPENDIX.

### STATISTICAL TABLES.

#### MASCARENHAS AND NEIGHBOURING ISLANDS.

	Area in Square Miles.	Population (1887).	Whites, Coloured, &c.	Hindoes and Chinese.
Mauritius . . . . .	708	368,000	116,000	252,000
Rodriguez . . . . .	45	1,800	—	—
Réunion . . . . .	790	161,000	136,000	25,000

Imports of Port Louis (1886), £2,400,000; exports, £3,440,000; shipping, 922 vessels of 692,000 tons.

Railways of Mauritius (1886), 90 miles; net revenue, £35,000.

Revenue of Mauritius (1886), £750,000; expenditure, £840,000; public debt, £746,000.

Imports of Réunion (1886), £1,125,000; exports, £532,000; revenue, £196,000.

Area of Amsterdam, 18 square miles; of St. Paul, 3 square miles; of Marion and Prince Edward, 125 square miles.

Area of Crozet, 210 square miles; of Kerguelen and dependencies, 1,800 square miles; of Heard and MacDonald, 175 square miles.

#### INDONESIA.

	Area in Square Miles.	Population (1881).
Dutch Indonesia . . . . .	600,000	39,850,000
British (North Borneo, Sarawak and Brunel) . . . . .	108,000	630,000
Portuguese . . . . .	15,000	530,000
Total . . . . .	723,000	31,810,000

Area of Sumatra and adjacent islands, 185,000 square miles; approximate population, 3,500,000.

Tobacco crop of North Sumatra, 1875, £200,000; 1880, £900,000; 1886, £2,400,000.

#### ADMINISTRATIVE DIVISIONS OF SUMATRA.

	Population (1886).	Chief Towns.	Population.
Atjeh (independent and reduced) . . . . .	543,000	Kota-Raja	30,000
Batta Land . . . . .	300,000	—	—
Tapanuli . . . . .	194,000	Sibogha	—
Padang, Lower (Beneden-landen) . . . . .	310,500	Padang	25,000
Padang, Upper (Boven-landen) . . . . .	670,500	Fort kock	—
Benculen . . . . .	152,000	Benculen	11,000
Lampung . . . . .	122,800	Telokh-Betong	—
Palembang . . . . .	557,000	Palembang	60,000
East Coast . . . . .	182,000	Medan	10,000

Riouw and Lingga Archipelagoes: area, 1,700 square miles; population (1888), 98,000.  
 Area of Bangka, 5,000 square miles; population (1886), 74,715, of whom 63,000 are Malays, and 21,000 Chinese.  
 Area of Billiton, 1,870 square miles; population (1886), 35,174.  
 Mean annual output of the Bangka and Billiton tin mines, 8,330 tons.  
 Area of Tambelan, Anambas, Natuna, and Serasan, 930 square miles; of Great Natuna, 640 square miles.

	Area in Square Miles.	Population.
Dutch Borneo . . . . .	210,000 . . . . .	1,071,000
Sarawak . . . . .	30,000 . . . . .	500,000
British North Borneo . . . . .	20,000 . . . . .	250,000
Brunei . . . . .	15,000 . . . . .	80,000
<b>Total . . . . .</b>	<b>295,000 . . . . .</b>	<b>1,901,000</b>

## ADMINISTRATIVE DIVISIONS OF DUTCH BORNEO.

Divisions	Provinces or Kingdoms.	Chief Towns.	Population.
WEST.—Area, 62,000 sq. miles; population, 410,000; capital, Pontianak.	Sambas . . . . .	Sambas . . . . .	10,000
	Pontianak . . . . .	Pontianak . . . . .	15,000
	Kotaringin . . . . .	— . . . . .	—
	Sampit . . . . .	— . . . . .	—
	Great and Little Dayak . . . . .	— . . . . .	—
	Dusun and Bekempai . . . . .	Marabahan . . . . .	10,000
	Amuntai . . . . .	Amuntai . . . . .	8,000
	Banjermassin . . . . .	Banjermassin . . . . .	38,000
	Martapura . . . . .	Martapura . . . . .	12,000
	SOUTH AND EAST.—Area, 150,000 square miles; population, 617,000; capital, Banjarmasin.	Tanah Laut . . . . .	— . . . . .
Tanah Kusan . . . . .		— . . . . .	—
Tanah Bumbu . . . . .		— . . . . .	—
Pasir . . . . .		Pasir . . . . .	20,000
Kutei . . . . .		Samarinda . . . . .	10,000
Sambilling . . . . .		Tangarung . . . . .	5,000
Gunong Tebur . . . . .		— . . . . .	—
Bulangan . . . . .		— . . . . .	—
Tidung . . . . .	— . . . . .	—	

Area of Labuan, 30 square miles; population, 6,300; shipping, 52,278 tons; exchanges, £184,000.  
 Revenue of Sarawak (1886), £80,000; exchanges, £800,000.  
 Imports of North Borneo (1887), £212,000; exports, £113,000; revenue (1888), £30,000.

## JAVA.

Population according to languages (1888): Javanese, 16,800,000; Sundanese, 2,500,000; Madurese, 2,600,000; Malay, 1,000,000; sundries, 300,000; total, 23,000,000.  
 Growth of population of Java and Madura in 30 years (1857—86), 11,300,000 to 22,000,000 = 98 p.c.  
 Mohammedan Schools in Java, 16,760; attendance, 255,000.  
 Primary Schools for Natives (1887), 201; attendance, 39,700.  
 Rice crop of Java (1885), 4,370,000 tons; rice exported (1887), 71,250 tons.  
 Natives employed on the coffee plantations (1886), 475,000 families.  
 Coffee crop (1816), 3,000 tons; (1850) 60,000 tons; (1879) 79,000 tons; (1887) 17,750 tons.  
 Average sugar crop (1857—62), 103,700 tons; (1875) 199,000 tons; (1887) 418,000 tons.  
 Tobacco exported (1831), 280,000 lbs.; (1864) 18,000,000 lbs.; (1882) 34,000,000 lbs.  
 Indigo crop (1887), 1,060,000 lbs. Salt (1885), 57,000 tons, value £526,000.  
 Live stock (1880): buffaloes, 2,542,000; oxen, 2,090,000; horses, 518,000.  
 Railways open (1887), 780 miles. Telegraph lines, 5,500 miles.  
 Letters forwarded, 5,162,000; newspapers, 3,029,000.  
 Exports to Great Britain (1886), £3,000,000; imports from, £1,300,000.  
 Total exports (1884), £12,600,000; imports, £10,300,000.  
 Shipping: 9,195 vessels, 2,227,000 tons; mercantile navy, 1,000 vessels, of which 34 are steamers, 94,000 tons.  
 Chief towns, with population in 1886: Batavia and suburbs, 172,000; Surakarta, 130,000; Surabaya, 129,000; Jokjokarta, 90,000; Semarang, 72,000; Pasuruan, 50,000.

Army of Dutch Indonesia (1887): Europeans, 14,230; Natives, 18,314; total, 32,544.  
 Navy (1886): 113 vessels; crews, 4,803, of whom 2,770 are Europeans.  
 Revenue (1888), £10,740,000; expenditure, £11,110,000.

## ADMINISTRATIVE DIVISIONS OF JAVA AND MADURA.

Provinces.	Capital.	Area in Square Miles.	Population (1886).
Buntam . . . . .	Serang . . . . .	3,300 . . . . .	545,847
Batavia . . . . .	Batavia . . . . .	2,600 . . . . .	1,013,884
Krawang . . . . .	Purwakarta . . . . .	1,800 . . . . .	331,638
Cheribon . . . . .	Cheribon . . . . .	2,700 . . . . .	1,309,163
Preang . . . . .	Bandong . . . . .	8,500 . . . . .	1,654,838
Tegal . . . . .	Tegal . . . . .	1,500 . . . . .	1,008,556
Pekalongan . . . . .	Pekalongan . . . . .	700 . . . . .	3,338,978
Semarang . . . . .	Semarang . . . . .	2,000 . . . . .	1,412,335
Japara . . . . .	Patti . . . . .	1,200 . . . . .	858,166
Banjumas . . . . .	Banjumas . . . . .	2,200 . . . . .	1,112,100
Bagelen . . . . .	Purworejo . . . . .	1,300 . . . . .	1,272,532
Kadu . . . . .	Magelang . . . . .	800 . . . . .	740,278
Surakarta . . . . .	Surakarta . . . . .	2,500 . . . . .	1,071,090
Jokjokarta . . . . .	Jokjokarta . . . . .	1,200 . . . . .	642,728
Rembang . . . . .	Rembang . . . . .	3,000 . . . . .	1,196,402
Surabaya . . . . .	Surabaya . . . . .	2,400 . . . . .	1,889,388
Madiun . . . . .	Madiun . . . . .	2,500 . . . . .	1,021,195
Kediri . . . . .	Kediri . . . . .	2,500 . . . . .	979,301
Pasuruan . . . . .	Pasuruan . . . . .	2,100 . . . . .	838,947
Probolingo . . . . .	Probolingo . . . . .	1,400 . . . . .	506,013
Besuki . . . . .	Besuki . . . . .	3,800 . . . . .	591,700
Madura . . . . .	Pamekasan . . . . .	2,100 . . . . .	1,403,494
Total . . . . .		60,100 . . . . .	21,997,259

## OTHER DUTCH POSSESSIONS.

	Area in Square Miles.	Population (1886).
Bali and Lombok . . . . .	4,300 . . . . .	1,342,932
Sumbawa . . . . .	5,600 . . . . .	150,000
Flores, Solor, and Allor . . . . .	8,800 . . . . .	373,000
Timor, Samau, and Rotti . . . . .	12,700 . . . . .	823,000
Wetter, Kisser, and Roma . . . . .	1,300 . . . . .	18,500
Damma, Nila, and Sarna . . . . .	180 . . . . .	4,300
Letti, Moe, and Lakor . . . . .	300 . . . . .	6,880
Luang, Sernatta, Babber . . . . .	320 . . . . .	28,750
Tenimber group . . . . .	2,200 . . . . .	6,700
Kei group . . . . .	240 . . . . .	17,580
Celebes, Kabuna, Wowoni, and adjacent islets . . . . .	70,000 . . . . .	650,000
Saley group . . . . .	270 . . . . .	57,000
Buton and Muna . . . . .	3,200 . . . . .	20,000
Tanah Jampea . . . . .	180 . . . . .	500
Pelling and Banggai . . . . .	1,200 . . . . .	10,000
Sula group . . . . .	2,500 . . . . .	6,500
Sangi group . . . . .	370 . . . . .	40,000
Talaut . . . . .	360 . . . . .	5,000

Macassar, imports (1886), £600,000; exports, £240,000; mean annual exchanges, £1,000,000.

CHIEF TOWNS OF CELEBES: Macassar, population, 20,000; Manado, 4,000; Bonthain, 3,500; Tondano, 3,000; Kema, 2,000; Palos, 2,000.

## SOUTHERN MOLUCCAS:—

	Area in Square Miles.	Population.
Buru and Amblauw . . . . .	8,750 . . . . .	62,000
Ceram . . . . .	7,280 . . . . .	200,000
Ceram Laut group . . . . .	50 . . . . .	2,000
Goram . . . . .	130 . . . . .	4,500
Amboyna . . . . .	270 . . . . .	32,000
Uliasser Islands . . . . .	100 . . . . .	26,000
Banda group . . . . .	15 . . . . .	8,000
Total . . . . .	16,595 . . . . .	330,500

## NORTHERN MOLUCCAS:—

	Area in Square Miles.	Population.
Batchian group . . . . .	1,050	2,000
Little Moluccas . . . . .	110	30,000
Halmahera (Jilolo) . . . . .	6,800	25,000
Morotai . . . . .	1,080	} uninhabited.
Obi group . . . . .	740	
Tafuri and Maju . . . . .	60	
Total . . . . .	9,840	57,000

## MAIN ADMINISTRATIVE DIVISIONS OF DUTCH INDONESIA.

	Area in Square Miles.	Population (1886).
Java and Madura . . . . .	60,100	21,997,259
Sumatra, West Coast . . . . .	50,000	1,190,254
Lampung Districts . . . . .	10,400	122,803
Palembang . . . . .	56,300	557,398
Sumatra, East Coast . . . . .	17,000	182,414
Atjeh . . . . .	20,000	543,450
Riouw . . . . .	1,680	4,198
Bangka . . . . .	5,000	74,715
Billiton . . . . .	1,870	35,174
Borneo, West . . . . .	61,700	401,687
Borneo, East and South . . . . .	144,000	671,948
Celebes and Sumbawa . . . . .	47,300	392,829
Menado . . . . .	28,000	222,497
Ternate and East Celebes . . . . .	95,050	102,048
Timor . . . . .	25,000	912,000
Amboyna . . . . .	19,800	251,691
Bali and Lombok . . . . .	4,300	1,342,332
Total . . . . .	647,250	29,248,872

## PHILIPPINE ARCHIPELAGO.

Area, 118,000; approximate population (1888), 7,000,000.  
 Tobacco exported (1884), 130,000,000 cigars and 13,000,000 lbs.  
 Mean annual tobacco crop (1875-85), 20,000,000 lbs.  
 Sugar exported (1885), 2,060,900 cwts.  
 Coffee exported (1884), 73,000 cwts.  
 Hemp exported (1887), 536,000 bales; value, £2,000,000.  
 Total imports (1884), £3,600,000; exports, £3,700,000.  
 Shipping: 802 vessels; tonnage, 650,000, of which 241,000 are British.

## CHIEF TOWNS.

Manilla, population (1880), 250,000; Laoag, 36,000; Batangas, 35,000; Tayabas, 23,000;  
 Lingayen, 23,000; Tuguegarao, 21,000; Daraga, 20,000; Vigan, 18,000; Gapan, 18,000; Albay,  
 13,000; Luoban, 13,000; Calumpit, 12,500; Bacolor, 12,000; Bulacan, 11,500; Ilo-Ilo, 24,000; Capiz,  
 23,000; Sibalon, 15,000; Tagbilaran, 12,000; Cebu, 10,000.  
 Revenue (1888), £2,300,000; expenditure, £2,325,000.

## ADMINISTRATIVE DIVISIONS.

Governments.	Area in Square Miles.	Population.
Luzon . . . . .	48,000	3,240,000
Visayas . . . . .	20,000	2,513,000
Mindanao . . . . .	40,000	751,000
Palawan, &c. . . . .	10,000	40,000
Total . . . . .	118,000	6,555,000



## APPENDIX.

## MICRONESIA.

	Area in Square Miles.	Population (1887).
Mariana Islands . . . . .	450	9,680
Pelew Islands . . . . .	200	12,000 (P)
Caroline Islands . . . . .	400	29,000
Marshall group . . . . .	160	10,600
Gilbert (Kingsmill) . . . . .	170	41,000
Ellice . . . . .	14	3,300
Total . . . . .	1,394	105,580

## PAPUASIA (NEW GUINEA).

	Area in Square Miles.	Estimated Population.
Dutch New Guinea . . . . .	156,000	300,000
British New Guinea . . . . .	90,000	140,000
German New Guinea . . . . .	70,000	100,000
Total . . . . .	316,000	540,000
Waigau, Batanta, Salwati, Mysol	3,000	—
Islands in Geelvink Bay . . . . .	2,000	—
Aru Archipelago . . . . .	2,000	—
Islands on the South-West Coast . . . . .	130	—
Moresby Group . . . . .	200	—
Entrecasteaux Islands . . . . .	1,100	—
Woodlark (Muyu) group . . . . .	450	—
Louislade Archipelago . . . . .	870	—
Total . . . . .	325,780	540,000 (P)

## MELANESIA.

	Area in Square Miles.	Est. Population.
Admiralty group . . . . .	770	2,000
Matthias group . . . . .	260	70,000
Other Western Islands . . . . .	240	
New Hanover . . . . .	500	
New Ireland (Tombara) . . . . .	5,000	100,000
New Britain (Birara) . . . . .	10,000	
York and other Islets . . . . .	300	20,000
"French" Islands (Willaumez, Raoul, Giguel, &c.) . . . . .	300	
Rook Island . . . . .	280	10,000
Long Island . . . . .	240	
Dampier group . . . . .	300	
<b>SOLOMON ARCHIPELAGO:—</b>		
Bougainville (Boukaj) . . . . .	4,000	175,000
Choisenl (San Marcos) . . . . .	2,000	
New Georgia group . . . . .	1,200	
Yzabel group . . . . .	2,000	
Guadalcanar and Savo . . . . .	2,500	
Malaita (Ramos), Meramasiki, &c. . . . .	2,400	
San Cristobal (Arossi, Baura) . . . . .	1,200	
Adjacent Islets . . . . .	1,000	
Santa Cruz Archipelago . . . . .	200	5,000
Banks and Torres Islands . . . . .	190	4,500
<b>NEW HEBRIDES:—</b>		
Espiritu-Santo . . . . .	2,000	20,000
Mallieolo . . . . .	850	8,000

	Area in Square Miles.	Est. Population.
Ambrym . . . . .	240	3,000
Vaté (Sandwich) . . . . .	200	3,000
Erromango . . . . .	400	2,000
Tanna . . . . .	150	10,000
Anatom . . . . .	60	1,280
Other Islets . . . . .	1,200	15,000
Tikopia, Anuda, and other eastern isles . . . . .	20	650
New Caledonia . . . . .	6,500	43,000
Loyalty Group . . . . .	1,100	20,000

Annual yield of the New Caledonian nickel mines, 12,000 tons.

Numes, imports and exports (1884), £640,000; shipping, 277 vessels.

Budget (1887), £400,000.

### AUSTRALIA, TASMANIA, NEW ZEALAND, AND FIJI.

Colonies.	Area in Square Miles.	Population (1887).	Revenue.	Expenditure.	Debt.
New South Wales . . . . .	310,700	1,043,000	£8,583,000	£9,100,000	£41,000,000
Queensland . . . . .	663,500	367,000	3,178,000	3,389,000	26,000,000
Victoria . . . . .	87,900	1,036,000	6,734,000	6,561,000	33,000,000
South Australia . . . . .	903,400	312,000	1,870,000	2,165,300	19,006,000
Western Australia . . . . .	978,000	43,000	378,000	457,000	1,290,000
Tasmania . . . . .	26,000	143,000	595,000	662,000	4,110,000
New Zealand . . . . .	104,000	604,000	3,520,000	4,082,000	37,000,000
Fiji . . . . .	8,000	125,000	65,000	73,000	255,000
Total British Austral } Colonial Empire }	3,084,500	3,873,000	£24,923,000	£28,429,000	£181,655,000

Aborigines (1881): New South Wales, 1,643.

Victoria, 768.

Queensland, 20,585.

South Australia, 6,348.

Tasmania, none.

New Zealand, Maori, 44,097.

### AUSTRALIA AND TASMANIA.

Births (1886), 35 per 100; deaths, 16 per 100; immigrants (1887), 64,800.

Wool produced (1887), 247,000 tons; sheep, 84,827,000; cattle, 7,577,000; horses, 1,252,000; pigs, 780,000.

Wheat produced (1886), 35,000,000 bushels; other cereals, 7,000,000 bushels; potatoes, 357,000 tons; sugar (1888), 40,000 tons.

Gold produced (1886), £4,100,000; tin, £1,120,000; copper, £416,000; silver, £250,000; coal, 3,070,000 tons, value £1,400,000.

Imports (1887), £57,000,000; exports, £51,000,000; total exchanges, £108,000,000.

Shipping (1888): vessels entered, 7,668; tonnage, 5,684,000; vessels cleared, 7,658; tonnage, 5,692,000.

Mercantile navy: 1,546 sailing vessels, 800 steamers; total tonnage, 259,000.

Railways (1888): 7,000 miles; capital invested, £76,000,000; net profits, £2,700,000.

Telegraph lines (1887): 32,000 miles; despatches (1886), 6,472,000.

Letters, cards, &c., forwarded, 99,430,000; papers, parcels, &c., 80,000,000.

Public schools (1886), 5,321; attendance, 546,000.

### CHIEF TOWNS.

WESTERN AUSTRALIA: Perth, population (1886), 5,000; Fremantle, 3,600.

SOUTH AUSTRALIA: Adelaide (1888), 130,000; Testulpa, 5,500; Port Adelaide, 5,280; Moonta, 5,000; Gawler, 3,000; Glenelg, 3,000.

QUEENSLAND: Brisbane (1888), 55,000; Gympie, 12,000; Rockhampton, 11,000; Ipswich, 10,000; Maryborough, 9,000; Townsville, 8,000; Toowoomba, 6,000; Croydon, 5,000.

NEW SOUTH WALES: Sydney (1887), 350,000 with suburbs; Newcastle, 20,000; Paramatta, 12,000; Goulburn, 8,000; Wollongong, 8,000; Maitland, 7,500; Bathurst, 7,000.

VICTORIA: Melbourne (1887), 392,000 with suburbs; Ballarat, 37,000; Sandhurst, 30,000; Geelong, 23,000; Eaglehawk, 8,000; Castlemaine, 7,000; Warrnambool, 6,000; Stawell, 5,000; Echuca, 5,000.

TASMANIA: Hobart (1885), 29,000; Launceston, 19,500.

## NEW ZEALAND.

Kauri gum exported (1887), 6,790 tons, value £5,000.  
 Land under tillage (1887), 1,380,000 acres; cereals produced, 600,000 bushels.  
 Pastures, 12,000,000 acres; sheep, 14,000,000; cattle, 853,000; horses, 187,000.  
 Tinned and frozen sheep exported (1887), 1,525,000.  
 Gold produced (1887), £800,000; coal, 559,000 tons.  
 Railways opened (1887), 1,750 miles; capital invested, £14,100,000.  
 Letters, &c., forwarded, 40,000,000; papers, parcels, &c., 20,000,000.  
 Telegraphic despatches, 1,836,000.  
 Total imports (1887), £32,000,000; exports, £35,000,000.  
 Shipping entered and cleared, 1,432 of 991,000 tons.  
 Mercantile navy: 503 sailing vessels; 108 steamers; total tonnage, 95,000.  
 Chief Towns: Auckland, population (1887), 57,000 with suburbs; Wellington, 28,000; Dunedin, 46,000; Christchurch, 37,000; Thames, 8,000; Napier, 8,000; Nelson, 7,500; Oamaru, 6,000; Invercargill, 5,500; Wanganui, 5,000.

## ADMINISTRATIVE DIVISIONS.

	Area in Square Miles.	Population (1887).
NORTH ISLAND.	45,000	284,000
Auckland		
Hawke's Bay		
Wellington		
	63,000	339,000
Taranaki		
Nelson		
Marlborough		
SOUTH ISLAND.		
Canterbury		
Westland		
Otago		
Other Islands		

## FIJI.

Viti Levu, 4,000 square miles; Vanua Levu, 2,400; Taviuni, 200; Kandavu, 200; Ngau, 60; Goro, 60; Ovalau, 60; other islets, 800.  
 Coconut crop (1885), 27,000,000 nuts, yielding 4,900 tons of copra.  
 Total imports, £800,000; exports, £500,000.  
 Shipping entered and cleared, 396 of 137,000 tons.

## EQUATORIAL POLYNESIA AND HAWAII.

Archipelagoes.	States or Protectorates.	Area in Sq. Miles.	Population.
Tonga (Friendly)	England and Germany	450	30,000
Wallis	France	120	8,000
Savage (Niue)	England and Germany	30	5,000
Samoa	England, Germany, and U.S.	1,000	34,000
Union (Tokelau)		12	520
Cook (Hervey)	England	140	11,500
Tubuai (Austral)	France	105	1,400
Tahiti (Society)	France	600	17,000
Phoenix		15	80
Manahiki		50	1,600
Tuamotu (Low Islands)	France	360	5,600
Easter and Sala y Gomez	Chili	40	600
Fanning (America Is.)	England	120	200
Marquesas	France	480	6,000
Hawaii (Sandwich)	Kingdom	6,700	81,000

Chief towns of Hawaii: Honolulu, population (1886), 20,500; Hilo, 5,000; Lahaina, 4,000.  
 Revenue, £700,000; expenditure, £698,000; debt, £470,000; exchanges, £3,200,000.



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28,000; Dnedda,  
naru, 6,000; Inver-

00; Ngau, 60; Goro,

AII.

Population.

30,000  
8,000  
5,000  
34,000  
520  
11,500  
1,400  
17,000  
60  
1,800  
5,800  
600  
200  
6,000  
81,000

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