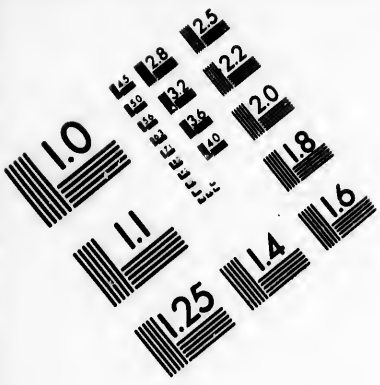

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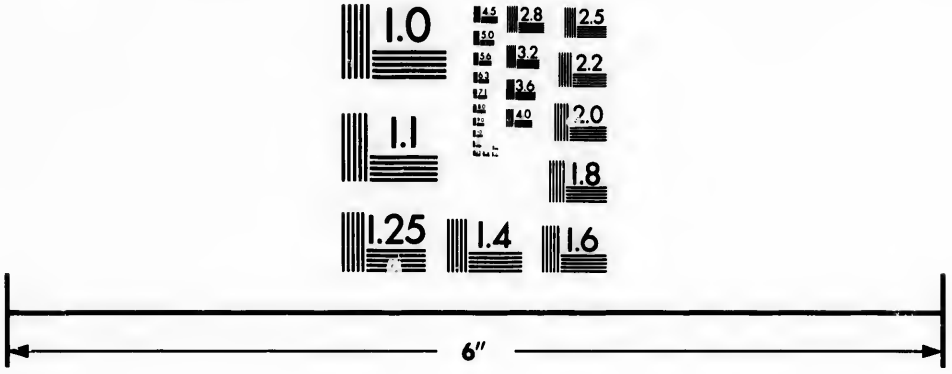

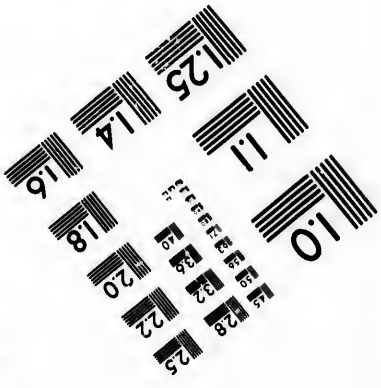

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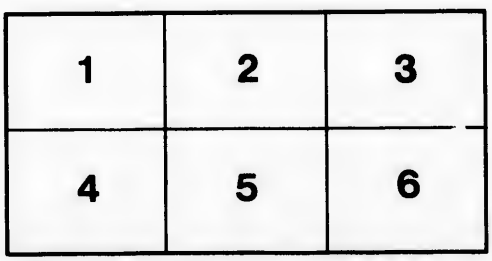
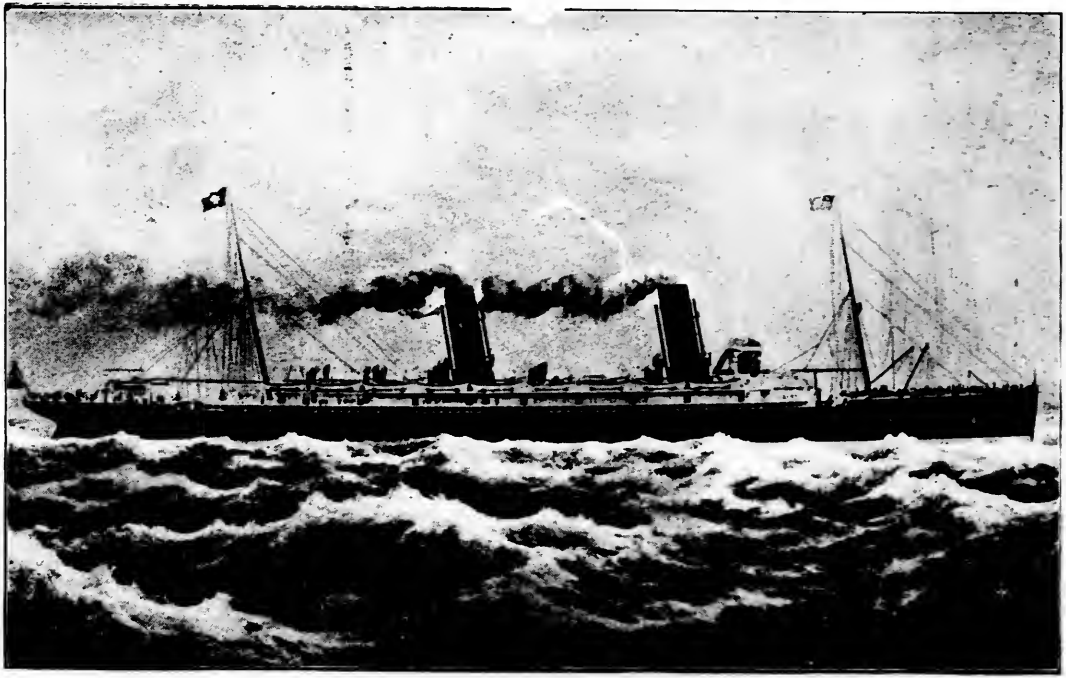


THE HISTORY

OF

NORTH ATLANTIC STEAM NAVIGATION



"LUCANIA."

"LUCANIA."

THE HISTORY

NORTH ATLANTIC STEAM NAVIGATION

1896.

THE HISTORY

OF

NORTH ATLANTIC STEAM NAVIGATION

WITH SOME ACCOUNT OF EARLY SHIPS AND SHIPOWNERS

BY

HENRY FRY

EX-PRESIDENT OF DOMINION BOARD OF TRADE OF CANADA
AND LLOYD'S AGENT AT QUEBEC

Mr Fry died at Sweetsburg, P.Q., Friday 27 Feb 1896.

"They that go down to the sea in ships, that do business in great waters; These see the works of the Lord, and his wonders in the deep. For he commandeth and raiseth the stormy wind, which lifteth up the waves thereof. . . . He maketh the storm a calm, so that the waves thereof are still. Then are they glad because they be quiet, so he bringeth them unto their desired haven."—*Psalm* cvii. 23-30.

WITH OVER FIFTY ILLUSTRATIONS OF SHIPS AND PORTRAITS OF OWNERS

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PREFACE.

THE following pages were originally written, for private circulation only, during a period of enforced leisure from ill-health. They have been revised for publication at the earnest request of a few old friends of the Author interested in steam shipping.

The only merit claimed for them is that of accuracy, to attain which the greatest pains have been taken.

Having been present at the launch of the first steamship built for the North Atlantic trade, the *Great Western*, in 1837, and that of the first ocean screw steamship, the *Great Britain*, in 1843, and having watched every Atlantic steamship with the deepest interest for fifty-six years, during which he has crossed the Atlantic thirty-seven times in various lines, the Author trusts he may not be considered open to the charge of presumption in thus acceding to the wishes of his friends.

His acknowledgments for valuable assistance are due to Andrew Allan, Esq., of Montreal; the Cunard Steamship Company of Liverpool; Clement A. Griscom, Esq., of Philadelphia, U.S.; Sir Edward J. Harland, Bart., M.P. for Belfast; Eugene T. Chamberlain, Esq., of Washington, U.S., Commissioner of Navigation; The Hamburg-American Packet Company of Hamburg; The North German Lloyd Company of Bremen; George Johnson, Esq., head of the Statistical

Department at Ottawa; Mark Whitwill, Esq., of Bristol; Archibald Campbell, Esq., of Quebec; and the Sampson Low, Marston & Co., Limited, of London.

He has also consulted 'The History of Merchant Shipping and Ancient Commerce,' by the late W. S. Lindsay, of London; 'The Atlantic Ferry,' by A. I. Maginnis, M.I.N.A., of Liverpool; 'Our Ocean Railways,' by A. Fraser-Macdonald; and 'The Mercantile Navy List,' published by Lloyds.

BELMONT, SWEETSBURG, QUE.

September, 1895.

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THE HISTORY

OF

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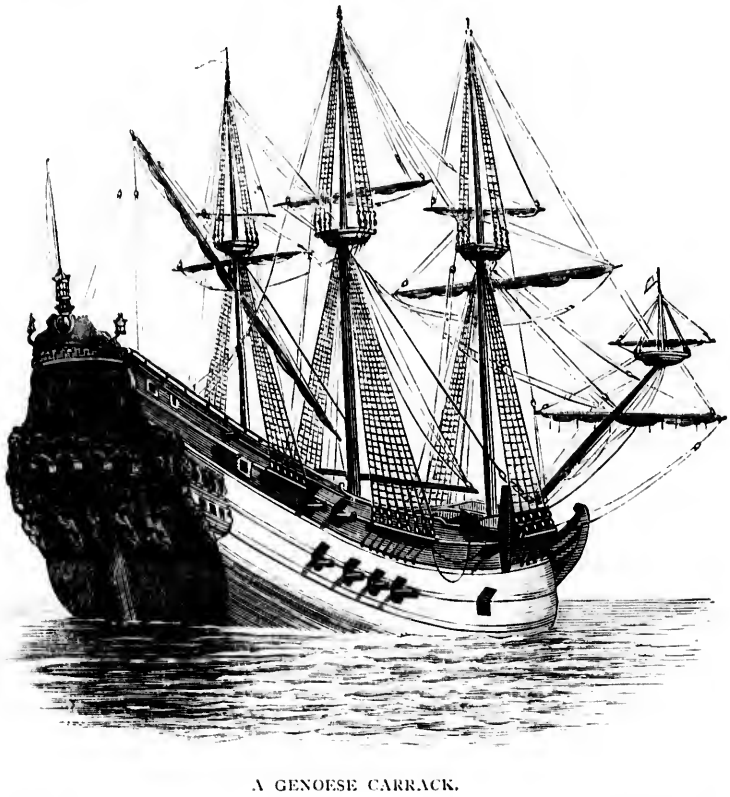
CHAPTER I.

EARLY NAVIGATORS.

THE close of the 15th, and the early part of the 16th, centuries, seem to have developed a sort of furore for maritime discovery. The Venetians and Genoese had long enjoyed a supremacy in maritime trade, and both had grown immensely wealthy. In A.D. 1202 the Venetians supplied shipping to convey the Crusaders on the fourth crusade, carrying no less than 4500 knights and 20,000 foot, with horses and provisions for nine months, but they made most exorbitant demands in payment, and their galleys secured the lucrative commerce of Greece and Egypt. During the 12th and 13th centuries the commerce of Europe was almost entirely in the hands of the Italians, more commonly known as "Lombards." They became the carriers, the manufacturers, and the bankers of all Europe. The Genoese, however, surpassed the Venetians in the art of shipbuilding, and they were, so far as can now be traced, the first to construct a ship approaching to the modern form and rig. In the first half of the 16th century some of their carracks are said to have been of no less than 1500 tons burthen. They were, too, as skilful and even more daring in the management of them than the Venetians. Pisa, one of the most ancient cities of Tuscany, proved in some respects a formidable rival to both the Venetian and Genoese traders; Tuscany became one of the most distinguished commercial states of Italy; the merchants of Florence established branch houses in distant foreign countries, and became very rich. Quarrelling with the Pisans the

Florentines purchased the port of Leghorn from the Genoese, and this acquisition rendered Florence one of the richest cities in Italy, and her commerce gradually equalled, if it did not surpass, that of Venice. Her merchants were princes. The Medici alone had at one time sixteen banking establishments in different parts of Europe. In A.D. 1329 the whole of the customs of England



A GENOESE CARRACK.

were farmed to the great commercial house of the Bardi at Florence. The trade with the East was opened in a measure by Cosmo de Medici, and was greatly extended and improved by his illustrious grandson Lorenzo.[1] She opened up a large trade with Spain and England, and her policy was far more liberal than that of Venice.

[1] See Roscoe's 'Life of Lorenzo de Medici.'

Many eyes were now turned to the East as the source of fabulous wealth. Hitherto it had only been known by the way of the Red Sea and the caravans which crossed the great desert. In the days of Solomon we learn that: "Every three years once came the ships of Tarshish bringing gold and silver, ivory and apes and peacocks" (2 Chronicles ix. 21).

The Portuguese were the first to attempt a passage by sea. The initiatory steps for the accomplishment of this great purpose were taken by Prince Henry of Portugal, who, on that account, was appropriately called "the navigator." He was the fifth son of King Dom John I.; his mother was an English Royal lady, the daughter of John o' Gaunt, and he was therefore the nephew of King Henry IV. of England, and grandson of Edward III. Prince Henry was a most enlightened prince, fond of mathematics and navigation, and long meditated voyages of discovery. In 1417 two very indifferent vessels were sent South, but returned unsuccessful. In 1418 they discovered Madeira by accident, but it was only in 1441 that Cape Blanco was reached. Cape de Verde Islands were discovered in 1446, and the Azores in 1449 or 1457. In 1471 the Equator was first passed, and in 1481 a fort and trading-station were established on the coast of Guinea. Dom John II. was also conspicuous for maritime enterprise. In 1487 Diaz discovered the Cape of Good Hope, but proceeded no further, and perished in a storm in 1500.

Vasco de Gama, another Portuguese, sailed from Lisbon 9th July, 1497, with four vessels, reached the Cape and Eastern Africa early in 1498, and Calicut, on the Malabar coast, in May, and returned to Lisbon in 1499. He sailed on his second voyage in 1502 with twenty ships, was patronised by the King, and blessed by the Church; made a third voyage as "Viceroy of India," and died at Cochin in 1525.

Columbus, a noble-minded man, and a few others, conceived the idea that "Cathay," or India, could be reached by sailing west. Columbus was born at Genoa in 1437, and after vainly seeking aid from his native province, Portugal and England, entered the service of Ferdinand and Isabella of Spain, who equipped three ships, and he sailed from Palos in August 1492. Being unacquainted with the variation of the needle, he went south, and discovered one of the Bahama Islands in October, and afterwards Hispaniola, but it was only on his third voyage in August, 1498, that he discovered the mainland of America, and, after cruel treatment from his enemies, died at Valladolid in 1506.

Amerigo Vespucci was also an Italian, having been born at

Florence in 1451, and from him it is supposed America took its name. He went to Spain and met Columbus at Seville, when the latter was preparing for his second voyage. Amerigo sailed with Hojeda, a Spaniard, as pilot in 1499, and on his return entered the service of Portugal; sailed on his second voyage in 1501, and third in 1503, discovering All Saints Bay in Brazil, and then re-entered the service of Spain as master-pilot, and died in 1516.

Magellan (or Magalhaens), a Portuguese, did not discover the strait named after him until 1519, when in the service of Charles V. of Spain, on his way to the Moluccas, and was killed at the Philippine Islands by natives in 1521.

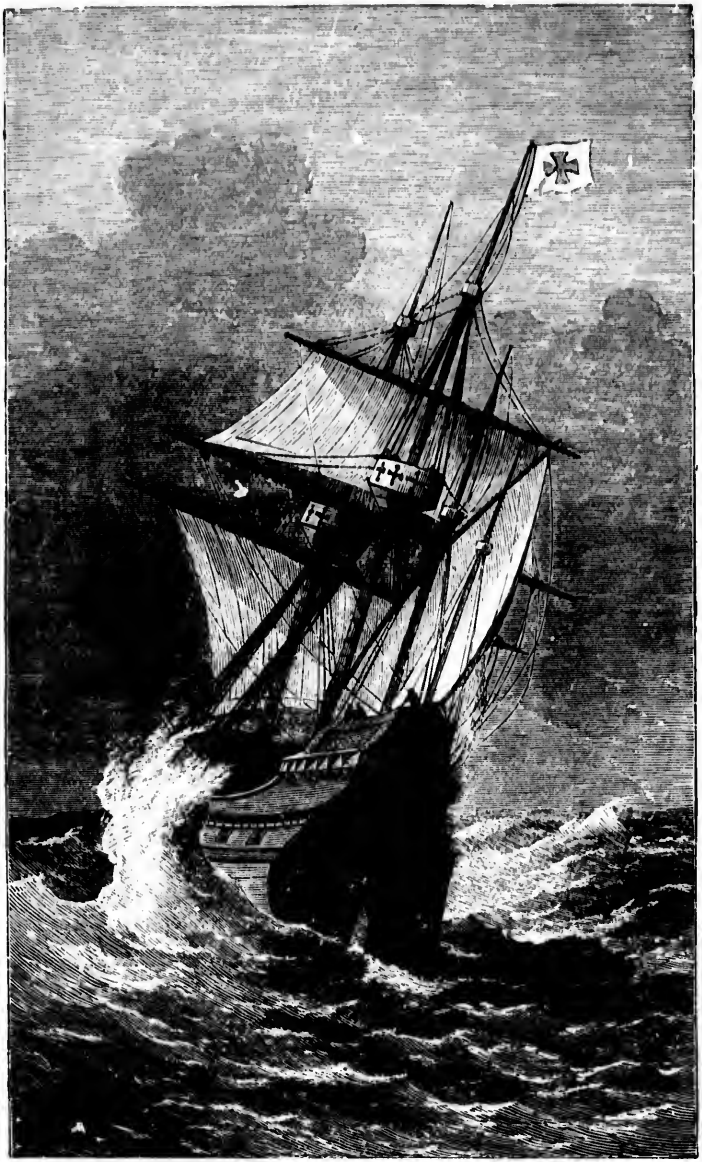
In the meantime, Cortez, a Spaniard, born in 1485, had visited Cuba in 1511 with Velasquez, and in 1518 commanded an expedition to Mexico, where he seized Montezuma, overran the country, perpetrated horrible cruelties, returned to Spain, and died in 1554.

Pizarro and Diego d'Almagro, both Spaniards of the lowest character, reached Panama in 1524, and accompanied by Lucque, a priest, visited Peru, and murdered Athualpa, the last of the Incas, in 1531. Pizarro founded Lima in 1535, murdered Almagro in 1537, and was himself assassinated in his own palace at Lima in 1541.

Jacques Cartier, a Frenchman, did not leave St. Malo until 1534, and entering the St. Lawrence, discovered the Island of St. John (now Prince Edward), Bay de Chaleurs, Quebec, and Montreal; but Cortereal is said to have touched at Labrador in 1500, calling the land "Terra Verde," and to have entered the Gulf of St. Lawrence and touched Acadian shores. Seryet de St. Just was also in Canadian waters in 1518, and in 1527. Thomas Thorne, of Bristol, is also said to have visited them, but how far to the west is not known.

Sir John Hawkins (born in Devon, 1521), Sir Francis Drake (born in Devon, 1545), and Sir Walter Raleigh (born in Devon, 1552), were, after Cabot, the most celebrated English navigators of the 16th century. All three took part in the defeat of the Spanish Armada in 1588. Hawkins was a most intrepid, daring man, serving principally in the West Indies, but disgraced his name and country by carrying slaves from Africa to the West and selling them. He died in 1595.

Drake's career was a marvellous one. His first voyage was to the West Indies in 1570. He afterwards fitted out three frigates at his own expense and sailed on his celebrated voyage round the world in 1577 with five small ships; reached Lat. 48° N. (near



VASCO DE GAMA'S "SAN GABRIEL" ROUNDING THE CAPE OF GOOD HOPE.

British Columbia), thence to the East Indies, doubled the Cape of Good Hope, and returned to Plymouth in 1580, after capturing many Spanish galleons ; visited the West Indies in 1585, capturing many places and ships ; he entered Cadiz in 1587 with thirty sail and destroyed the shipping there, and died at sea in 1596.

Raleigh, after serving in France, the Netherlands, Newfoundland, and Ireland, founded Virginia and Guiana, fell into disgrace and was confined in the Tower of London for twelve years ; was then released and returned to Guiana, but was cruelly beheaded by King James I. in 1618.

Tasman (Abel Jan) was a Dutch navigator who made many important discoveries in the South Seas in the 17th century ; he discovered New Zealand in 1642, but did not land. In the same year he discovered Van Diemen's Land (now named Tasmania, after him).

Dampier, who published his celebrated 'Voyages round the World,' in four volumes, was only born in Somerset in 1652, and died in 1712.

James Cook, another celebrated English navigator, was born in Yorkshire in 1728, and was present at the capture of Quebec in 1759, in the *Mercury ;* was afterwards made lieutenant, and made his well-known voyages in the South Seas (the account of which was edited by Dr. Kippis), exploring New Zealand, etc., and was killed by natives at Owyhee in 1779. He was the first to land in New Zealand, 8th October, 1769, near Gisborne.

George Vancouver served with Cook, endeavoured to find a passage from the North Pacific to the North Atlantic, and published an account of it. Died in 1798. Behring was a Dane in the service of Russia in Northern Seas, and perished on a desolate island in Behring's Straits in 1741.

This preliminary sketch of early navigators will suffice to prepare the way for the claim made on behalf of Sebastian Cabot, a native of Bristol, England, one of the noblest seamen that ever trod a ship's deck : not only a brave and skilful sailor, but a man of considerable scientific attainments for his age, and withal, a man of eminent piety. That claim is that Cabot, and not Columbus, was the real discoverer of the Continent of America. Now for the proofs.

Sebastian Cabot was the son of John Cabot, a skilful Venetian pilot who had settled in Bristol, where Sebastian was born in 1475, or, according to some authorities, in 1477.[1] The street where he

[1] Some authorities say Sebastian was born in Venice.

resided was, and is still, called Cathay, and is well known to the writer by that name. It is near the celebrated St. Mary Redcliff Church.

The early voyages of the Cabots are wrapped in doubt owing to the mysterious disappearance of Sebastian's 'Mappes and Discourses,' to which he refers. Sebastian held the same view as Columbus, that Cathay could be reached by the N.W., and all his early voyages took that route.

The first record of the family is that John Cabot, a Venetian, was made a citizen of Venice in 1476. There is some doubt as to whether John made any voyage of discovery himself, and one writer affirms that he did not. The weight of evidence, however, is in favour of his having, at least, performed the first authentic voyage with Sebastian, and it is generally admitted that he died in 1498, before the second expedition sailed. The fame of John, however, has been eclipsed by that of his illustrious son Sebastian, whose career I propose to trace.

On a map of Sebastian's travels, preserved in the Bibliothèque of Paris, dated 1544, it is stated in Latin and Spanish that "John and Sebastian Cabot together discovered the new land on June 24th, 1494" (probably an error for 1496), and that Cabot himself "made this figure extended in plane. . . ." In confirmation of this, it is stated in the first volume of 'Spanish State Papers,' under date July 25th, 1498: "The people of Bristol sent out every year two or three light ships in search of the island of Brazil and the seven cities, according to the fancy of that Italian Cabot; and they have done so for the last seven years." Whatever may have been the character and results of these early voyages, we have no well authenticated account of them until 1496, when King Henry VII. of England granted, on the 5th March, a patent to "John Cabot, a Venetian by birth, who had settled at Bristol, and to his three sons, Lewis, Sebastian, and Sanctus, giving them authority to sail to all parts, countries, and seas of the East, of the West, and of the North, under our banner and ensign, with four ships of what burden or quantity so ever they be, and as many marines or men as they will have with them in the said ships upon their own proper costs and charges."[1] They were also to enjoy the privilege of exclusive resort and traffic to all places they might discover, reserving one-fifth of the clear profit of the enterprise to the Crown. There has been much dispute as to the date of Cabot's first authentic voyage, whether it took place in 1496 or 1497. Many of

[1] 'Rymal' (Fœdera), vol. xii. p. 595.

the accounts, too, evidently confuse the record of his first voyage with the second, made in 1498 or 1499.

The highest English authority on these early voyages is Richard Hakluyt, born at Eyton, Herefordshire, in 1553. He was prebendary of Bristol Cathedral, and afterwards rector of Wetheringset. He wrote 'Voyages and Discoveries of the English Nation' in three volumes, a most valuable and trustworthy work. He says :—

"A great part of the continent of America, as well of the islands, was first discovered for the King of England by Sebastian Gabote, an Englishman, born in Bristowe, son of John Gabote, in 1496; nay more, Gabote discovered this large tracte of prime lande *two years before Columbus saw any part of the continent.*"

And again :

"All that mighty tracte of lande from 67 degrees N., to the latitude almost of Florida, was first discovered out of England by the commandment of Henry VII."

And again :

"He" (Cabot) "sailed so far toward the west that he had the island of Cuba on his left hand in manner in the same degree of longitude."

Mr. Gerald E. Hart of Montreal, a student of Canadian history, who owned a valuable library of historical books, says: "An analysis of the evidence of old maps and documents convinces me that Cabot sailed from Bristol in 1496, and was consequently the real discoverer of the continent of North America." Mr. Hart also advanced authorities to show that to the discovery of the island by Cabot and his English squadron, was due the name of Cape Breton. England had not then lost her old name of Britannia, and in Spanish manuscripts of the time her people were called "Bretons."

Rev. Mr. Harvey, author of the 'History of Newfoundland,' says :—

"The most reliable account of Cabot's first voyage is contained in a letter of Lorenzo Pasqualigo, Venetian Ambassador in London, addressed to his brother, and preserved in the 'Calendar of Venetian State Papers.' It is dated London, August 23rd, 1497, and contains the following remarks:—

"The Venetian, our countryman, who went with a ship from Bristol in quest of new islands is returned, and says that 700 leagues hence he discovered land, the territory of the Grand Cham. He coasted for 300 leagues and landed. He was three months on the voyage, and on his return he saw two islands to starboard, but would not land, time being precious, as he was short of provisions. The king has also given him money wherewith to amuse himself till

then (spring of 1498), and he is now at Bristol with his wife, who is also a Venetian, and with his sons. His name is Juan Cabot, and he is styled 'The Great Admiral.'"

Rev. Dr. Howley of Newfoundland, quotes a letter from Don Raimondo Soncini, envoy of the Duke of Milan at the court of Henry VII., who was well acquainted with the Cabots, to the same effect. Mr. Harvey also quotes Hakluyt (vol. iii., p. 27):

"In the year of our Lord 1497, John Cabot, a Venetian, and his son Sebastian (with an English fleet set out from Bristol), discovered that lande which no man before that time had attempted, on the 24th June, about 5 o'clock in the morning. This land he called 'Prima Vista,' that is to say, 'first seen.' That island which lieth out before the land he called the Island of St. John, upon this occasion, as I think, because it was discovered upon the day of John the Baptist."

Mr. Harvey holds that "Prima Vista" was Cape North in Cape Breton, and that Cabot did not discover Labrador until his *second* voyage.

Here note, 1st. Pasqualigo does not say that the round voyage only occupied three months. He probably meant the outward voyage, as the vessel was small.

2nd. If he coasted 300 leagues it is highly improbable that he could have made the *round voyage* in three months. His sighting the two islands too (doubtless the Azores), proves that he had gone south from "Prima Vista."

3rd. *He was short of provisions* when he sighted the Azores, and it is not at all likely that this would be the case if he had only been absent from Bristol less than three months.

4th. If he only discovered land on the 24th June, 1497, it is hardly possible that he could have been back in Bristol before August 10th, when we know the king gave him £10 from the privy purse.

5th. As the patent was granted on the 5th March, 1496, it is not likely that Cabot delayed sailing for fourteen months, nor that if he only left Bristol in May, 1497, he could have been back previous to August 10th.

On the whole, I come to the conclusion that John and Sebastian left Bristol in the ship *Matthew* of 200 tons in 1496, and discovered Cape Breton on June 24th; that he proceeded south, coasting along the continent, and returned to Bristol early in 1497. Columbus only sighted the mainland of America on the 1st August, 1498, on this third voyage, having discovered one of the Bahama Islands in 1492.

It is clear therefore that Cabot is entitled to the honour of being *the first to rediscover that portion of the continent now known as the United States of America.* Also that he discovered what is now known as part of Canada, *at least* 38 *years before Cartier entered the St. Lawrence.* Cartier did not leave St. Malo until 1534 He is no doubt entitled to the merit of *exploring* the St. Lawrence and to have discovered Quebec and Montreal. Moreover, on the same day that Cabot discovered "Prima Vista," he discovered St. John Island near Cape Breton, but, which some writers say may have been either Prince Edward, or Newfoundland. As to the term "New-found-land," it must be remembered that all the "newland" discovered at that time was so named, and Cabot himself could not have been aware that what we now know as "Newfoundland" was an island.

I say rediscovered, because if the Icelandic "Sagas" are to be believed, Greenland was discovered by Icelanders in A.D. 982 and the continent of America in A.D. 1000. In the royal library at Copenhagen a richly illuminated MS., the 'Codex Flateyensis,' contains the history of "Eric the Red," and of his son "Leif the Happy." It was written by two monks at Flatoë in Iceland, in two volumes, on fine parchment, between A.D. 1370 and A.D. 1380. It states that both father and son left Iceland in A.D. 982, and, sailing west, discovered Greenland. Leif returned to Iceland, and went thence to Norway, where he was persuaded by King Olaf Trygefsen to embrace Christianity and go back as its missionary to this newly discovered country. When on his voyage there he was driven by adverse winds to the coast of America, as far south, it is believed, as Massachusetts, designated in the Codex "Vinland," or "Wineland," probably because Lief and his companions had found wild grapes growing in abundance there. There is a tradition too in Iceland that Columbus, hearing of these "Sagas," visited Iceland in 1477, and Icelanders point out with pride the very spot where he landed.[1]

A second patent was granted to Cabot by the king in 1498, the school-books say on the 3rd February, but Biddle (in his 'Life of Cabot') says he discovered the original in the Rolls Court, London, and that it was dated 3rd July, 1498. An expedition of three hundred men was fitted out, and the merchants of Bristol sent small stocks of goods. Cabot brought back "hawkes," "wild cattes," and "popingays." On this second authentic voyage Cabot appears to have gone further north, and to have met much ice, but

[1] 'Our Ocean Railways,' by A. Fraser-Macdonald.

there is some doubt as to whether it occurred in 1498 or 1499. The records of the city of Bristol have this entry in 1499 :—

"This yeare Sebastian Cabot born in Bristoll, proffered his services to King Henry for discovering new countries, which had no greate or favourable entertainment of the King, but he, with no extraordinary preparation, set forth from Bristoll, and made greate discoveries." [1]

If the second patent was only granted on the 3rd July, 1498, it seems probable that Cabot's second voyage only occurred in 1499. Kohl, the German geographer, says, "The Portuguese Galvano, one of the original and contemporary authorities on Cabot's voyage of 1498, says, that having reached Lat. 60° N., he and his men found the air very cold, and great islands of ice. Then they sailed back again to the south." Peter Martyr, as quoted by Zeigler, said that "Cabot sailing continually from England towards the N., followed the course so far that he chanced upon great flakes of ice in the month of July, and, keeping clear of these, he followed the coast by the shore, bending towards the S." Ramusio in the preface of the third vol. of his 'Voyages,' says, "Cabot had written to him that he had reached 67½° N. Lat., and he speaks of its general sterility and abundance of Polar bears." Mr. Harvey insists that all three refer to the *second* voyage and not to the *first*, when no mention is made of ice. Navarette, in describing from the records in the Spanish archives the voyage of Hojeda, who sailed from Spain 20th May, 1499, says, "What is certain is that Hojeda in his first voyage found certain Englishmen in the neighbourhood of Caqaibaco." Where this was is not clear, but it would seem that Cabot must either have made his second voyage in 1499, or have left a small colony out of the three hundred men he took with him.

In 1501 Henry VII. granted a third patent to three merchants of Bristol and three Portuguese to proceed in search of lands, and in 1502 a fourth, but no mention is made of Cabot, and we lose sight of him for some years. The disappearance of Cabot's "mappes and discourses," which he had prepared for publication, may account for his having been unnoticed. In Peter Martyr's testimony to Cabot he says, "Cabot did not leave England till after the death of Henry VII. in 1509." [2]

In 1512 Cabot entered the service of Spain and resided at Seville. In 1515 we find him "a member of the Council of the Indies," with expectation of commanding an expedition to India, but the death of King Ferdinand in 1516 caused Cabot to return to

[1] Seyer's 'Memoirs of Bristol,' p. 11.
[2] 'Decades' 11, Chap. 12.

England, where he was appointed to prepare a similar expedition, but this was a failure through the cowardice of Sir Thomas Pert. Robert Thorne, a celebrated Bristol merchant, urged Henry VIII. to prosecute such voyages to the world of "gold, balmes and spices." The dreadful sweating sickness of 1517, however, spread death and dismay throughout the kingdom.

In 1520 Cabot returned to Spain with Charles V. and was appointed "Pilot master to the Spanish monarchy." In 1524 Spain and Portugal quarrelled about the limits assigned by the Papal Bull, and held a conference. At the head of the list stands "Sebastian Cabot" and "Ferdinand Columbus," when it was decided in favour of Spain. In 1525 Cabot was appointed chief of an association formed at Seville to prosecute trade with the East, with Robert Thorne of Bristol. In 1526 Cabot left with an expedition for the East *viâ* the Straits of Magellan, but owing to a mutiny he put into La Plata and explored the river as well as the Parana, but he was attacked near the present site of Buenos Ayres. Charles sent a fresh expedition to his aid, and in 1531 Cabot returned to Spain as "Pilot Major." Henry VIII. died in 1546, and in 1549 Cabot returned to Bristol an old man, under King Edward VI., who patronised him liberally. Charles V. tried in vain to induce him to return to Spain. He was employed in investigating the variation of the compass, and is said to have published a map of the world, and a work entitled 'Navigazione nelle parte Septentrionale.' He was also engaged on other means for improving navigation, and was frequently consulted on all such matters. He advised a new expedition of three ships to go by the northern route; and notwithstanding the opposition of the "steel yard" (Germans), who had a monopoly, the "Merchant Adventurers' Company" was formed,[1] with Cabot as governor, and an expedition was despatched in 1553 under Sir R. Willoughby and R. Chancellor. Cabot drew up their celebrated instructions in thirty-two articles. They reflect the highest credit on his sagacity, good sense, and comprehensive knowledge, and they are full of admirable advice and soundest principles. Beyond special and minute instructions as to navigation, the most rigid attention is enjoined to the moral and religious duties of the crews.

'No blasphemy of God, or swearing, ribaldrie, filthy tales or ungodly talke; neither dicing, carding, tabling, nor other devilish games, whereby ensueth povertie, strife, variance, brawling, fighting and oftentimes murther, to the utter destruction of the parties, and provoking of God's most just wrathe and

[1] This Society still exists in Bristol.

sword of vengeance. These and all such like pestilences and contagions of vices and sinnes to be eschewed, and the offenders once monished and not reforming, to be punished at the discretion of the Captain. It is likewise ordered that morning and evening prayer to be reade and said in every ship daily . . . and the Bible or paraphrases to be reade devoutly and Christianly to God's honour, and for his grace to be obtained, and had by humble and heartie prayer of the navigantes accordingly."

The expedition met with many disasters, and both commanders perished, but in 1557 it returned with a Russian ambassador who met with a very hearty reception.

Queen Mary left all such matters to her husband Philip, and the miserable wretch reduced Cabot's pension one-half, and shortened his life. From this time Cabot sank into comparative insignificance. Sixty-one years had elapsed since the date of his first commission, and the powers of nature failed. Mr. Nicholls says :—[1]

"His last public appearance recorded was, his dining on board the pinnace *Seathrift*, Captain Burroughs, at Gravesend, April 17, 1556, but he is known to have been alive April 27, 1557, when Philip compelled him to resign his pension. It further appears that Eden (see his 'Taisnerus' in the British Museum) was present at his death ; but he has not noted either the place or date thereof."

He must, however, have been eighty years of age.

What a contrast does his career present to that of the early Portuguese and Spanish navigators, whose lives were marked by cruelty, rapine, and murder ! Vasco de Gama cut off the hands, ears, noses and lips, not only of his captives, but of a Brahmin priest, who was sent by the king as an ambassador, to sue for peace under a safe conduct from De Gama, and another he roasted over a slow fire. Cortez is estimated to have killed 100,000 Mexicans on his invasion, and he committed the most horrible cruelties. Pizarro treacherously strangled and burnt Athualpa, whose part he had professed to take, and afterwards strangled his fellow-countryman and companion Almagro. The Portuguese, too, have always been noted for their barbarous cruelty to the African negroes. Columbus was also a marked contrast to these sanguinary wretches ; a man of the highest character and noblest purposes, but he was manacled and imprisoned by a Spanish rival. Sebastian Cabot may be justly regarded as one of the most illustrious navigators the world has ever seen, and though history

[1] 'Life of Cabot,' p. 186. Nicholls was librarian of Bristol library.

has failed to do him justice, England owes him a debt of imperishable gratitude. One of his biographers writes :—

"He ended, as he had begun, his career in the service of his native country; infusing into her marine a spirit of lofty enterprise, a high moral tone, and a system of inflexible discipline, of which the results were not long after so conspicuously displayed."

Lord Campbell says of Cabot :—

"He was the author of our maritime strength, and opened the way to those improvements which have rendered us so great, so eminent and so flourishing." [1]

Mr. W. S. Lindsay says of him :—

"The exact date of his death is not known, nor has any record been left where he was buried. He, who with Columbus, had presented a new world to his sovereign, died like him, neglected, if not despised; and at last so thoroughly unknown, that England cannot point to the spot of earth where rests all that was mortal of one of her best and bravest seamen." [2]

The old city of Bristol is but little altered since the days of Cabot. The street in which he lived, and the quays from which he embarked may still be seen by the visitor, and the lovely, tortuous little Avon down which he sailed on his memorable voyages, still winds its way to "Kingroad" and the Bristol Channel. New trades have been created; ships from America, India, and all parts of the world now crowd those quays, but the citizens still revere the name, and cherish the memory of Sebastian Cabot.

[1] 'Lives of the Admirals.'
[2] 'History of Merchant Shipping,' vol. ii., p. 86.

CHAPTER II.

EARLY SAILING SHIPS.

ALTHOUGH the Portuguese were the first to discover the route to India, *viâ* the Cape of Good Hope, and were skilled sailors, they made very poor colonists. They were ignorant, superstitious, and cruel. They discovered Brazil in A.D. 1500, as also parts of Africa. They colonised both, but they were the chief actors in the barbarous slave trade, with all its indescribable horrors, and inflicted on the beautiful province of Brazil two curses, from which it has suffered to this day—African negroes and yellow fever. In A.D. 1580, Portugal was conquered by Spain. Her colonies were neglected, and many were wrested from her by Holland and other powers. In 1640 she regained her independence, but she has dwindled into insignificance, with a small merchant fleet, a contemptible navy, and disordered finances. Holland seized her Indian possessions, and Brazil ultimately became independent. Her rival, Spain, however, became a very powerful state in the 15th and 16th centuries. She had large possessions in South America, the West Indies, the Netherlands, Italy, Africa, and the Indian archipelago. In the middle of the 16th century her troops were the first in Europe; her fleets covered the seas. The mines of Potosi and Chili enriched Cadiz with an annual tribute equal to 100,000,000 dollars. In 1554 King Philip II. was considered a fit consort for a queen of England, and married her. But the Spaniards were proud, haughty, avaricious, intolerant, and cruel. In conquering St. Domingo they are said to have destroyed, in battle or cold blood, three million of its inhabitants, including women and children. By the persecution and expulsion of the Jews and the Moors they lost much of their commerce and manufactures. Philip II. established the inquisition in the Netherlands, and persecuted the Protestants to such an extent that 100,000 of them are said to have perished at the hands of the barbarous Duke of Alva. In 1588 she invaded England with her

great armada, which was repulsed and nearly destroyed. In 1648 she was compelled to recognise the independence of the seven United Provinces, and soon afterwards lost her Italian possessions. In 1704 Gibraltar was captured by England, and afterwards Trinidad. In 1805 Nelson at Trafalgar destroyed her naval power. Louisiana was ceded to France and Florida to the United States, while Peru, Chili, and the Central American states gained their independence. Thus Spain was reduced to a fifth-rate power.

Following Portugal and Spain, Holland came to the front as a great maritime power. The Dutch were made of very different stuff to either the Portuguese or the Spaniards. Lovers of freedom, they not only fought desperately against their cruel persecutors, the Spaniards, but they embraced the reformed religion, and gave hospitable shelter to the persecuted of England and other countries. Bold, energetic, and brave, they carried everything before them. In 1585, having obtained the help of England, they baffled all the efforts of Spain; and their commerce arrived at such a height, that in 1602 they established their celebrated East India Company. Spain, being both weakened and discouraged by the ill success of a tedious war, in 1609 agreed to an armistice for twelve years. During this truce the Republic attained to a degree of power which it has never since exceeded.[1] Compelled by necessity to make war against the Spanish fleets, the Dutch soon became excellent sailors, and enterprising, indefatigable merchants, who visited every sea, and to whom no port was too distant, no obstacle too discouraging. The commerce of Cadiz, Lisbon, and Antwerp fell into their hands, and in this way the United Netherlands, in the middle of the 17th century, was the first commercial state and the first maritime power in the world. With one hundred vessels of war they bade defiance to every rival. The Dutch East India Company conquered islands and kingdoms in Asia, and with about two hundred ships they carried on a trade with China and Japan. They alone supplied Europe with the productions of the Spice Islands. The gold, the pearls, the precious jewels of the East all passed through their hands. They owned the great island of Java, and in 1610 built the city of Batavia. In 1624 they founded New Amsterdam, now New York. They possessed colonies in the West Indies and in South Africa. They supplied the ships which carried on the foreign commerce of England, and after repeated wars, in 1648, by the treaty of Munster, Spain renounced all claim to the United Netherlands.

[1] See Motley's 'Rise of the Dutch Republic.'

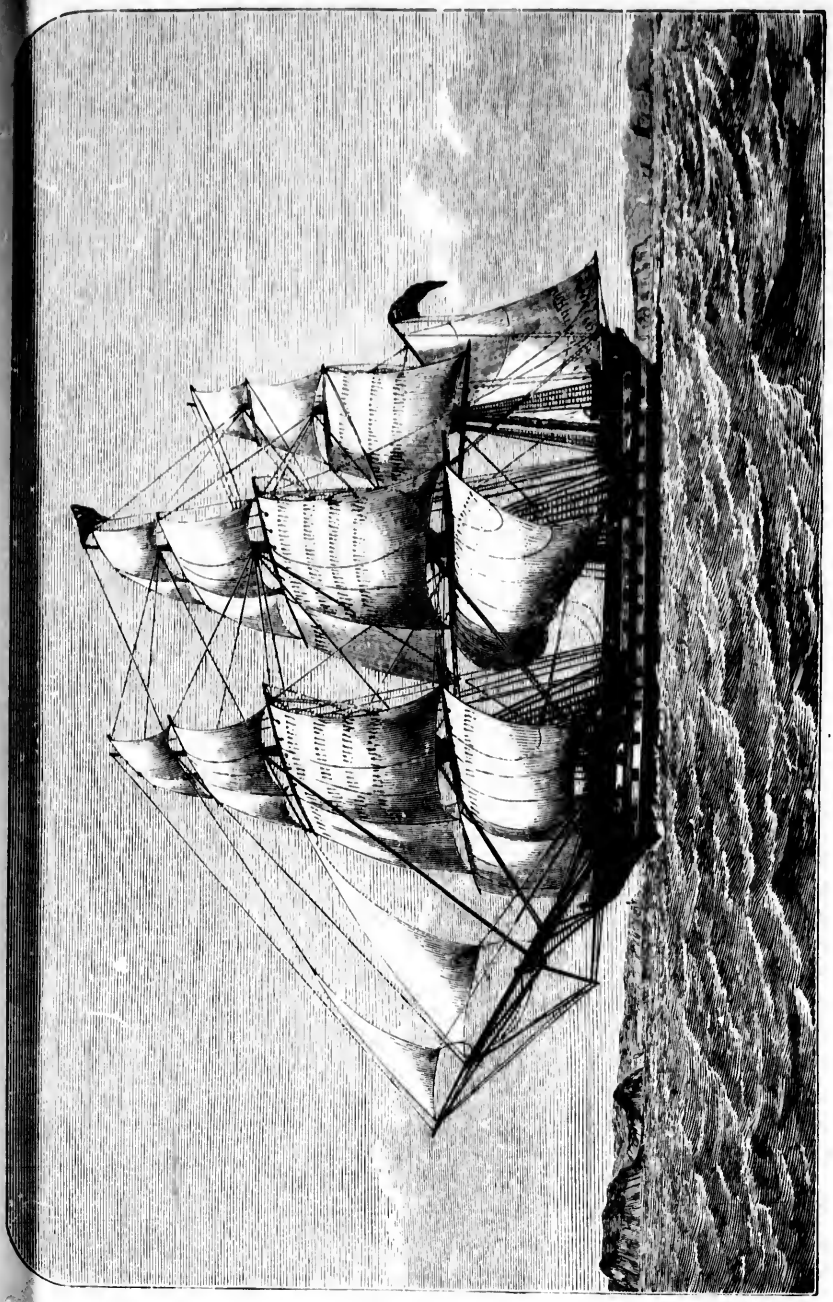
But now a great man arose in England, whose bold measures turned the tide, and did much to destroy the maritime power of the Dutch. Oliver Cromwell determined to wrest the supremacy of the sea from Holland and to encourage British shipping. This he did by means of his celebrated Navigation Laws, passed in 1651. They enacted that—

"No goods or commodities whatever of the growth, production, or manufacture of Asia, Africa, or America should be imported into either England or Ireland, or any of the plantations, except in British-built ships, owned by British subjects, of which the master and three-fourths of the crew belonged to that country." A subsequent Act enacted that no goods of the growth, production, or manufacture of Europe should be imported into Great Britain except in British ships and navigated by British subjects, *or in such ships as were the real property of the country, or place in which the goods were produced, or from which they could only be, or most usually were, exported.*

From these Acts, which were only repealed in 1849, may be dated the decline of the maritime supremacy of the Dutch and the rise of the British.

The Dutch, seeing that these stringent laws could only be aimed at them, at first sought to effect a treaty with England, but secretly determined to fight for their supremacy at sea. They got together one hundred and fifty vessels, and placing Martin Van Tromp in command, declared war in 1652. Desperate and sanguinary struggles ensued, with varying fortunes to both sides. Blake was the great English admiral, assisted by Monk, Ayscough, Prince Rupert, Spragge, and the Earl of Sandwich. The Dutch had Martin Van Tromp and his son Cornelis, De Ruyter, De Witt, Van Ness and others. Six great actions were fought in 1652–3 on the English coasts. The English won three, the Dutch two, and one was indecisive. The Dutch suffered severely, not only in the loss of warships, but by the capture of their fleets of merchantmen, and the diminution of their trade. So, on the 5th April, 1654, a treaty of peace was concluded, but Cromwell refused to abate one jot of the new laws, and he demanded, and received, an admission of the English sovereignty of the seas. Cromwell died in 1658, and his laws were ignored, but Charles II. was compelled to re-enact, and virtually to confirm, Cromwell's Navigation Acts in the first year of his reign.

The Dutch, fearing their maritime downfall, and urged on by the intrigues of France, in 1664 were ripe for a fresh war, but endeavoured to gain time. Charles, however, seized 130 of their ships, homeward bound, before the formal declaration of war, and they were condemned as lawful prizes. War was consequently



HON. EAST INDIA COMPANY'S SHIP "EARL OF BALCARRAS, 1417 TONS, 26 GUNS.

again declared, and a great battle was fought off Harwich, 3rd June, 1665. The Dutch lost 19 ships and 6000 men; the English 4 and about 1500 men. In 1666 France declared war against England, and Denmark was subsidised to assist the allies with a fleet. In June, 1666, a bloody struggle took place off the coast of Flanders, when the English lost 2 admirals, 23 great ships, 6000 men, and 2600 prisoners; and the Dutch lost 4 admirals, 6 ships, and 2880 men. Another great battle was fought on the 24th July, when the English beat De Ruyter, driving him into port, and afterwards burning 100 merchant ships. Negotiations were opened for peace at Breda, but the Dutch, believing Charles to be trifling, despatched De Ruyter to the Thames. He destroyed the fortifications of Sheerness, burnt three ships, and then burnt three more near Chatham. The Londoners were greatly alarmed, and sunk seventeen ships at Woolwich and Blackwall, fearing he would sail up to London Bridge. De Ruyter retired, but scoured the English coast until the treaty of Breda was signed in July, 1667. Thus terminated this bitter and bloody struggle. England suffered much, but Holland still more, and her trade was permanently crippled, while England's steadily increased, and London succeeded Amsterdam as the chief emporium of the commercial world.

To go back, in 1591, Thomas Cavendish, an Englishman, undertook a voyage to the East Indies, which led to the formation of the great East India Company, in 1600, by London merchants, assisted by Robert Thorne, of Bristol, the largest and most important commercial undertaking recorded in history. This great company lasted two hundred and fifty-eight years. It commenced with five vessels, 130 to 600 tons, and gradually increased their size to 1507 tons. The company had a monopoly of English trade with India and China, and made vast sums, but their expenditure was on a lavish scale. They ultimately conquered and held a large part of India. At one time they had a footing in Japan too. They had many conflicts with the Dutch and Portuguese, and in the next century were harassed by French ships of war and privateers, and had to arm and increase the size of their ships in order to fight successfully. Between 1700 and 1819 forty-four of the company's ships were captured by the enemy, although they were often victorious. They charged enormous freights, as much as £30 per ton measurement for tea, and their captains made large fortunes. They were the first to build large English merchant-ships. In 1858 the company was finally dissolved, and their territories transferred to the Crown, the trade to India having been thrown open in 1814, and in 1832 the China trade followed.

Up to 1651, as we have seen, English maritime commerce was pretty well monopolised by the Dutch, the English being busily engaged in domestic troubles and fighting for political freedom.

A well-known writer of about 1666, Sir Henry Petty, estimated the tonnage of all Europe at 2,000,000 tons, of which he apportions 900,000 tons to the Dutch, 500,000 to the English, 100,000 to the French, 250,000 to the Hamburghers, Swedes, and Danes, and 250,000 to Spain, Portugal, and Italy. But between 1666 and 1688 Dr. Charles Davenport says that the British tonnage had doubled. Such had been the effect of Cromwell's Navigation Laws. France, her old enemy, sought to maintain supremacy over both the Dutch and the English, and by means of her navy and privateers, played havoc with British ships, but on May 12th, 1692, Admiral Russell defeated the French in the great battle of La Hogue; and the treaty of Ryswick, in 1697, led to great prosperity. During these years, however, England was gradually increasing her colonial possessions, and thus extending her empire. The Pilgrim Fathers landed in New England, November 9th, 1620, and laid the foundations of a great nation. Jamaica, Barbadoes, and other West India islands, the Bermudas, the Bahamas, Nova Scotia, the Gambia, the Gold Coast Settlements, and St. Helena, were all conquered or settled in the 17th century.

The English revolution occurred in 1688, and from that time the trade of the plantations, or colonies, steadily and rapidly increased.

British ships, however, were still very small. In 1701–2 a return shows the number of ships owned in the principal ports was as follows :—

	Number of Ships.	Tons.	Average Size. Tons.
London	560	84,882	157
Bristol	165	17,338	105
Yarmouth	143	9,914	69
Exeter	121	7,107	58
Hull	115	7,564	65
Whitby	110	8,292	75
Liverpool	102	8,619	84
Scarborough	102	6,860	67

The Dutch Indiamen were evidently copied from the Genoese carracks, and the early English ships were built on much the same model, with high poops and forecastles. Cabot's ship was only 200 tons; Drake went round the world in the *Pelican*, of 100 tons, and four smaller vessels; Frobisher started for China

viâ the north-west, in 1576, with the *Gabriel* and *Michael*, of only 25 tons, and discovered Greenland. Within the memory of the writer (1838–50) ships of 300 tons traded to India and China, and barques of 200–300 tons to the West Indies, while the trade of Quebec was carried on chiefly by brigs of 150 to 300 tons. Now Great Britain owns many iron sailing-ships of 2000 to 3000 tons, and one four-masted ship of 3336 tons.

To return, we must pass rapidly over the 18th century, the great modern development of British shipping not having commenced till the 19th.

Scotland was united to England in 1707, which gave an immense impulse to the commerce of the former. War often caused serious losses to British shipping, and during the reign of George I. (1714–27) hordes of privateers and buccaneers infested the seas whenever war was declared, plundering legitimate commerce. Many new colonies were added, and the century was remarkable for English maritime expeditions, which added to the geographical knowledge of mankind, and promoted the peaceful arts of commerce. Among these were those commanded by Dampier in 1699; Anson in 1740; Byron in 1764; Wallis, and Carteret, and Cook. Gibraltar was captured in 1704; Canada in 1759–60; Honduras in 1783; and the Straits Settlements in 1785; New South Wales was colonised with convicts in 1787; and Sierra Leone in the same year.

But now another great maritime power came into existence. The American colonies demanded, and at length obtained, severance from the Mother Country. In 1776 they signed the "Declaration of Independence," and after coercive measures had failed, it was finally acknowledged on the 30th November, 1782, but the treaty was only signed on 3rd March, 1783, and ratified by Congress 4th January, 1784. Though they could not interfere with the foreign or coasting trade of Great Britain, except to and from their own ports, they rapidly produced some of the finest sailing-ships in the world. They were singularly favoured by Nature for maritime affairs. They had great forests of oak and pitch pine, both eminently suitable for shipbuilding. New York and New England possessed numerous deep-water harbours, and the latter had a large, hardy, seafaring population. The early New York packet-ships were splendid specimens of naval architecture, 800 to 1800 tons, and most of them with three decks. They almost monopolised the trade between England and the United States for many years; they often made rapid passages in the spring and summer, but in winter they had to contend with such heavy

westerly gales that they sometimes occupied sixty, seventy, eighty, and even ninety days to reach New York. Many of them carried one thousand emigrants, but after a long and bitter struggle with iron screw steamships they finally disappeared in 1860.

In 1793 commenced the terrible struggle with Napoleon, lasting with short intervals until 1815, paralysing British trade, and involving Great Britain in an enormous debt, heavy taxation, suspension of specie payments, and a commercial panic; at the close of this war the debt stood at £900,000,000, or $4,500,000,000! Then the war with the United States lasted from 1812 to 1817.

In 1849 the discovery of gold in California led to a great demand for extreme clipper ships, and the United States turned out the largest and the finest wooden sailing ships afloat. In 1851 a similar discovery in Australia led to great activity among British and Colonial shipbuilders. Quebec, St. John, N.B., and Nova Scotia, all turned out large wooden clippers up to 1800 tons. During the war with Napoleon, too, Ceylon, Trinidad, Malta, British Guiana, Cape Colony, Mauritius, and Ascension were added to the British Colonial Empire.

The repeal of Cromwell's Navigation Laws in 1849 gave the Americans access to the whole foreign and colonial trade of Great Britain, and they became severe competitors with the British, so that at one time, in 1861, they owned (including river and lake tonnage) slightly more tonnage than Great Britain and Ireland, say 5,400,000 tons. But during the terrible Civil War a few privateers fitted out by Southerners, chief of which was the celebrated *Alabama*, so crippled American commerce by burning Northern ships at sea, that United States shipowners rapidly transferred their tonnage to neutral flags or sold them.

But all this while two revolutions were quietly going on, both of which greatly favoured Great Britain above every other nation, and ultimately placed her in her present proud position. Iron and steam were the agents. Steam tonnage replaced sailing vessels, and iron and steel wooden hulls, and to the history of these two great revolutions we must now turn.

CHAPTER III.

HISTORY OF THE MARINE STEAM ENGINE.

EMINENT naturalists, such as Owen, Darwin, and Paley, have often pointed out that many of the inventions of man are but feeble imitations of the wonderful works of Nature. This is true as regards the steamship. The tail of the fish embodies the principle of the oar and the screw propeller, and it has long been a proverb among sailors that "a cod's head and a mackerel's tail" form the best possible design for a fast-sailing ship. The web foot of the duck was the prototype of the paddle wheel. The cuttlefish is propelled by ejecting a fluid from a tube, exactly as is H.M.S. *Waterwitch*, or Dr. Jackson's *Evolution*.[1] The swan extends her wings as sails to catch a favouring breeze. The combined action of the paddle wheel and screw propeller will be found in the microscopic insects *Paramacium caudatum* and *Paramacium compressum*, and even the bulkheads of the modern iron steamship have their exact counterpart in the shell of the little nautilus, while the spider's web is composed of four thousand strands, and is fifty per cent. stronger in proportion than our steel wire rope.

The idea generally entertained that the power of steam is a modern discovery has been proved to be erroneous, for it was known 120 B.C., when Hero of Alexandria experimented with it and published an account of his "Æolipile" in his treatise on pneumatics.

Mr. Bourne states that the principle of the "Æolipile" is the same as that embodied in Avery and Ruthven's engines for the production of rotary power.

The works of Woodcroft show that as early as the 13th century Roger Bacon spoke "of a vessel which, being almost wholly submerged, would run through the water against waves and winds with a speed greater than that attained by the fastest London pinnaces." In 1601 Baptista Porta, of Naples, published many

[1] Darwin.

curious experiments on the power of steam and its condensation. In 1615 Solomon de Caus shows that he was well acquainted with the power of steam. In 1618 David Ramsay obtained a patent for an invention "to make boates for carriages running upon the water as swift in calmes and more safe in stormes than boates full sayled in great windes," and in 1630 he patented a plan "to make boates, ships, and barges to goe against the wind and tide."[1]

In 1637 Francis Lin patented a similar plan, and in 1646 Edward Ford proposed another. In 1661 the Marquis of Worcester, a wonderful man, was certainly the first to make an actual steam engine: he refers to "a boat that roweth or letteth even against wind and stream," and he speaks of "water rarefied by fire." In the same year, Hooke described windmills, in which we have all the main features both of the screw propeller and feathering wheel.[2] Papin, who was driven from France by the revocation of the Edict of Nantes, and elected F.R.S. in 1681, describes in 1690, "a steam cylinder in which a piston descends by atmospheric pressure, when the steam below it is condensed," and as one of its uses he mentions, "the propulsion of ships by rames and volatiles," or paddle wheels.[3] He certainly first suggested the vacuum.

Thomas Savery, one of the most ingenious men of his age, proposed in 1696, a mode of raising water by "the impelling force of fire," adding, "it may be very useful to ships."[4]

Thomas Newcomen, a working blacksmith of Dartmouth (Devon), greatly improved Savery's engine in 1705, and Papin used it to propel a steamboat on the Fulda.

Jonathan Hulls, of Campden (Gloucestershire), in 1736 made some practical progress, and secured a patent for propelling a steamboat by a steam engine driving a *stern wheel*,[5] which was the first steamboat authentically recorded; although his boat was hardly fitted for the purposes of commerce, many such have since been used in the United States and Australia.

But it was not until the 5th January, 1769, when James Watt, a native of Greenock, obtained his patent, that any steam engine could be effectually adopted in marine propulsion. Watt was a mathematical instrument maker, and his first connection with the steam engine arose from his having been requested by the Professors of Natural Philosophy in the University of Glasgow to

[1] Woodcroft. [2] Bourne. [3] Woodcroft, pp. 16, 17.
[4] 'The Miners' Friend.' [5] Woodcroft.

repair a model of one of Newcomen's engines in 1764. Among his various improvements in the steam engine, the most important were the separate condenser, and the double-acting engine for causing the steam to act above the piston as well as below it. These rendered the power of the engine much more effective, and caused considerable economy. He also invented the crank, and in 1781 the "sun and planet motion"; this did not answer, but his partner, James Pickard, in 1780 patented a method of working a mill with a rotary motion by means of the present connecting rod, crank and flywheel, constituting the second important improvement in the steam engine. There seems little doubt, however, that Watt was the real inventor of the crank, but neglected to take out a patent.[1] Joseph Bramah, a man of genius, in 1785 obtained a patent and proposed to propel vessels through the medium of either a paddle wheel or a screw propeller, but there is no record of his having put it into practice. Patrick Miller, of Dalswinton, Scotland, in 1787 published a pamphlet on the subject of propelling boats by means of paddle wheels turned by men, and spent some £30,000 in experiments. A tutor in his family, Mr. James Taylor, urged Mr. Miller to apply steam to drive the wheels of his boat, and at last he was induced to employ a young, hardworking operative engineer, William Symington, who soon produced the desired results. The engine was placed in a small pleasure boat only twenty-five feet long, and tested on Loch Dalswinton, 14th November, 1788. Although the cylinders were only four inches in diameter, it drove the boat at the rate of five miles an hour. After a few days it was taken out, and is now in the Patent Office Museum, London. In 1789 it was resolved to repeat the experiment on a larger scale on the Forth and Clyde Canal. A double engine, with 18-inch cylinders, was built at the Carron Ironworks, fitted on board another of Miller's vessels, and tried on Dalswinton Loch in December, 1789, with great success, making 6½ to 7 miles an hour. More than ten years elapsed before Symington found another patron. In 1801 Lord Dundas employed him to fit up a steamboat to tow barges on the Forth and Clyde Canal, and called her the *Charlotte Dundas*, after his daughter. Having availed himself of Watt's improvements, Symington patented his new engine 14th March, 1801, and in the opinion of most impartial writers, she was *the first practical steamboat*.[2] In March, 1802,

[1] Muirhead's 'Life of Watt.'

[2] John Fitch, the son of a Connecticut farmer, who was born in 1743, was a genius and a prophet. He was engaged at the same time as Symington in experimenting on steamboats; but he was far less of a practical engineer than

she went on her trial trip and was most successful. Her cylinders were 22 inches with 4 feet stroke. The Duke of Bridgewater gave him an order to construct eight similar vessels, but the Duke died before the details of the agreement were completed. The *Charlotte Dundas* was laid up out of fear that she would injure the banks of the canal.

Poor Symington, being in great poverty, at length received £150 from the Privy Purse, and now, in the year 1891, a bust of him has at length been placed in the Edinburgh Museum of Science and Art!

Mr. Woodcroft says: "Symington had the undoubted merit of having combined for the first time *those improvements which constitute the present system of steam navigation.*" It is a singular fact that Watt discouraged Symington, predicting the failure of his engine, and threatening him with legal penalties if it succeeded.

In 1800 Henry Bell, of Helensburgh, opposite Greenock, laid before the Government his invention for the improvement of steam navigation, but it was not until January, 1812, that he completed the *Comet*. She was the first *passenger* steamboat built in Europe; 40 feet keel, 10½ feet beam, and only 4 H.P. She was built for Bell by John Wood & Co., of Port Glasgow, and ran between Glasgow, Greenock, and Helensburgh three times a week.

Two claims have been made by Americans for priority. John C. Stevens spent thirteen years (1791–1804) and $20,000 in experiments, and in 1804 tried small twin-screw propellers near New York; but he admitted that, on the whole, his attempts were unsuccessful.

Robert Fulton, also an American, a very ingenious and enterprising civil engineer, built the *Clermont* and ran her on the

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the young Scotch mechanic. He first proposed to use vertical oars, worked by cranks, turned by a horizontal steam engine. In 1786 he tried his machine at Shepherdstown, Pennsylvania, in a boat of nine tons. In 1787 he built another boat, 45 × 12 feet, with a 12-inch cylinder, the mode of propulsion being somewhat similar, in which he is reported to have made the trip from Philadelphia to Burlington, at an average rate of seven miles an hour.

In 1790 he completed another and a larger boat, propelled in a different manner. But the grasshopper paddles, which he now employed, were not adapted for the general purposes of navigation. It is evident that his plans were either not adapted for practical purposes, or that the machinery was too complicated, or too expensive. He once wrote: "This, Sir, whether I bring it to perfection or not, will be the mode of crossing the Atlantic in time for packets and armed vessels." A remarkable prophecy. But all his plans failed; he was generally deemed to be crazy, and died in 1798.

Hudson River in 1807 with 24-inch cylinders, and 4-feet stroke (Symington's was 22 in. by 4 feet), but it is now well known that in 1802 he called on Symington, saw the latter's engine in motion, and was allowed to take notes and sketches of it, under a promise that Symington should have the superintendence of building such vessels in the United States. But he never afterwards communicated direct with Symington.

Moreover, Bell had forwarded to the U.S. Government in 1803, a detailed account of his method of propelling vessels, and it seems that Fulton had been given or shown the plans. By a letter addressed by Bell to the *Caledonian Mercury* in 1816, it appears that Fulton wrote him (probably in 1803), requesting him to call on Mr. Miller and Mr. Symington, and to send him a drawing and description of the last boat, with the machinery. These were sent out, and sometime afterward Fulton answered that he had "constructed a steamer from the different drawings of the machinery forwarded to him by Bell which was likely to succeed with some necessary improvements." It has also been stated that the *Clermont's* engine was built by Boulton and Watt, of Birmingham, England.

The *Comet* did not pay, and she was sent to ply on the Firth of Forth, where she usually ran 27 miles in 3½ hours (7½ miles an hour). Her engine is now in the Kensington Museum, London. Bell failed to profit by his undertaking, and died at Helensburgh in 1830, aged 63, having been chiefly supported in his declining years by an annuity of £50 a year, granted him by the Clyde trustees.[1] No merit therefore as the *inventor* of the present system of steam navigation can be conceded to either Fulton or Bell. In fact there can be no doubt that Symington's *Charlotte Dundas* was superior in mechanical arrangements to either the *Comet* or the *Clermont;* but both were instrumental in the introduction, for commercial purposes, of steam navigation. It is only just to Fulton to remark that he never claimed to be the *inventor* of the steam engine as applicable to marine propulsion; Mr. Lindsay too says that he never took out a patent for his engine, but another writer affirms that he did, and gives the date as February, 1809.

The success of the *Comet* and *Clermont* soon led to many others. In 1813 Leeds, Manchester, and Bristol built one each, and in 1814 Hull built another. In December, 1814, the first steamboat was seen on the Thames, the *Margery*, 70 tons, 14 H.P. In 1815 the first arrived at Liverpool from the Clyde. In 1818 David

[1] James Deas, C.E. In 1889 the Clyde alone turned out 250 ships, of 335,201 tons, of which 253,374 tons were iron or steel steamships!

Napier, a name more associated than any other in Great Britain with the early development of the steam engine, launched the first sea-going steamboat from the yard of William Denny, of Dumbarton, the *Rob Roy;* she was only 90 tons and 30 H.P., but she ran between Glasgow and Belfast with great success.

In 1826 the first of the so-called leviathans, the *United Kingdom*, was built by Robert Steele, of Greenock, to run between London and Leith. She was 160 feet long, 26½ feet beam, 200 H.P., and was considered the wonder of the day. She was no doubt the prototype of the *Royal William*, laid down at Quebec four years later, and launched in April, 1831.

CHAPTER IV.

THE STEAMBOAT IN CANADA.

CANADA, and especially Montreal, was closely identified with the introduction of steam navigation. It is remarkable, but perfectly true, that a steamboat carrying passengers ran between Montreal and Quebec in 1809, *three years before* any such vessel ran in Great Britain. This was the *Accommodation*, 75 feet keel, and 85 feet on deck, and was doubtless copied from Fulton's *Clermont*. On her first trip she occupied sixty-six hours, thirty of which she was at anchor.[1] She was due to the enterprise of the late John Molson.

In 1813, she was followed by a larger boat, the *Swiftsure*, 130 feet keel, and 140 feet on deck, with a beam of 24 feet, which made the downward trip in 22½ hours.[2] In the same year the *Car of Commerce* was built, followed, in 1817, by the *Quebec* of 100 tons, and 100 I.H.P., the engines for which were supplied by Messrs. Maudslay & Sons, of London, England; and also the *Lanzon*, a ferry steamboat, 150 tons, and 50 H.P.

In 1833, Quebec sent forth the first Atlantic steamship, the *Royal William*, which steamed from Quebec to London (*via* Pictou) in 25 days, four years before any other ship succeeded in doing it.

[1] *Quebec Mercury*, 1809. Mr. William McLennan writes, that she left Montreal, November 3, 1809, and made the run in thirty-six hours. The fare was £2 10s. = $12.

[2] *Quebec Mercury*.

CHAPTER V.

EPOCHS IN ATLANTIC STEAM NAVIGATION.

THE history of Atlantic steam navigation is, in truth, only an illustration of the progress of the human mind. At the beginning of this century there was not a single trading steamship in existence. The *Comet* of 1812 has multiplied into 12,000 steamships, measuring over 16 million tons, of which about 63 per cent. belong to the United Kingdom, trading to every corner of the world. Her 20 tons have multiplied into a ship of 18,000; her 40 feet to 692 feet; and her 4 H.P.[1] to 30,000 in a single ship. Symington's 4-inch cylinder has grown to 120 inches; the pressure of steam in the boiler has increased from 13 lbs. to 200 lbs. on the square inch; the 243 knots, the maximum of the *Great Western* in 1838 to 560; and the average speed from 8·2 to 22·01 knots, while the consumption of coal has decreased from about 5½ lbs. to 1½ lbs. per I.H.P. per hour, and is continually diminishing. There have been at least six distinct epochs in Atlantic steam navigation during these years.

1st. Sail to wooden paddle (for speed), 1833.
2nd. Wood to iron hulls (for strength), 1843.
3rd. Paddle to screw (for economy), 1850.
4th. Simple to compound engines (to save fuel), 1856.
5th. Iron to steel hulls (for cost), 1879.
6th. Single to twin screws (for safety), 1889.

These epochs it is proposed to consider in the order given above.

[1] H.P. means *nominal* horse-power, an arbitrary rule of the British Admiralty, depending on the diameter of the cylinders, and the length of the stroke. I.H.P. means the *actual* power exerted by the engines, as shown by an indicator.

First Epoch.

Some dispute has arisen as to the first North Atlantic steamship, but there is no difficulty now in giving the exact truth. As, however, numerous errors and contradictions have occurred, and been perpetuated, as to these early steamships, it seems desirable to correct them and place the facts beyond doubt. Even so high an authority as the Canadian Government statistician, Mr. George Johnson, tells us that the *Great Britain* was built at London, (England), whereas the writer saw her building at Bristol. Mr. McCord contradicts Mr. Miles's prize essay as to the *Royal William*, and both are now proved to be wrong, as we shall see. A recent article in 'Scribner's Magazine' also contains several errors.

The claim of the *Savannah* may be dismissed in a few words. She never was a "steamship" in the ordinary meaning of the term, and on the only occasion on which she attempted to steam across the Atlantic, she failed to accomplish it. Some say she tried it in 1818, and some say it was in 1819. Some give her port of departure as Savannah, and some say she sailed from New York. A recent writer[1] has cleared up these points satisfactorily. She was a small sailing ship of 350 tons, built at New York, for a sailing packet between New York and Havre. When building, she attracted the attention of Captain Moses Rogers, who had been associated with Fulton and Stevens in commanding the *Clermont* and several other early steamboats on inland waters; on his advice, she was purchased by Messrs. Scarborough & Isaacs of Savannah, Georgia. She was rigged as a ship, steam apparently being intended as an auxiliary in calms or light head winds. Her engine was built by Stephen Vail, afterwards associated with Morse in the invention of the telegraph, at the Speedwell Ironworks, near Morristown, New Jersey. It had only one cylinder of 40 inches diameter with 6 feet stroke. Her paddle wheels were of wrought iron, and comprised 8 radial arms, held in place by one flange, and so constructed as to enable them to be closed together like a fan. *They were furnished with a series of joints, so that they could be detached speedily from the shaft and taken on deck*, which could be done in twenty minutes. She left New York on March 29th, 1819, *for Savannah*, where she arrived on April 6th, as duly recorded in the *Savannah Republican* of the 7th. In the same paper, we have the following advertise-

[1] 'Our Ocean Railways,' by A. Fraser-Macdonald, pp. 37, 46.

ment on the 19th May: "The steamship *Savannah*, Captain Rogers, will, without fail, proceed for Liverpool direct to-morrow, 20th inst," but she only actually sailed on the 22nd. She was spoken with on the 29th, in lat. 27.30° N., which settles her port of departure. Her log shows that she was off Cork on the 17th June, when there was "no cole to git up steam," but "with all sails set to the best advantage," she appears to have arrived in the Mersey at 6 P.M. on the 20th, "making the run in 29 days 11 hours from Savannah to Liverpool, during which the engine worked the wheels only 80 hours."[1] This affords ample proof of what has been stated. On the 21st July, she sailed for St. Petersburg, *viâ* Stockholm, where she arrived on 13th September, steam being used for only 239 hours. On the 10th October she sailed for Savannah. The engines were not used on any single occasion during it until November 30th, when, as the log informs us, Captain Rogers "took a pilot *inside the bar*, and at 10 A.M. anchored in Savannah river and furled sails—got under weigh with steam and went up and anchored off the town."

So that as an Atlantic steamship she was a complete failure. In 1820 she was sold, her engines taken out, and she was employed as a sailing packet between Savannah and New York, and subsequently lost on Long Island.

The honour undoubtedly belongs to Quebec, and all the facts relating to the ship have recently been given by her builder, and the true dates ascertained from the diary of the Quebec Exchange (both unimpeachable authorities).

Mr. W. S. Lindsay, ex-M.P., in his admirable 'History of Merchant Shipping,' says, in a note, "The *Royal William* was between 400 and 500 tons, built at Three Rivers, and her engines, constructed in England, were fitted into her at St. Mary's Foundry, Montreal. She only made this one Atlantic passage, and was sold to the Portuguese Government."

Here are three historical errors in half-a-dozen lines, and they have been very widely copied.

Mr. James Goudie, who brought out her plans from Greenock, and acted as foreman, has recently given the facts in a published letter to Mr. Archibald Campbell, of Quebec.

She was 830 tons. She was built at Cap Blanc, Quebec, near the toll-gate, by George Black and John Saxton Campbell for a Quebec company, to run between Quebec and Halifax, N.S. Her engines were put in by Bennett & Henderson, of Montreal, and

[1] Captain Rogers, written to a Connecticut paper in 1838.

she was sold in London to the Spanish Government as a warship or transport. Her dimensions were 146 feet keel, 176 feet over all; beam, 27 feet 4 inches, and 43 feet 10 inches outside the paddle boxes; depth, 17 feet 9 inches, very nearly the same dimensions as the *United Kingdom*.

The diary of the Quebec Exchange, as published in the Montreal *Gazette*, shows that she was launched on Friday, April 29th, 1831, in the presence of His Excellency Lord Aylmer, and named by Lady Aylmer after the reigning king, the band of the 32nd Regiment attending.

She arrived at Montreal, May 2nd, and sailed from Quebec, August 24th on her first trip to Miramichi, P. E. Island, and Halifax. She finally left Quebec for London at 5 A.M. of August 4th, 1833, under the command of Captain McDougall, *steaming all the way*, but calling at Pictou for coal, and at Cowes, arriving at Gravesend, September 11th. These are the facts. Mr. Miles gave the date as the 18th, and Mr. McCord as the 5th, both doubtless quoting from untrustworthy authorities. Thus are historical errors perpetuated.

The facts contained in the following article relating to these early ships may be accepted as indisputable :—

"ROYAL WILLIAM."

SOME FACTS ABOUT THE LITTLE CRAFT.

Quebec has the honour of building the first steamer that crossed the Atlantic—built by a Scotchman.

A writer in 'Chambers' Journal' says: "In many quarters the idea seems still to prevail that the first steamer to cross the Atlantic was the *Savannah*, which in 1819 made the voyage from the port of the same name in Georgia to Liverpool in twenty-five days. The *Savannah*, however, was not a steamship, and was under sail more than two-thirds of the way across. She was a full-rigged packet ship, and had on her deck a small steam engine, by means of which motion was given to the craft in smooth water when the wind failed. The log is full of such entries as: 'At 8 A.M. tacked ship to the westward;' 'Took in the mizzen and foretop-gallant sails;' 'Got the steam up, and it came on to blow fresh—we took wheels in on deck in thirty minutes;' 'Stopped wheels to clean the clinkers out of the furnace;' 'Started wheels,' and so on. In 1838, the *Sirius* and the *Great Western* successfully made the journey from England to America; but five years before that date, Canadian enterprise accomplished the feat of bridging the Atlantic Ocean with a little vessel propelled wholly by steam. This was the *Royal William*, whose beautiful model was exhibited at the British Naval Exhibition in London, where she attracted the attention and curiosity of the first seamen in the empire. The

Royal William—named in honour of the reigning sovereign—was built in the city of Quebec by a Scotchman, James Goudie, who had served his time and learned his art at Greenock. The keel was laid in the autumn of 1830, and her builder, then in his twenty-second year, writes: 'As I had the drawings and the form of the ship, at the time a novelty in construction, it devolved upon me to lay off and expand the draft to its full dimensions on the floor of the loft, where I made several alterations in the lines as improvements. The steamship being duly commenced, the work progressed rapidly, and in May following was duly launched, and before a large concourse of people was christened the *Royal William*. She was then taken to Montreal to have her engines, where I continued to superintend the finishing of the cabins and deck-work. When completed she had her trial trip, which proved quite satisfactory. Being late in the season before being completed, she only made a few trips to Halifax.' The launching of this steamer was a great event in Quebec. The Governor-General, Lord Aylmer, and his wife were present, the latter giving the vessel her name. Military bands supplied the music, and the shipping in the harbour was gay with bunting. The city itself wore a holiday look. The *Royal William*, propelled by steam alone, traded between Quebec and Halifax. While at the last-named place she attracted the notice of Mr. Samuel Cunard, afterwards Sir Samuel, the founder of the great trans-continental line which bears his name. It is said that the *Royal William* convinced him that steam was the coming force for ocean navigation. He asked many questions about her, took down the answers in his note-book, and subsequently became a large stockholder in the craft. The cholera of 1832 paralysed business in Canada, and trade was at a standstill for a time. Like other enterprises at this date, the *Royal William* experienced reverses, and she was doomed to be sold at sheriff's sale. Some Quebec gentlemen bought her in, and resolved to send her to England to be sold. In 1833 the eventful voyage to Britain was made successfully, and without mishap of any kind. The *Royal William's* proportions were as follows: builder's measurement, 1370 tons; steamboat measurement, as per Act of Parliament, 830 tons; length of keel, 146 feet; length of deck from head to taffrail, 176 feet; breadth of beam inside the paddle boxes, 29 feet 4 inches; outside, 43 feet 10 inches; depth of hold, 17 feet 9 inches. On the 4th of August, 1833, commanded by Captain John M'Dougall, she left Quebec, *viâ* Pictou, Nova Scotia, for London, under steam, at five o'clock in the morning. She made the passage in twenty-five days. Her supply of coal was 254 chaldrons, or over 330 tons. Her captain wrote: 'She is justly entitled to be considered the first steamer that crossed the Atlantic by steam, having steamed the whole way across.' About the end of September, 1833, the *Royal William* was disposed of for ten thousand pounds sterling, and chartered to the Portuguese Government to take out troops for Dom Pedro's service. Portugal was asked to purchase her for the navy, but the admiral of the fleet, not thinking well of the scheme, declined to entertain the proposition. Captain M'Dougall was master of the steamer all this time. He returned with her to London with invalids and disbanded Portuguese soldiers, and laid her up at Deptford Victualling Office. In July, orders came to fit out the *Royal William* to run between Oporto and Lisbon. One trip was made between these ports, and also a trip to Cadiz for specie for the Portuguese Government. On his return to Lisbon, Captain M'Dougall was ordered to sell the steamer

to the Spanish Government, through Don Evanston Castor da Perez, then the Spanish ambassador to the court of Lisbon. The transaction was completed on the 10th of September, 1834, when the *Royal William* became the *Ysabel Segunda*, and the first war steamer the Spaniards ever possessed. She was ordered to the north coast of Spain against Don Carlos. Captain M'Dougall accepted the rank and pay of a commander, and, by special proviso, was guaranteed six hundred pounds sterling per annum, and the contract to supply the squadron with provisions from Lisbon. The *Ysabel Segunda* proceeded to the north coast; and about the latter part of 1834, she returned to Gravesend, to be delivered up to the British Government, to be converted into a war steamer at the Imperial Dockyard. The crew and officers were transferred to the *Royal Tar*, chartered and armed as a war steamer, with six long thirty-two pounders, and named the *Reyna Governadoza*, the name intended for the *City of Edinburgh* steamer, which was chartered to form part of the squadron. When completed, she relieved the *Royal Tar*, and took her name. In his interesting letter, from which these facts are drawn, to Robert Christie, the Canadian historian, Captain M'Dougall thus completes the story of the pioneer Atlantic steamer: The *Ysabel Segunda*, when completed at Sheerness Dockyard, took out General Alava, the Spanish ambassador, and General Evans and most of his staff officers, to Saint Andero, and afterwards to St. Sebastian, having hoisted the Commodore's broad pennant again at Saint Andero; and was afterwards employed in cruising between that port and Fuente Arabia and acting in concert with the Legion against Don Carlos until the time of their service expired in 1837. She was then sent to Portsmouth with a part of those discharged from the service, and from thence she was taken to London and detained in the City Canal by Commodore Henry until the claims of the officers and crew on the Spanish Government were settled, which was ultimately accomplished by bills, and the officers and crew discharged from the Spanish service about the latter end of 1837, and *Ysabel Segunda*, delivered up to the Spanish ambassador, and after having her engines repaired, returned to Spain, and was soon afterwards sent to Bordeaux, in France, to have the hull repaired. But on being surveyed, it was found that the timbers were so much decayed, that it was decided to build a new vessel to receive the engines, which was built there, and called by the same name, and now (1853) forms one of the royal steam navy of Spain, while her predecessor was converted into a hulk at Bordeaux. This, in brief, is the history of the steamer which played so important a *rôle* in the maritime annals of Canada, England, and Spain. Her model is safely stored in the rooms of the Literary and Historical Society of Quebec, where it is an object of profound veneration. At the request of the Government, a copy of the model has been made, and will form part of the Canadian exhibit to the World's Fair at Chicago."[1]

The honour, however, of building the first steamship expressly for the Atlantic trade, *to cross without re-coaling*, unquestionably

[1] The article in 'Chambers' Journal' was founded on a lecture delivered by Archibald Campbell, Esq., before "The Literary and Historical Society of Quebec," and on a work entitled 'Quebec Past and Present,' written by J. M. Lemoine, Esq., F.R.S.C.

belongs to Bristol, England, and the writer saw her launched on the 19th July, 1837. This was the *Great Western*, thus refuting the opinion of Dr. Lardner, given in a lecture at Liverpool, and reported in the Liverpool *Albion* of December 14th, 1835, in which he said—

"As to the project, however, which was announced in the newspapers of making the voyage directly from New York to Liverpool, it was, he had no hesitation in saying, perfectly chimerical, *and they might as well talk of making a voyage from New York or Liverpool to the moon.* The vessels which would ultimately be found the best adapted for the voyage between this country and the United States would be those of 800 tons, which would carry machines of 200 H.P."

Mr. Macgregor Laird ridiculed this in the *Albion* of December 28th, over the signature "Chimera." In the eighth and last edition of his book on the "steam engine," Dr. Lardner, however, declares that he never stated that a "steam voyage across the Atlantic was *a physical impossibility.*" This, of course, does not tally with his Liverpool lecture.

The *Great Western* was designed and built by William Patterson, of Bristol, of wood, for the "Great Western Steamship Company," and was launched July 19th, 1837. She was of unusual strength, her bottom being solid, and her frame secured with iron diagonal bracing. Her dimensions were 212 × 35·4 × 23·2, 1340 tons gross, and 679 tons net,[1] with a round stern, and Neptune for a figure-head. Her engines, by Maudslay & Sons, of London, were 440 H.P. nominal, cylinders of 73½ inches with 7 feet stroke. Lieutenant James Hosken, R.N., was her first commander, and afterwards B. R. Matthews. She sailed from Bristol on the

[1] There have been three systems of measurement in vogue in Great Britain. 1st. *Builders*, or the old measurement (O. M.) under the law of 1773, a very rough calculation. 2nd, New Measurement (N. M.) of 1834, amended by 6 & 7 Vict. ch. 84, and consolidated by 8 & 9 Vict. ch. 89: and 3rd, new new, measurement (N. N. M.), the present law enacted in 1854. The last was devised by Moorsom, and is by far the most scientific of the three; the ship being gauged in sections, just like a cask of wine. Under the law of 1834, engine, boiler, and coal spaces are deducted from the gross tonnage for dock dues, wharfage, &c. The Board of Trade, too, for a time allowed the space under spar (or upper) deck (as in the Allan boats) to be deducted, but this was abused through a clerical error in the Act, and has recently been repealed. There are also three modes of ascertaining the length of a ship, hence apparent disagreements in description; first, the keel; second, between perpendiculars; that is between the stem and stern post; and third, the length *on deck*, or *over all*. The official rule is between perpendiculars, but the length *on deck* is the popular method. Latterly the spaces occupied by crew and passengers have also been deducted from gross tonnage.

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"GREAT WESTERN,"
Leaving Kingroad (Bristol), on her first voyage to New York, 8th April, 1838.
(From a painting by Walters in 1838.)

8th April, 1838, and arrived at New York on the 23rd, direct, in fifteen days. Her best day's run was 243 knots, and her average 208, or equal to 8·2 knots per hour, burning 655 tons of coal.

Commenting upon the arrival of the *Sirius* and *Great Western*, the New York *Courier and Enquirer* of April 24th, 1838, said—

"What may be the ultimate fate of this excitement—whether or not the expenses of equipment and fuel will admit of the employment of these vessels in the ordinary packet service—we cannot pretend to form an opinion; but of the entire feasibility of the passage of the Atlantic by steam, as far as regards safety, comfort, and despatch, even in the roughest and most boisterous weather, the most sceptical must now cease to doubt."

The New York papers of 24th April, 1838, advertise her thus—

"British Steam Packet Ship *Great Western*, James Hosken, R.N. Commander, having arrived yesterday from Bristol, which place she left on 8th inst. at noon, will sail from New York for Bristol on Monday, May 7th, at 2 P.M. She takes no steerage passengers. Rates in the cabin, including wines and provisions of every kind, 30 guineas; a whole stateroom for one person, 50 guineas. Steward's fee for each passenger, £1 10*s.* sterling. Children under thirteen years of age, half-price. No charge for letters or papers. The captain and owners will not be liable for any package, unless bill of lading has been given for it. 100 to 200 tons can be taken at the lowest current rates. Passage or freight can be engaged, a plan of cabin may be seen, and further particulars learned by applying to Richard Irvin, 98, Front Street."

She left New York 7th May, and arrived back on the 22nd.

While she was fitting out, the *Sirius*, Lieutenant Roberts, R.N., commander, built by Menzies, of Leith, 703 tons, 320 H.P., engines by Wingate, 178 feet × 25½ × 18¼, trading between London and Cork, left London for New York, and arrived a few hours before her; but Mr. Johnson is in error in saying that she steamed from London to New York in 18½ days. She re-coaled at Cork, sailing *from thence* 4th April, and was eighteen days from Cork to New York, running out of coal, and burning spars, resin, etc.

In the *Marine News* of April 4th, 1838, published in New York, the agents of the *Sirius* advertise her as a "new and powerful steamship, 700 tons burden, 320 H.P." The advertisement continues—

"This vessel has superior accommodations, and is fitted with separate cabins for the accommodation of families, to whom every possible attention will be given.

"Cabin, $140·00, including provisions, wines, etc.

"Second cabin, $80·00, including provisions."

She left New York 1st May and arrived 18th. The *Great*

Western ran regularly for nine seasons, lying up in winter; and although the passage-money was so high, fifty guineas, she was a great favourite. Her best time East is said to have been 10 days, 10 hours, 15 minutes.[1] The company tendered to carry the mails, but failed to get the contract, and were ultimately beaten off by the heavily subsidised Cunard boats. She was sold to the Royal Mail Company for £25,000, ran for ten years between Southampton and the West Indies, and was finally broken up at Vauxhall in 1857. Her success immediately led to several other attempts, but only one endured for any length of time. The *Sirius* did not attempt a second voyage; but in July, 1838, Liverpool despatched another *Royal William*, the same size as her namesake, for New York. She belonged to the City of Dublin Steam Packet Company, was 817 tons, built by Wilson & Co., 175 × 27 × 17·6 feet, with engines of 276 H.P., by Fawcett & Preston. She was a failure in point of speed, having occupied 19 days going west, and 14½ going east. In October, 1838, the Liverpool Transatlantic Steam Company purchased from Sir John Tobin, and despatched the *Liverpool* from that port. She was 1150 tons and 468 H.P. (235 × 35 × 21 feet), but was slow and crank, and occupied 16½ days on her first passage from Cove of Cork, having put back there on the 30th October. She was afterwards improved and her tonnage increased by 393 tons.

On the 7th December, 1839, the *President* was launched on the Thames with great *éclat*. She was built by Curling & Young, 2366 tons, and 540 H.P. Her career was very brief, for in March, 1841, she left New York, and was never seen or heard of again. It was supposed that she struck an iceberg. Two other boats were temporarily employed, the *Oriental*, 1670 tons and 440 H.P., and the *British Queen*, 2016 tons and 500 H.P. (234 × 40). All these boats, however, were soon eclipsed by the subsidised Cunard boats, which for many years defied all competition.

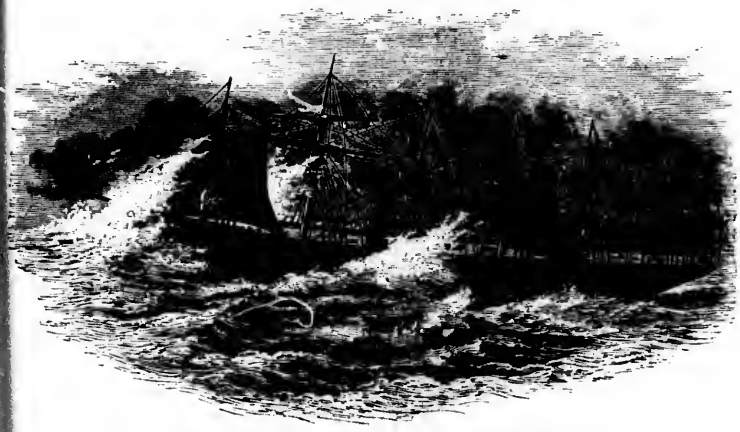
SECOND EPOCH.

Wood to Iron.

The "Great Western Steamship Company," in 1840, decided on building a larger ship, and consulted the celebrated engineer, I. K. Brunel. With his usual boldness he advised an iron ship of 3000 tons, and Mr. Patterson was commissioned to build her. This was the *Great Britain*, which, when completed, was the most

[1] One writer says it was "about 13½ days."

magnificent ship then afloat. She was a beautiful model, with round sides; a special graving dock was built for her, so as to avoid launching, and she was designed, like the *Great Western*, for a paddle ship. During her construction Mr. T. P. Smith brought his screw-boat, the *Archimedes*, to Bristol, and a series of experiments there convinced Brunel, and although the frames of the paddle-boxes were already up, he decided to alter her to a screw. She thus excited the deepest interest throughout Europe. It is said that no engineer could be found willing to build her engines of 1500 I.H.P. by contract, and that the company had to construct them. To forge her main shaft James Nasmyth invented his celebrated steam-hammer, and the screw-shaft was driven by



"GREAT BRITAIN" IN A GALE OFF LUNDY ISLAND.

four endless chains over a great drum. There were four cylinders, 88 inches diameter with 6 feet stroke. On the 19th July, 1843, Prince Albert came down from Windsor to christen her, and Her Majesty and many thousands of people visited her afterwards in London. She was 322 × 51 × 32, 2984 tons gross. On her completion she drew a little more water than was expected, and her sides being round it was found impossible to get her through the locks of the harbour basin. Ultimately, after some delay, the coping-stones of the lock were removed, and she was released. Her success as a steamship was perfect; but after a few trips to New York she ran ashore in Dundrum Bay, Ireland, on the 22nd September, 1846, through the culpable neglect of Captain Hosken (a lieutenant of

the Royal Navy !), and remained there all winter without receiving serious damage. The following summer she returned to Liverpool, and was sold to Gibbs, Bright & Co., who altered her rig, supplied her with new direct-acting engines of only 500 H.P., and ran her in the Melbourne trade for about twenty-one years. In 1882 she was converted into a sailing ship, as sound and as strong as when she was first built. She is now a coal hulk at the Falkland Islands.[1]

There were many, however, who were not convinced of the suitability of iron for ships, and more who had no faith in the value of the screw. Both, therefore, made slow progress for some years after 1843.

As far back as 1809 Trevethick proposed an iron ship, and in 1815 Dickenson patented an invention for iron boats, but the prejudice against iron was so strong, and especially on the part of the Admiralty, that it came to nothing practical. In 1818 the first iron vessel was built by Thomas Wilson, at Faskine, 11 miles from Glasgow, the *Vulcan*, and fifty-seven years afterwards she was still carrying minerals on the Clyde! In 1821 the first iron steamship, the *Aaron Manby*, was built at Horsley, for the joint account of Mr. Manby and Captain, afterwards Admiral, Sir Charles Napier, followed by two or three other small vessels. Shortly afterwards an engineer at Paris commenced to build, but failed. The Shannon Steam Packet Company built one in 1824, and Fawcett and Preston soon afterwards built several small iron vessels at Liverpool, and the Thames followed suit. In 1832 Lairds, of Birkenhead, were the first to build an iron steamship for ocean navigation, the *Elburkah*, of only 55 tons, to ply on the River Niger. In 1834 they built the *Garry Owen*, 125 × 21·6, with two engines of 90 H.P.; and in 1837 two for the East India Company, for the Indus, of 350 tons; and in the same year the *Rainbow*, of 600 tons and 180 H.P., for the London General Steam Navigation Company, the largest iron steamship then afloat. From this it may be seen what a bold experiment the *Great Britain* was in 1840. Two of the objections to iron steamships, the deviation of the compass and the rapid fouling of their bottoms, were both eventually overcome, the former by Gray's floating compass, and the latter by anti-fouling composition for painting the bottom.

[1] William Patterson was a modest, unassuming man, but with a genius for shipbuilding. He afterwards built a magnificent wooden steamship, the *Demerara*, of 3000 tons. She stranded in going down the River Avon, and this ruined him.

Third Epoch.

The Screw Propeller.

It is impossible to decide who was the inventor of the screw propeller. It has been claimed by many. Mr. McGregor says "the use of the screw propeller may be of an indefinite antiquity." It has even been claimed for the Chinese as far back as 1680. In 1745 Masson describes an apparatus for working an oar at the stern of a vessel so as to give it a sculling motion. In 1746 Bougner mentions that revolving arms, "like the vanes of a windmill," were tried for the propulsion of vessels. Watt suggested it in 1770. In 1779 Matthew Wasbcrough, of Bristol, took out a patent for one. In 1785 Joseph Bramah speaks of one, "similar to the fly of a smoke-jack," and in 1798 he tested it in a boat. In 1800 Edward Shorter patented a "perpetual sculling machine," having the action of a two-bladed propeller, which was tried in 1802 in H.M.'s ships *Dragon* and *Superb*.[1] In 1804 Stevens, of New York, crossed the Hudson in a small boat propelled by two screws and took her to the Delaware.

In 1815 Richard Trevethick patented "a worm or screw revolving in a cylinder at the head, sides, or stern of a vessel." In 1826 Woodcroft patented a mode for "propelling boats and vessels," but gave no specification. In 1832, however, he prolonged his patent and fully described his "increasing pitch screw propeller," which, when tried, proved very successful; and in 1844 he patented his "varying pitch screw propeller," which was certainly in advance of any other at the time. In 1823 a Captain Delisle tried two on a small scale in France, and Sauvage tried another in 1832.

In 1833 Robert Wilson, a Scotch engineer, says he brought under the notice of the Admiralty a screw, "perfect in all its details," which was rejected.[2] But in 1836, John Ericsson, a Swede settled in London, fully demonstrated the value of the screw. He first tried it in a model boat only twenty inches long, and then had a boat built 45 × 8 feet, in which he fitted his engine, and *two propellers* of 5 feet 3 inches, both being on the same shaft. This was the *Francis B. Ogden*. The result was far beyond his most sanguine expectations, for she made ten miles an hour, and afterwards towed a large packet ship, the *Toronto*, at the rate of five miles an hour. Next he towed a barge with the

[1] Woodcroft.

[2] 'The Screw Propeller,' by R. Wilson. 1860.

Lords of the Admiralty and three admirals on board at the rate of ten miles an hour; but scientific theorists, and many engineers, declared that it was constructed on erroneous principles, and its failure certain, while the admirals decided that the ship would not steer.

In 1836, too, Thomas Pettit Smith, six weeks before Ericsson, patented "a screw or worm made to revolve rapidly under water in a recess or open space, formed in that part of the afterpart of the vessel commonly called the dead-rising, or dead wood of the stern."

His first trial, in a boat of six tons with a 6-inch cylinder and 15-inch stroke, was so successful that on the 29th July, 1839, the "Screwship Propeller Company" was formed to purchase the patent. The Company tried it on a larger scale, 14th October, 1839, in the *Archimedes*, of 237 tons (125 × 22 × 13), with a cylinder of 37 inches and 3 feet stroke, 45 H.P. The screw consisted of two half-threads, 8 feet pitch, and 5 feet 9 inches in diameter. The engine made 26 and the screw 138 revolutions per minute, with multiplying gear. Mr. Smith expected a speed of 12·60 miles an hour, but she only made 9·25, showing considerable loss by "slip." Her engine, however, was not sufficiently powerful for the size of the boat. These experiments decided the practical value of the screw. Brunel adopted it for the *Great Britain* in 1842, and the Admiralty ordered the *Rattler*, of 888 tons, to be built at Sheerness. She was launched in April, 1843, and proved a great success.

It was 1850, however, before David Tod, of Glasgow, brought it into general use. It seems clear, therefore, that the credit for bringing it into practical application must be shared by Woodcroft, Ericsson, and Smith.

In 1838, a friend of Ericsson's, Mr. Stockton, an American, had a small iron screw-boat, the *R. F. Stockton*, built by Laird, of Birkenhead (70 × 10), and sent her to the United States, where she was employed as a tug boat. Ericsson himself went to New York, and died there in 1889, after a very long and useful career.

FOURTH EPOCH.

The Compound Engine.

Randolph, of Randolph, Elder & Co., Glasgow, first introduced the compound engine in paddle boats for the Pacific Company in 1856, but it did not come into general use until 1870.

Alfred Holt, of Liverpool, tried it successfully in his boats in the

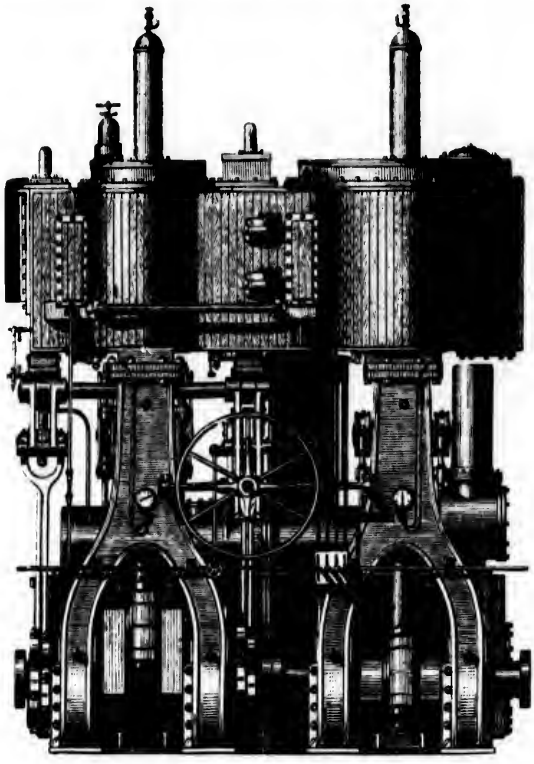
China trade in 1865, running direct from Liverpool to the Mauritius, 8500 miles, without re-coaling. In 1868 the National Company tried it in the *Italy*. The opening of the Suez Canal on the 17th November, 1869, gave an immense impetus to screw steamships for the Indian, Chinese, and Australian trades, and, combined with the compound engine, created a revolution in the carrying trade of the world, which has proved almost fatal to sailing ships, especially as they are unfit for the Canal or the Red Sea.

To understand this it is only necessary to remember that the first Cunard boats could only carry 225 tons cargo and 90 passengers, and could only steam 8·7 knots per hour, on an average, consuming 4·7 pounds of coal per I.H.P. per hour, while the first of their screw compound boats, the *Bothnia*, built in 1874, carries 3000 tons of cargo, and 340 saloon passengers, besides steerage, and steams on an average 13 knots, consuming only 2·2 pounds of coal per I.H.P. per hour, her engines being only 507 H.P. nominal, against 425 in the *Acadia*, of 1840.[1] In the simple engine the steam passed at low pressure from the boilers to the cylinder, where it did its work, and then passed direct to the condenser. But in the compound it passes at very high pressure into a small cylinder, and thence by expansion into a large one, and thence, in the triples, to a still larger one, before it passes into the condenser. The *Mongolian's* cylinders, for example, are 30, 50, and 80 inches in diameter respectively, with 5 feet stroke. The *Friesland's* are 35½, 56, and 89 inches, with 4¼ feet stroke. Of course they do not do three times the work of the old engines, but, as the cranks are set at different angles, much greater power is obtained.

Steam is now used in marine steel boilers up to 200 lbs. pressure to the square inch, instead of at 13 lbs. in the early boats; but as it requires very little more coal to raise 200 lbs. than 13 lbs. the consumption of coal has been gradually reduced from about 5½ lbs. to 1½ lbs. per I.H.P. per hour. Experts tell us that to convert a quantity of water at 32° into 10 lbs. of steam requires one cwt. of coal; into 40 lbs. it requires only 1·012; and into 90 lbs. only 1·024 lbs. One of Napier's engines, in the Russian ship of war *Sinope*, recently consumed only 1·45 lbs. per hour at full power, and the *Empress of Japan*, of the C. P. R. line, consumed only 1·56 lbs. on her trial trip. "Forced draught" has also been introduced, which causes a more perfect combustion of the fuel; but much depends on the quality of the coal, the work of the firemen,

[1] Sir John Burns.

and the character of the boilers. Warm water is also returned from the condenser to the boilers, which is another economy, and the steam is "super-heated" to increase its power. The *Daventry*, by using an "evaporator," has raised the water to 170° Fahr., and the *Enchantress*, by means of a "feed-heater," has raised it to 210°, which must economise the consumption of coal.



COMPOUND ENGINE.

Some one professes to have discovered a means of returning steam to the boilers, which, if successful, would of course produce another revolution in steam engines. Quadruple cylinders have also been adopted in a few ships. There is still plenty of room for further reduction in the consumption of coal, as, according to Mr. Merrifield, F.R.S. ('Text-books of Science'), no steam

engine, as yet, does one-fifth of the work which, theoretically, it ought to do *if all the heat produced by the combustion of the coal were utilised.* It will doubtless soon be reduced to 1 lb. per I.H.P. per hour, or even less.

The early screws could only run about 3000 knots at full speed without re-coaling, but compound engines now enable them to run about 10,000 knots, and still more at reduced speed. Large steel boats of moderate power and speed now carry immense cargoes of dead weight, so that sailing ships have no chance against them. Thus, the *Rossmore*, 4360 tons gross, carries 6800 tons of cargo, besides coal, and steams 12 knots with engines of only 2500 I.H.P., or about 500 nominal. The *Georgian*, of 5800 tons gross, is said to carry 7000 tons of cargo besides coal, or nearly 60 per cent. over her tonnage; and the White Star freight-boat *Cevic* recently cleared from New York for Liverpool with the following enormous cargo :—

144,000 bushels of grain.
9,000 bales of cotton.
896 head of cattle.
1,130 tons flour, copper, meats and hay.
3,000 boxes cheese.
2,600 barrels oil and wax.
2,000 bales hides.[1]

Iron and wooden sailing ships only carry 40 to 45 per cent. over their tonnage. Steamships, however, have been greatly overdone, and freights have been reduced to ruinous rates. Thus, wheat has been carried from Montreal to Liverpool at $4\frac{1}{2}$ cents per bushel (formerly 25 to 30 cents), and iron from Glasgow to New York at 2*s.* 6*d.* per ton (formerly 25*s.*), and grain from New York to Liverpool at 4 cents per bushel, or less.

Fifth Epoch.

Steel Ships.

Steel ships did not come into vogue until about 1879. The British Admiralty first tried it in the *Iris* in 1875. The Siemens-Martin steel proving much stronger than iron at about the same price, it was found possible to reduce the weight of material, and thus to reduce the ship's cost. Not only so, but as the ships floated lighter, they could carry considerably more cargo than iron ships of the same size. In 1879 the Allans built the *Buenos Ayrean* of steel; but the proportion of steel to iron tonnage built

[1] Since this was written the *Georgic*, a freight boat carrying 14,000 tons, has been launched from the yard of Harland & Wolff, Belfast.

on the Clyde was only 10½ per cent. In 1880 the Cunard Company decided to try it in the *Servia*, and so rapidly did it come into favour that in 1889 97 per cent. of the Clyde tonnage was built of steel, and on the Tyne and other shipbuilding centres the proportion was much the same. Steel has been at a remarkably low price for some time, and ship plates are now sold as low as £4 15*s.* per ton, = $23, less than 50 per cent. of their cost twenty years ago. The result is that the shipyards of Great Britain and Ireland stand unrivalled, and have produced 1,250,000 tons of shipping in a single year for all nations except the United States.

SIXTH EPOCH.

Twin Screws.

The *City of New York*, of the Inman and International line, in 1888 adopted twin screws, but she was by no means the first to do so. They were, in fact, tried by Stevens, on the Hudson, in a small boat as far back as 1804, but she failed because, it is said, he could not make the stern pipes tight. Ericsson, too, tried them in a very ingenious way, on one shaft, in the *F. B. Ogden*, on the Thames in 1836, with great success. But the *City of New York* was the first of the North Atlantic passenger fleet to adopt them. They have not increased the speed much. The *Etruria*, a single screw, has averaged 19·65 knots per hour, Queenstown to Sandy Hook, while the best run of the celebrated *City of Paris* only averaged 20·70, and that of the *Teutonic* 20·349. But they have added immensely to the *safety* of the ships, for many reasons, and it may be as well to explain them.

The dangers to which the ordinary screw steamship is exposed may be classed under five heads:—

1. Fracture of main shaft, as in the case of the *City of Brussels*, *Circassian*, *Umbria*, *Sarnia*, and many other ships.

2. Loss of screw or its fans, as in the case of the *Peruvian* and *Sardinian*.

3. Loss of rudder or damage to it, as in the case of the *Great Eastern* and *Alaska*.

4. Breaking down of the machinery, as in the case of the *Aurania*.

5. Collision between two ships or with rocks, as in the case of the *Oregon*, *Idaho*, and *City of Chicago*.

The first four render a single screw steamship helpless, and she can only reach port by being towed, or by the very tedious process of sailing under her own canvas.

The fifth is usually fatal, as the cross bulkheads are generally misplaced or too weak to withstand the pressure of a large body of water.

Now ships with twin screws have two independent sets of engines and boilers, and in this fact is found their immunity from most of the dangers inherent in all single screw ships; indeed, it may be said to exempt them from the consequences of the first four sources of danger, and even in the fifth case it may prolong the ship's life, or lead to her rescue. How? Let us see.

1. It is impossible, in most cases, to repair a broken shaft at sea, but in a twin screw the only effect is to diminish her speed about one-third, say from 18 to 12 or 13 knots. As a matter of fact, the *City of New York* once made 382 knots with one screw in 24 hours, an average of nearly 16 knots per hour.

2. This kind of accident is a very common one. The screw cannot be replaced at sea, but in a twin the effect is no worse than in the first case. Many things cause the loss of a screw. The *Scythia* lost hers by striking a whale; the *Peruvian* by striking field ice; the *Sardinian* through breaking the end of her main shaft. Floating timber, too, or a sunken wreck may cause it. But from all these accidents a "twin screw" is virtually free; or rather, if they do occur, the second screw is usually available.

The 3rd is also a very common accident, and renders a single screw ship perfectly helpless. The *Great Eastern* became unmanageable, but having paddle wheels, slowly returned to Queenstown. The *Sardinian* transferred her passengers in mid-ocean, and the *Alaska* was assisted into New York by the *Lake Winnipeg*.

But in a twin screw it is possible to overcome even this disaster. By modifying the speed of the one screw or the other, as may be necessary, it is quite possible to make a fair course, sufficiently so to take the ship near to her destination, when a tug can easily be procured to assist her into port. This is exactly what the *Paris* did on a recent occasion. She has also the great advantage of being able to turn a circle in about her own length—an immense advantage in a narrow channel, or when fighting an enemy, as every sailor knows.

The 4th is a kind of accident occurring from a variety of causes. Machinery can often be repaired at sea, as duplicates of many parts are carried; but in many cases it cannot: cylinders crack, air pumps, piston rods, or condensers break, and the engine is rendered useless. The *Aurania* broke a connecting rod, which smashed the cylinder, and she drifted about until picked up by

tugs. A paddle boat usually has two engines, and, unless the main shaft breaks, she can go ahead slowly with one engine, or even with one paddle; but in a single screw, if one cylinder is disabled, the others will probably be rendered useless, because the steam passes from the high-pressure cylinder through the intermediate into the low, and thence into the condenser. But in a twin screw the total breakdown of one engine only involves a diminution of speed.

5. Collisions have recently become a source of terrible disaster to iron ships, and here again the utility of twin screws is seen. In a single screw further protection is obtained by means of cross watertight bulkheads, when properly placed and constructed, though they have too often failed by an injudicious manipulation of doors through them. Double bottoms are also a great protection when a ship strikes on a sandy or level bottom, or even on rocks. In collisions between two iron ships, one usually escapes if she has a strong collision bulkhead near her bows, but the other too often sinks in a few minutes from defective bulkhead arrangements, as referred to above, as has recently been illustrated in the case of H.M.S. *Victoria* and *Camperdown*, and of the North German Lloyd steamer *Elbe* and the *Crathie*.

The Cunard steamship *Oregon*, of 7000 tons, was sunk by a miserable little wooden schooner which struck her in a vital part near the engine-room. Her bulkhead might have saved her, but it was pierced by sliding doors; the grooves were filled with small coal, and the doors could not be closed in time.

Twin screws having two independent sets of engines and boilers have generally in their engine-room a *central longitudinal* bulkhead running from the keelson to the main deck. The effect of this is threefold. (1.) It cuts the spaces in halves; (2.) It strengthens the transverse bulkheads: (3.) It effectually separates the two sets of engines.

There remains to be considered one other danger, common to all ships, and perhaps the most terrible of all to landsmen—that of fire. The great advantage of an iron or steel ship, and especially of a twin screw, over a wooden ship is, that the fire may possibly be confined to one section and drowned out with water or steam from steam pumps or direct from the boilers without the passengers even being terrified by smoke. This was actually done in the case of the *City of Richmond* as well as in other ships.

Twin screws, too, reduce the necessity for sails, and thus the great resistance offered by cumbrous masts, yards, and rigging is lessened, simple pole masts having in most cases been substituted.

This adds much to the ship's speed in head winds, and raises the average speed of the voyage considerably. Hence the wonderful regularity of the passages of such ships as the *Paris*, *Teutonic*, and *Lucania*, all twin screws, and all fitted with pole masts without yards.

The U.S. warships *Columbia* and *Minneapolis*, recently built at Philadelphia, have "triple" screws, one in the centre, and one on each quarter; the latter made 21·8 knots, as the mean of 4 hours' sea trial.

CHAPTER VI.

SPEED CALCULATIONS.

SOME confusion often occurs in the minds of non-professional people as to the speed of steamships. Every ship has, in fact, three standards of speed, and it may be as well to state them clearly:

1. There is the builder's trial of speed *on the measured mile*, which is her maximum under the most favourable circumstances; fine weather, smooth water, light draught, clean bottom, fresh-mined coals, and picked firemen.

2 There is her sea speed in fine weather, which will always be less, except when running before a strong, fair wind, owing to mixed or inferior coals, foul bottom, head sea, or careless firemen. Supposing her speed on the measured mile to be 19 knots, her sea speed will rarely exceed 17 to 17½.

3. There is her *average* sea speed on a long voyage, which, in ordinary weather, will probably not exceed 16 to 16½, and in continuous bad weather, with strong head winds and sea, may be much less. To ascertain her *average sea* speed, therefore, it is necessary to take a series of voyages.

The *City of Paris* made 21·9 knots on her builder's trial, but she has never averaged over 20·7 on her quickest sea passage, and her average speed is barely 20 knots, although she has only pole masts and no yards. The *Teutonic* made 21 on her trial trip, but only 20·349 on her celebrated passage of 5 days 16 hours 31 minutes, and her average speed is less.

CHAPTER VII.

THE CUNARD LINE AND ITS COMPETITORS.

IT is now time to turn to the history of the various lines of steamships, and first I take the most remarkable and successful line the world has ever seen, in which Canada has again had a considerable share, viz., "The British and North American Royal Mail Steamship Co.," familiarly known as the "Cunard Line."

Mr. Johnson, however, is not correct in terming it the first Atlantic line, as the "Great Western Steamship Co." was formed at Bristol, and went into operation two years in advance of it. The combination of talent, energy, foresight, and pluck which originated and carried on this wonderful company with a success quite unparalleled was very remarkable.

Two Nova Scotians, both men of great ability and energy, share the honour of originating it, and three Scotchmen of equal ability, assisted in working it out.

Samuel Cunard was a member of a well-to-do Quaker family which had emigrated from Wales to America early in the 17th century and settled in Philadelphia. When the United States declared their independence, the family emigrated to Halifax, N.S., where Samuel was born in 1788. After serving in a merchant's office he accepted a partnership in a shipowning firm of Boston, Mass. In 1815 he proposed to the Admiralty to undertake, at his own risk, the conveyance of mails between Boston, Newfoundland, and Bermuda, and carried out his scheme most satisfactorily to the British Government.[1] As early as 1830 he contemplated the establishment of a line of steamships to run between Liverpool, Halifax, and Boston. The arrival of the *Royal William* at Halifax from Quebec in 1831 gave a fresh impetus to the idea, and we find him taking the greatest interest in her, and acting as a director of the company. Mr. Cunard acted as agent in Halifax for the "Hon. East India Company," and in 1838 he proceeded to

[1] A. Fraser-Macdonald, p. 80.

England and consulted Mr. Melvill, the Secretary of the East India Company, which had just launched the *Hugh Lindsay*, and asked Mr. Melvill to favour him with an introduction to any shipbuilder likely to join him in carrying out his project.

Mr. Melvill gave him a letter to Robert Napier, of Glasgow, one of the most celebrated marine engineers the world has ever seen. This was the first fortunate step, as we shall see. Napier introduced him to two other remarkable men—George Burns (whose father had been for seventy-two years minister of the

S. Cunard

Barony Parish, Glasgow), and David McIver, of Liverpool. In 1824 Mr. George Burns had engaged in steam navigation between Glasgow and Belfast, and in 1829 between Glasgow and Liverpool. Mr. David McIver was at that time associated with a rival company trading between Glasgow and Liverpool, but a little later both companies were amalgamated, and thereafter the Burns's and McIver's worked together. Mr. Burns, in recalling this important epoch in his life, said that "it was not long before we began to see daylight through the scheme, and I entertained the proposal

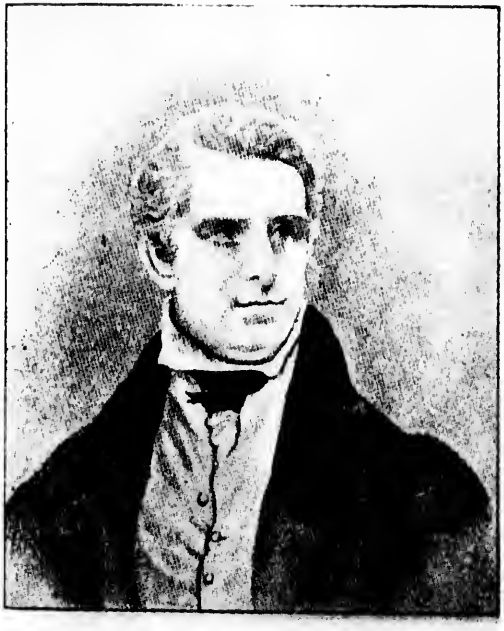
cordially, and invited Mr. Cunard to dine with me." Mr. McIver, however, at first, was dead against it, and after dinner advised that Mr. Cunard should be told "that the thing would not suit them." They breakfasted with Mr. Cunard next morning at Robert Napier's house, went further into the details of the scheme, and agreed to co-operate with Mr. Cunard in finding capital and ships should he succeed in obtaining a mail contract. David McIver

Yours Sincerely
George Burns

died in 1845 and was succeeded by his brother Charles, also a very remarkable man, with a singularly sound judgment of men and business and of tremendous energy. Such was the combination. Cunard was a clever manager of men, and superintended the Government contracts and the management of the House of Commons in London. Burns superintended the construction of the ships in the Clyde; McIver managed them in Liverpool, and Mr. Cunard's sons in Halifax. Napier's engines were the

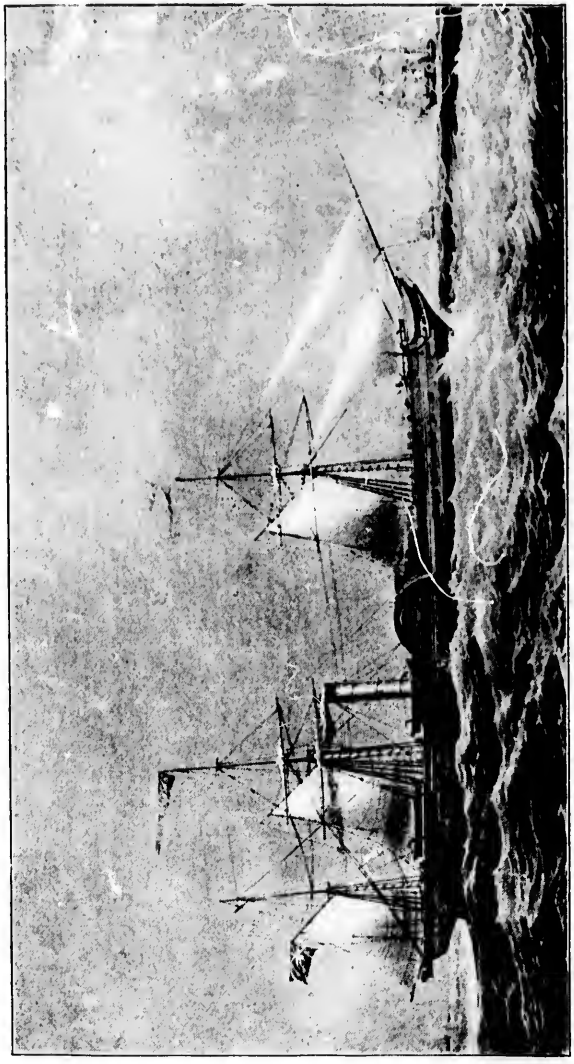
perfection of workmanship, so much so that an American engineer told the writer that the *Cambria's* engines were so superbly finished that they "ought to be put under a glass case."

While Cunard was negotiating with the British Government, by a singular coincidence, Hon. Joseph Howe, Judge Haliburton ("Sam Slick"), and two other Haligonians who had left Halifax for London on the 26th April, 1838, on board H.M. 10-gun brig



David Mac Bain

Tyrian with the mails, were overtaken by the *Sirius* steamship from New York, which stopped, took on board the mails, and was soon out of sight. Howe went on board the *Sirius*, and was so impressed by the incident that he at once foresaw that Halifax would be "nowhere" without steamships, and held many warm discussions with his friends. The result was that on their arrival he and Haliburton went to Bristol, and conferred with the directors



"BRITANNIA."

of the Great Western Company, who offered at once to run a line of steamships to Halifax if the Government would grant a subsidy for the carriage of the mails. Cunard, hearing of the efforts of Howe and Haliburton, met them in London with his own proposals. Meeting two New Brunswickers there, Messrs. Bliss and Crane, they made strong representations to the Government, and on the

HON. JOSEPH HOWE.

24th August Howe prepared a letter on the subject addressed to Lord Glenelg, signed by himself and Mr. Crane.[1]

The outcome of it was, that in October the Admiralty advertised for tenders.

The Great Western Steamship Company tendered and anticipated no serious opposition, but, much to their chagrin, Mr.

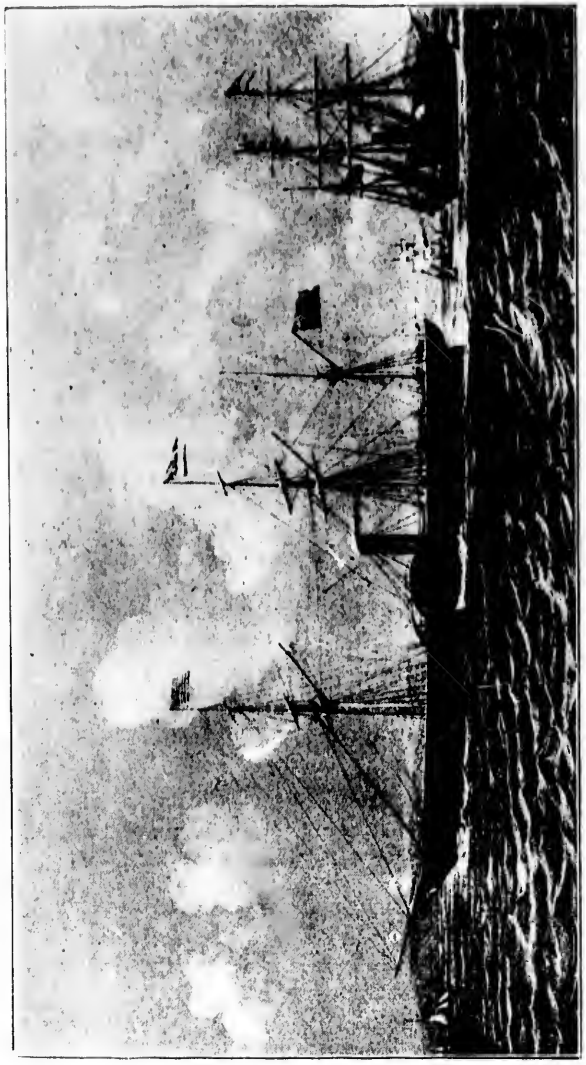
[1] Geo. Johnson, in Montreal *Gazette*.

Cunard's tender was accepted, and a contract signed by Samuel Cunard, George Burns, and David McIver. The original conditions were that for the sum £55,000 sterling per annum, they were to supply three suitable steamships to run twice a month for eight months, and once a month in winter, twenty round voyages a year for ten years to Halifax and Boston; afterwards it was thought desirable to have fixed days for departure on both sides of the Atlantic, and for over forty years the boats left Liverpool on Saturdays, and Boston or New York on Wednesdays.

By a subsequent arrangement they agreed to provide four boats instead of three, and, subject to some other conditions, the subsidy was raised to about £81,000 per annum.[1] (Mr. Cunard, in his evidence before a committee of the House of Commons in 1846, stated it at £3295 sterling per round voyage.)

They then built on the Clyde four wooden paddle boats, all alike. The *Acadia* was built by John Wood; the *Britannia* by R. Duncan; the *Caledonia* by C. Wood; and the *Columbia* by Robert Steele. They were 207 feet long, 34 feet beam, and 24·4 feet deep, 1155 tons gross, and 619 net, their dimensions and model being very similar to the *Great Western*. All four engines were constructed by Robert Napier on the "side lever" principle, with 72½ inch cylinders, 6 feet 10 inches stroke, 425 H.P. nominal, and 740 H.P. indicated; consuming 38 tons of coal per day, or 4·7 lbs. per I.H.P. per hour. Their average speed varied from 8·3 to 8·7 knots per hour.[2] On the 4th July, 1840, the *Britannia* commenced the service from Liverpool, and was 14 days 8 hours to Boston, or excluding 12 hours at Halifax, 13 days 20 hours.[3] Mr. Cunard went out in her, and during his stay in Boston is said to have received no less than 1873 invitations to dinner.[4] The Bostonians were very enthusiastic over the new ship, and gave a banquet in honour of the event. In February, 1844, the *Britannia* was frozen up in Boston harbour, when to save her from delay the citizens, at their own expense, and with the aid of thousands of volunteers, cut a channel through the ice seven miles long and set her free! Their punctuality, comfort, and freedom from accident gave great satisfaction to the public. The Great Western Company succeeded in getting a Parliamentary inquiry into the contract, but the committee reported in favour of the Cunard Company and added that "the service had been most efficiently performed."

[1] Lindsay's 'History of Merchant Shipping.'
[2] John Burns.
[3] The *Acadia*, however, did it in 11 days 4 hours afterwards.
[4] A. Fraser-Macdonald.



"EUROPA."

A small boat to run between Pictou and Quebec, the *Unicorn*, was, however, the first Atlantic boat to reach Boston on 2nd June, 1840.

The only loss the company met with for thirty years was the *Columbia*, wrecked on Cape Sable, but, happily, no loss of life or mails occurred.

She was replaced in 1843 by the *Hibernia*, 219 × 35·9 × 24·2, 1422 tons gross, 791 net, and 500 H.P. nominal, 1040 I.H.P., and about half a knot faster. In 1845 the *Cambria*, a sister ship, was added, and proved faster still, averaging 9·6 knots. She was known as the "flying *Cambria*."

The Americans were, naturally, chagrined at the loss of their passenger and fine goods traffic, but courageously held on to their famous sailing packets (then among the finest in the world), increasing their size and speed.

But it was all in vain; they were doomed, and were gradually driven out of the trade. In 1845 they resolved to try an auxiliary steam engine, and built the *Massachusetts*, a wooden ship of 751 tons, 161 × 31·9 × 20. Her engine was designed by Ericsson and fitted with his lifting screw, the blades of which turned up when under sail. The engine was very compact, 170 H.P., sufficient to drive her nine knots in a calm, consuming only 9 tons of anthracite coal per day. Her total cost was only £16,000 sterling. Auxiliary engines, however, have never been successful in merchant ships; and after making two voyages to Liverpool, she was sold to the United States Government and re-named the *Farralones*. About 1870 the Government sold her, when her machinery was removed, and she again changed her name to the *Alaska*.

But Americans are not easily beaten, and although they were not yet prepared to run against the Cunard Line, they established a line of their own between New York, Southampton, and Bremen; and in June 1847 they started their first ship, the *Washington*, on the same day that the *Britannia* left Boston, boasting that "she was bound to win the race." She was 1750 tons gross, and her engines were said to indicate 2000 H.P. Her cylinders were the same diameter as the *Britannia's*, 72 inches, but they had 10 feet stroke, and her boilers could carry 30 lbs. of steam. Nevertheless the *Britannia* won the race by two full days. The London *Times* described the *Washington* as an "elongated three-decker, and about as ugly a specimen of steamship building as had ever been seen at Southampton." She was followed by a similar boat, the *Hermann*, but after a short trial both were withdrawn.

In the next year (1848), the increasing wants of the trade

induced the British Government to make a new contract with the Cunard Company for a weekly line. The new subsidy was no less than £156,000 sterling per annum, and it was arranged that the boats should run alternately to New York direct, and to Halifax and Boston.

To fulfil this contract the company built four larger and faster wooden boats on the Clyde, all nearly alike in dimensions and power, the *America*, *Europa*, *Canada*, and *Niagara*. The *Europa* was built by John Wood, and the others by Robert Steele. The exact dimensions of the *Canada* were 251 × 38 × 25·7, 1825 tons gross, 1001 net, cylinders 90 × 8 feet stroke, 689 H.P. nominal and 2000 indicated, by Napier, the boiler carrying 13 lbs. steam. Her average speed was 10·5 knots.[1]

In 1850 also the company contracted to supply branch boats at Halifax of 350 tons and 80 H.P., to carry the mails to St. John's, Newfoundland, and to Bermuda, and in 1851 St. Thomas was added.

The total subsidy was then no less than £178,000 sterling per annum, and this the company enjoyed for many years. The *Europa* was afterwards lengthened, and the *Niagara* and *Canada* converted into sailing ships.

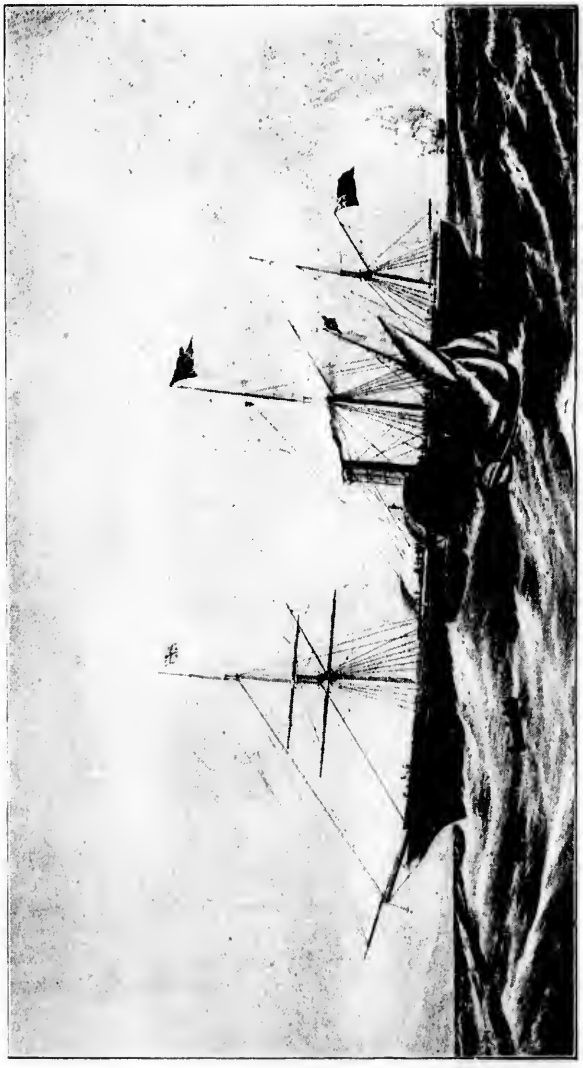
The Americans also subsidised a fortnightly line to Southampton and Havre. The *Franklin* and *Humboldt* were built to carry it out, but they were both wrecked. They were replaced by the *Arago* and *Fulton* in 1856, but both were ultimately withdrawn.

The "Collins" Line.

Hitherto the United States Government had been opposed to all subsidies on principle, but Americans now became intensely jealous of the British, and the Senate made several official reports complaining of "The Queen of the Ocean levying her imposts upon the industry and intelligence of all the nations that frequent the highway of the world." In 1849 they decided to subsidise a line of steamships of extreme speed, that should "run the Cunarders off the Atlantic," and "sweep the seas in war." How they succeeded we shall soon see.

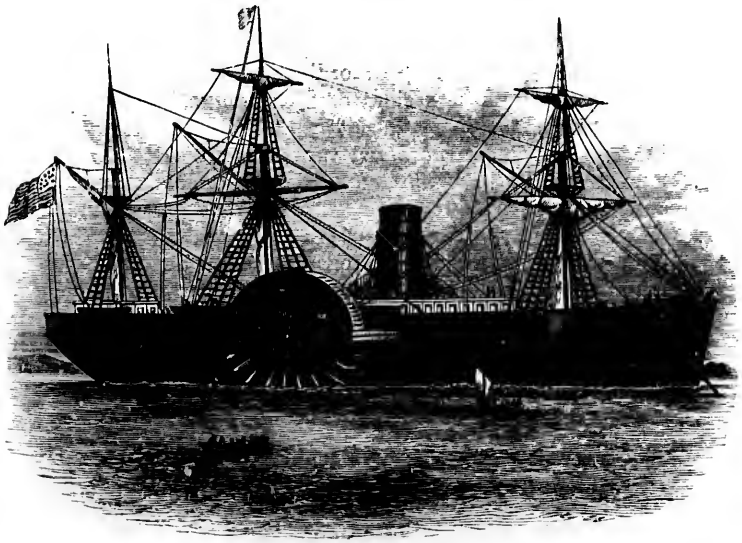
The Government made a contract with Mr. E. K. Collins, of New York, to build five (afterwards reduced to four) first-class wooden steamships of about 3000 tons, to perform twenty round voyages each year, at $19,250 (£4000 sterling) per voyage. They

[1] John Burns.



"ASIA."

were named the *Arctic*, *Baltic*, *Atlantic*, and *Pacific*. The *Arctic* was considered the finest ship. She was designed by George Steers, of New York (of *America* yacht fame), and built by W. H. Brown, of New York, at a cost of $700,000. They were good models, with solid frames of live oak, planked with pitch pine, and strengthened with diagonal iron straps, 282 × 45 × 32, 2856 tons gross. The engines were designed by Faron (a Government engineer), after a careful study of the Cunard boats, and built by the Novelty and Allaire Companies; side lever, cylinders



COLLINS SS. "ATLANTIC."

95 inches, with 9 feet stroke, 800 H.P. nominal, and the boilers carried 17·5 lbs. of steam and consumed 87 tons of coal per day.[1]

Mr. Faron was sent to England to spy out the Cunard Company's engines and boilers, and nothing was left undone to ensure success. The cabins, too, were superior in elegance and luxury to any British ship, and the state-rooms were fitted with electric bells, but the discipline was far inferior to the Cunard ships.

Their cost, however, so far exceeded the estimate that the Government not only had to make the company an advance, but, influenced by the frequent appeals of Senator Bayard, agreed to

[1] C. B. Stuart.

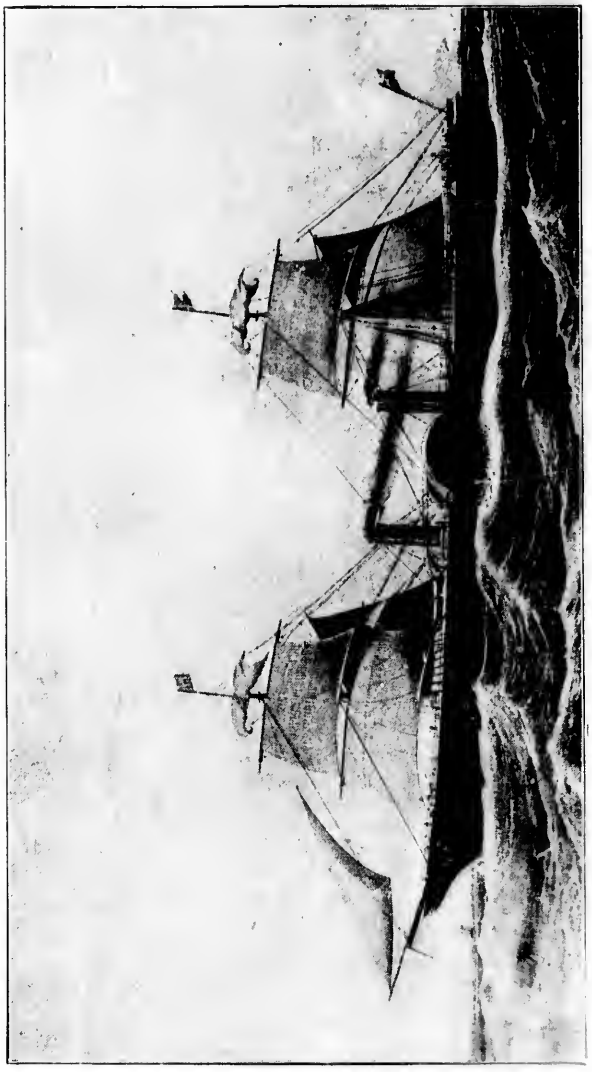
increase the subsidy to $33,000 per voyage, or $858,000 per annum, for only twenty-six voyages (which was more than double that paid to the Cunard Company at first), but they demanded increased speed. In 1849 they commenced to run the *Atlantic*, sailing 27th April, and at first they certainly fulfilled the expectations of their most sanguine friends. They slightly exceeded the Cunard boats in speed; they reduced the freight of fine goods from £7 10*s.* to £4 per ton, and they were generously patronised by Americans, carrying, in 1852, 50 per cent. more passengers to New York and 30 per cent. more to Liverpool than their opponents. The *Arctic's* best run west was 9 days 13 hours from Liverpool, and 9 days 13 hours 30 minutes going east, her maximum speed being 13·3 knots per hour. Extraordinary interest was manifested in the competition on both sides of the Atlantic, and heavy bets were constantly made.

To meet it the Cunards ordered two ships from Robert Steele, the *Africa* and the *Asia*, built of oak and double-planked, and launched in 1850; 266 × 40 × 27·2, 2226 tons gross, 1214 net; engines by Napier, cylinders 96½ inches, with 9 feet stroke, 824 H.P. nominal, consuming 76 tons of coal per day.[1] They were magnificent ships for their day, but, owing either to their models or their boilers, they were not quite as fast as the Collins boats, their best passage west being 10 days 10 hours 50 minutes, and east 10 days.

But the Cunards were not to be vanquished. With indomitable energy they produced ships which were not only superior in speed to the Collins ships, but also in regularity and safety. In 1852 they launched the *Arabia*, built by Steele, also of wood, 285 × 40·8 × 27·2, 2402 tons gross, 1474 net, with engines by Napier of far greater power than any of the previous ships; her cylinders were 103 inches, with 9 feet stroke, 938 H.P. nominal, but 3250 indicated, consuming no less than 120 tons of coal per day.[1] She had very fine lines, and was extremely fast in smooth water, her maximum speed, when light, being 15 knots; but in a head sea she buried herself, and the engines being too powerful for her hull she worked herself to pieces. Eventually she was broken up. Her sister ship, *La Plata*, was sold before she was completed, to replace the burnt *Amazon*, running to the West Indies.

And now at length the Cunards resolved to abandon wood, and ordered from Napier an iron ship of great size and power, which was launched in 1855, and started on her first voyage in January, 1856. This was the celebrated *Persia*, which became a great

[1] John Burns.



"PERSIA."

favourite with passengers and distanced everything. Her dimensions were 376 × 45·3 × 29·9, 3300 tons gross, 2079 net; cylinders 100 inches, with 10 feet stroke, 917 H.P. nominal, but 4000 indicated, consuming no less than 150 tons of coal per day.[1] But they still adhered to the paddle wheel. She made the western passage in 9 days 21 hours 41 minutes from Liverpool, and the eastern in 9 days 2 hours and 55 minutes, her average speed being 13·95 knots; but the writer has seen her make 16½ when light, and 360 knots in 24 hours. Her average time in 1856 was 24 hours less than the Collins ships.

By a clause in their original contract with the Government, the Cunard Company were bound to construct their vessels of sufficient strength and capacity to act as gunboats if required. Though they were never called upon to fight, in another capacity their services proved of great value during a national emergency. Thus, in 1855, during the Crimean War, eleven of the company's ships were employed as transports. They carried troops, horses, and military stores to the Crimea, and wounded soldiers back to Scutari hospitals, and thus rendered service of inestimable value to the State.

So many of their ships being taken from the mail route the Collins line, for a time, took the Cunard days of sailing alternately, and thus kept up the weekly communication with the United States.

The later history of the Collins ships, however, was a very sad one. While the world was applauding the apparent triumph of America in the great ocean race, Charles McIver wrote to Mr. Cunard: "The Collins Company are pretty much in the situation of finding that breaking our windows with sovereigns, though very fine fun, is too costly to keep up;" and this prediction was soon verified.

On the 27th September, 1854, when 60 miles S.E. of Cape Race, the *Arctic*, Captain Luce, bound to New York with 233 passengers (of whom 150 were first-class) and a crew of 135, was in collision with a small French iron steamship, the *Vesta*, during a dense fog. The *Vesta* was saved by her collision bulkhead, and reached St. John's, Newfoundland. The *Arctic* launched a boat to save the passengers and crew of the *Vesta*, but it was soon found that the *Arctic* herself had received fatal injuries, and in four hours she sank. As it was blowing a gale at the time some of her boats were destroyed in launching; others, which got clear of the sinking ship, were never again heard of, and only two, with 31 of

[1] John Burns.

the crew and 14 passengers, escaped. Among those who perished were the wife of Mr. Collins, their only son, and a daughter. Seventy-two men and four women sought refuge on a raft, hastily constructed, but one by one they were swept away, and at eight o'clock the following morning one human being alone was left, and after retaining his place for a day and a half after all his companions had perished, he was saved by a passing vessel.[1]

The writer heard the account of the wreck from Captain Luce, who went down with his ship, but rose to the surface, and was picked up and landed at Quebec. As many of the passengers were wealthy Americans, there was terrible grief throughout the United States over the disaster.

On the 23rd January, 1856, the *Pacific*, Captain Eldridge, left Liverpool with 45 passengers and a crew of 141, running against the new *Persia*, and was never heard of again. She was supposed to have struck an iceberg, as the *Persia* did. Although the Collins Company was virtually bankrupt, they launched the *Adriatic*, superior in size and speed to the other boats,[2] but as they failed to procure more capital, and Congress, influenced by the jealousy of Boston, Philadelphia, and Baltimore, refused to grant any more assistance, the company finally collapsed in 1858, and the three remaining boats were sold.

The "Vanderbilt."

In 1855 Mr. Cornelius Vanderbilt, of New York, built a large wooden boat of 2936 tons, with a "walking beam" engine, and called her the *Vanderbilt*. She was to "beat everything afloat," but failed to get a subsidy. He ran her and a smaller boat, the *North Star*, for some time to Southampton and Havre, but as the *Persia* beat the former by 13 hours, the old man was so annoyed that he made her a present to the United States Government during the civil war of 1861–5, and she was afterwards a sailing ship, and known as the *Three Brothers*. She is now a coal hulk at Gibraltar.

To return to the Cunards. They were not altogether satisfied with the *Persia*. She proved weak in the bilges, and it cost £40,000 to strengthen them. She was, too, very hard upon coals. So they determined to surpass her on the same lines. Strangely enough, they were still wedded to the paddle wheel long after others had abandoned it for the screw.

[1] 'Annual Register,' 1854, p. 162.

[2] The *Adriatic* was sold to the Galway Line, and is now a hulk in Africa.

"SCOTIA."