

SCIENTIFIC GOSSIP.**Miles of Railroad in the United States
—Making Leather Waterproof
—Instantaneous Photography—&c., &c.**

There are 124,000 miles of railroad in the United States, or seven times as many miles as there are in the United Kingdom of Great Britain.

An announcement was made a short time since before the Linnean Society of New South Wales by Mr. William Macleay that the total numbers of Australian fishes now amounts to 1,291 species.

An establishment in Bavaria for the manufacture and preserving of railroad sleepers is able to turn out 500,000 sleepers a year, which is about one-tenth of the number required annually for the maintenance of the German railroads.

There has lately been constructed by MM. Chailiot and Gratiot, of Paris, a new tool to which they have given the name of the birch drill machine. The arm is jointed or hinged in the middle so that the drill can be brought to any point on the table without shifting the lathe. Bevel gear transmits the power.

Cast-iron may be so hardened as to resist cutting by an ordinary file by the following method: When the iron is brought to a cherry-red heat, sprinkle some cyanide of potassium upon it, raise the temperature then little above red heat, and, lastly, dip in the tempering tank. Cyanide of potassium may be used for case-hardening iron also with decided effect.

For the first time in the history of the Academy of Sciences, Paris places have been offered by the Government to selected members to take part on a diplomatic mission. That learned body has recently received a requisition from M. Ferry to appoint three delegates to the international commission which is to meet in Washington on the 1st of October next to determine the choice of a first meridian.

When transplanting the strawberry, an expert forbids the removal of the runners, and recommends leaving six inches of them attached to each side of the plant. The end of these runners are then to be bent down and buried with the roots. Plants thus treated are provided with means for drawing nourishment at once, and will thrive in adverse conditions which prove fatal to plants stripped of their runners.

In making the fluid extract and tinctures of cinchona, anemone flowers, &c., Mr. Alfred B. Taylor has found it especially serviceable to use a portion of the finished preparation from a previous operation to macerate and partially exhaust the drug before applying the new portion of the menstruum; and as there is no limit to the quantity of finished preparation that can be used when necessary, it is possible to exhaust completely the drug operated upon.

Prof. Thompson, in a recent lecture, informed his audience that the magnetic pole is now near Boothia Felix, or more than 1,000 miles west of the geographical pole. In 1657 the magnetic pole was due north, it having been eastward before that year. Then it began to move westward until 1816, when the maximum was reached. This is now being steadily diminished, and in 1976 it will again point due north. Prof. Thompson says that the changes which will have been observed not only on the direction, but in the strength of the earth's magnetism, will show that the same causes which originally magnetized the earth are still at work.

For making leather waterproof the following receipt has been printed: Twenty-four parts oleic acid, 18 ammonia soap, 24 water, 6 raw stearic acid, and 3 tannin extract are thus incorporated. The oleic acid is first melted with the raw stearine, then the ammonia soap is added, afterward the tannin extract, and finally the water. The ammonia soap is obtained by treating oleic acid with ammonia until the smell of the latter is not perceptible after a prolonged stirring. By adding to the whole mixture a solution of two parts copper in six parts of water a deep black color is secured, admirably adapted for dyeing shoe leather.

The instantaneous photographs taken of various animals in motion have received marked attention from the Berlin Physical Society. It was seen on examining the several photographs separately that the conventional and customary representations of moving animals produced by artists were

not always correct, and some of the pictures as photographed seemed to be impossible. A whole series of views of the different positions assumed by the horse when trotting, on being looked at through the stroboscope, gave instant proof, however, of their fidelity to nature. These achievements of Mr. Maybridge, of San Francisco, in photography have won for him a deservedly high European reputation.

Hitherto it has puzzled eminent surgeons to account for sudden death caused by apparently inadequate wounds in the heart, such as those made by the prick, without penetration even of a needle. Herr Schmey, a student of the Physiological Institute, Berlin, has, however, just discovered that when a needle pricks a certain small spot on the lower border of the upper third of the septum cordis, quite instantaneously the movements of the heart are arrested and forever motionless in death. "It is now the task of anatomical investigation," says Prof. Kronecker, who verified the discovery of his pupil, Herr Schmey, and communicated it to the Physiological Society of Berlin, "to demonstrate with accuracy this vital centre, the existence of which has been proved experimentally."

Flints, including chips and cores and a large tomahawk weighing four pounds, from Utah, collected by Dr. H. B. Guppy, of the British Government vessel *Lark*, were lately exhibited and described by Dr. Liversidge before the Royal Society of New South Wales. Dr. Liversidge remarked that some years ago Mr. Brown, the Wesleyan missionary, brought from New-Britain a soft white limestone which was quite undistinguishable from chalk, not only physically but chemically, and pointed out that this discovery of flints afforded another very strong proof of the probable presence of true chalk of cretaceous age in the South Sea Islands. The flints which were shown before the society possess all the characteristics of those from the chalk of Europe, and can not by mere inspection be distinguished from them.

English Preachers.

Canon Liddon and the Bishop of Peterborough stand out as unquestionably the two finest preachers of the Established Church. There is a story of a private soldier having gone to St. Paul's on an afternoon when Dr. Liddon was to preach. The printed paper with the hymn was handed to him, but not understanding that it was offered gratis he refused it with a shake of the head, saying: "You don't suppose I should be here if I had got any money?" Most of the people who go to hear the eloquent Canon are different from this soldier, for they would pay—and very liberally—to get seats near the pulpit. On the afternoons of the Sundays when Dr. Liddon is in residence, the cathedral presents an extraordinary sight with its huge nave aisles densely thronged. So far as the preacher's voice will reach, people stand, straining eyes and ears, and fortunately Dr. Liddon's voice resonates well under the dome, though now and then it becomes indistinct through the preacher's speaking too fast in his excitement. Two other things occasionally mar Dr. Liddon's delivery. Shortness of sight makes him often stoop to consult Bible or notes, and again he bows the head in a marked manner when he utters the holy name, but when he thus bends he goes on speaking, so that his words fall on the pulpit cushion and are deadened, which produces upon people who are at some little distance off the effect of continual stoppages and gaps in the sermon. No other defects besides these, however, can be noted in orations which for beauty of language, elevation of thought, and lucidity in reasoning could not be surpassed. We have heard Dr. Liddon many times at Oxford and in London, and have observed that the impression produced by his eloquence was always the same, no matter who might be listening to him. We remember in particular, a sermon of his on the text, "The kingdom of God cometh not with observation." It was absolutely magnificent to hear him prophesy the gradual progress of the world toward a higher state. Every man, from the greatest to the least, was made to feel his share of the responsibility in advancing or retarding the evolution of mankind, and while the consequences of evil were pointed out as extending to incalculable lengths, there was a sublime hopefulness in the promise that the smallest good offering brought to the Creator would be multiplied by him as the "five loaves were multiplied."

Australian Defences.

The area of South Australia is so great, and its population and resources comparatively still so undeveloped, that no attempt to defend the country districts or the numerous small towns on the sea-board can at present be contemplated. The heart of the country beats in Adelaide, which is at once the seat of Government and the repository of the national wealth. It is estimated that once in the hands of an enemy the sum of £5,000,000 sterling could be levied from it in a few hours, by placing Government's banks, and private individuals, alike, under rigorous contribution. The whole duty of local defences has been thrown upon the colonists themselves. Under no obligation to the Imperial Government to protect themselves, bound by no tie of federation to intercolonial uniformity of action, and imbued with a touching belief in the ubiquity and omnipotence of the British fleet, the different Australian Governments drifted on vaguely for several years. This state of apathy was rudely dispelled by the Russo-Turkish scare of 1877, when the Antipodeans suddenly awoke to their defenceless condition. Soldiering is very popular in South Australia. There is a steady and ever-increasing flow of recruits into the ranks of the Militia, so that, notwithstanding a severe medical examination, the inevitable waste is amply provided for. About 30 per cent. of the time expired men re-join for a second term of three years, for which they receive £1 bounty. Many more enrol in the Reserve, where they annually attend twelve drills and fire through their classes to keep up the knowledge acquired with the colors. Between Militia and Volunteers about three thousand men have passed through the ranks, and are now more or less trained to the use of arms; they form a considerable, though unenclosed, reserve upon whom it would be safe to rely in case of emergency. The rising generation are also being steadily drilled at the State (Anglican School Board) schools throughout the Colony. All teachers have to pass in company drill before appointment, and so well do they train their boys that more than once six or seven hundred lads, collected from various schools, have been marched on to the parade ground and have gone through a long battalion drill with great success. Throughout the force the *physique* is excellent. The infantry in height, build and age, are decidedly superior to the line regiments of the present day, and the Artillery can hold their own with their brethren at home.

Of the remarkable loyalty and affection for the Old Country which prevades not only the South Australians, but all the Australasian troops, we will give one instance. Within four hours of the arrival in Adelaide of the news of our defeat at Majuba Hill three hundred men from the small defence force, we have been describing, had volunteered for active service in the Transvaal, "to help our chaps against the Boers." The offer had already been telegraphed home when the other colonies hearing of it, instantly began to follow suit, and in twenty-four hours 2,000 sturdy Australians had placed themselves at the service of the Home Government, eager to help to avenge the honor of the British flag. It is greatly to be hoped that the colonies will lose no time in federating for military and naval purposes.

At present each member of the Australasian group works independently, without concert with her neighbors—a state of things which in time of peace is expensive, and in time of war might become dangerous. Even more pressing is the necessity for establishing a colonial government manufactory of small-arm ammunition in some central locality, whence the magazines could be replenished without need of constant application to the British authorities.

Out of the population, which we may roughly estimate at 2,900,000, there are more than 16,000 men who voluntarily undertake military duties. The capital sum spent, or about to be spent, on permanent fortifications since 1877 (without reckoning naval defences) amount to a million sterling; while the estimated annual military expenditure is calculated at £272,000. In the face of these figures no one can accuse the Australian colonists of too exclusively relying on Imperial protection in case of war.

A Forfar bailie, being told recently that he was ambiguous, declared that the charge was false, as he had not drank anything for years.

The Honolulu Fish Market.

A visit to the fish market of Honolulu on a Saturday afternoon, Winter or Summer, (for there are no seasons here, remember,) is a sight seldom elsewhere to be met. Situated on the street lying beside the still surface of the bay, it seems as if the fish had only to be angled for with the fingers from the piers in order to be caught, cleaned, sold, cooked, and eaten. Every variety of fish affords to be seen in this market, pre-eminently the nutritious mullet. Fish-wives, fish-husbands, and fish children barter the scaly merchandise from stalls or counters covered with fish and specie. Nowhere else that I know of could vendors leave in parallel piles upon their tables with impunity gold and silver coins often amounting to scores of dollars. A good deal of chatting, joking, and bargaining accompany proceedings in this place of trade, the picturesque natives preponderating both as buyers and sellers, while all around is life, noise, flutter, and business eagerness. The scene reminds one of the Neapolitan fish market in the square where Massaniello organized his popular uprising and revolutionary revolt—that bold fisherman, king of but three days' reign. Fish is a favorite food of the Hawaiian at all times, which, with a bowl of *poi*, makes up his usual meal. Shellfish, shrimp especially, are sold for salads *a la mayonnaise*, but there is no native edible oyster. The oyster of the Pacific, anywhere I have ever been, even on our California coast, in no wise equals our Atlantic Bay Points, Chesapeake, or East River bivalves, either as regards size, flavor, or subsequent epicurean satisfaction.

The Unexpected Visitor.

The uninvited visitor drops upon us at most inconvenient times and seasons, quite a matter of course, like a poor relation, and proceeds to make herself too cozy at home without more ado. Naturally we do not expect any great amount of diffidence on the part of a person who is bold enough to intrude upon the privacy of another without special request, and we are therefore but little surprised when we find her investigating the upper story of the house, or devising means for invading the rooms that have been closed to her, or interviewing the servants; when she demands cables not upon the table, and tells us about the luxurious surroundings of her last house; when knowing the breakfast hour, she willfully lies in bed till that meal is spoiled, till all the delicacies prepared for her delectation have lost their relish and become indigestible; when she is impatient if so nothing is not being done for her entertainment; when she complains of the temperature of the dining room in warm weather, and the torment of the flies, the persistence of the mosquitoes, without seeming to realize that they are annoyances to which she has voluntarily subjected herself; or when she is curious about our work. At the same time that she aggravates us with her peculiarities, her audacities interest and amuse us; we find ourselves wondering what she will do or say next, and if she has exhausted her impertinences. And her peculiarities afford a constant theme for mirthful thought long after she has left us.

Selling Eggs by Weight.

There is from twenty to thirty per cent difference in the weight of eggs, yet the custom is almost universal in the Eastern markets, of selling them by the dozen at a uniform price. Even ducks' eggs, which are much larger, and by some regarded as richer, bring no more than the smallest hen's eggs of not half the weight. In California, eggs, fruits, and many other articles that are here sold by the dozen, the bunch, or by measure, are sold by weight. The practice is a good one and works beneficially for a parties especially for the producer. It operates as a premium upon the cultivation of the most productive varieties of fruits, vegetables, and farm stock. The farmer, who is painstaking with his poultry and gets the largest weight of eggs, has a fair reward for his skill and industry. The present custom is a premium to light weights, and good layers. We need a change in the interest of fair dealing in trade, and, if necessary, it should be enforced by legislation. If the legislature is competent to fix the weight of a bushel of corn or potatoes, it can easily regulate the weight of a dozen eggs, and thus promote justice between buyer and seller.

A hearty meal taken while excessively fatigued has often destroyed life.