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SCIENTIFIC AMERICAN SUPPLEMENT

No. 644.

For the Week Ending May 5, 1888.

Price 10 cents. For sale by all newsdealers.

PATENT TRICKS—OLD AND NEW.

When an inventor receives a patent, his name is immortalized in the *Official Gazette*, and he immediately becomes the object of attack from a horde of hungry aspirants for money, among whom are ex-clerks, patent brokers, and pretended patent lights of varying degrees. The patentee is deluged with circulars and letters from this class of gentry. Some write to inform him confidentially that his patent is good for nothing; but on receipt of a certain fee they will set it right and make it sound as a silver dollar. Others pleasantly inform the new-fledged inventor they have read his patent with great pleasure, consider it to be a very valuable invention. If properly introduced, much money can be soon realized. The State of Iowa, they say, is worth $50,000, Ohio $45,000, Pennsylvania $65,000, and so on. All that is necessary is to print some circulars and do a little blowing, which the broker generously offers to do on receipt from the inventor of ten to fifty dollars cash in advance. Another writes to say he has an actual offer of $10,000 for the patent for Canada, provided the patent is at once taken, which he will procure on receipt of the necessary money. It is almost needless to suggest these schemes are designed to fleece the inventor. The so-called patent sellers rarely effect a *bona fide* sale. They depend upon the advance fees obtained as above for a livelihood. Some of them have thus grown rich and prosperous.

These pretended sellers try to make it appear they are reliable by giving respectable references, and cite names of patentees for whom they purport to have sold patents. One mode of procuring these references is as follows: They write the patentee they have a customer who will buy a county right in Minnesota for $500, and pay by deeding 25 acres of land in Arkansas, really worth $1,000, but the parties are so anxious to obtain the patent right they are willing to let the land go and take the right, in settlement, provided $50 cash is paid and a mortgage is given for $500. This done, the patent broker closes the transaction, receives the $50 cash, which is the full value of the land, also receives a mortgage for $500, together with the patent deed. At the same time the broker is careful to obtain a written certificate from the inventor stating, "I take pleasure in saying that X. Y. Z. & Co. have sold a patent right for me, at my price, and on terms satisfactory, and I recommend them," etc. In this way references are secured which make quite an impressive show on circulars, while the inventor is so ashamed of having been so easily duped, he keeps mum.

One of the latest tricks is the following: The patentee receives a letter from A. & B. asking for how much he will sell his patent for such and such a State. He replies, giving a price, say $5,000. The patentee soon after receives another letter from X. Y. Z., saying that A. & B. write they have corresponded with you, and now say they have decided to purchase the patent on the terms named, provided the title and claims are found to be correct. To ascertain this, they require that X. Y. Z. shall examine and report upon the patent, otherwise A. & B. will not purchase; that if the patentee wishes to complete the sale, he must remit fifty dollars to pay for the examination, which is a work independent of the sale, and must be independently paid. The inventor sends the money; a report is made adverse to the patentee; no purchase is made; none was ever intended. Such are a few of the adroit schemes now in vogue for swindling "innocent" inventors.

Bills have been introduced in Congress to protect innocent purchasers of patents, *i. e.*, infringers. Might it not also be well for somebody to formulate a law to protect innocent inventors?

THE BOARD OF HEALTH AND PRIVATE STABLES.

Until quite recently, it has been almost the universal custom for owners of private stables in this city to have, outside the walls of the building, a cemented brick vault with a wrought iron cover, for the refuse of the stable. The contents of this vault were carted away once or twice a week. And this was considered not only the most convenient way of disposing of the manure and litter of the stable, but in a sanitary sense the most desirable, as all emanations from the inclosure were dispelled in the open air. But about one year ago, our Board of Health (in its wisdom?) passed a resolution requiring the vaults outside of stables to be permanently closed. Notices were accordingly served upon the occupants of stables to empty, disinfect, and close the manure vaults, so there shall be no access to them from the outside. Forming part of this notice was a clause stating that, failing to comply with the requirements set forth, within five days, legal proceedings would be commenced to enforce the ordinance, the penalty for non-obeyance of which, we have since learned, is $50 and costs.

Our health board is undoubtedly one of the best administered departments in the city. Nevertheless, we cannot but think it has made a serious blunder in passing its resolution of March 2, 1887, suppressing the outside manure vault of private stables, especially if the measure was adopted for sanitary reasons, and we are reluctant to believe the commissioners had any other motive.

The result has been that the short time allowed for closing these objectionable out of door pits, and providing other receptacles inside, without incurring a penalty of $50, and probably as much more for costs, induced the occupants of the stables receiving the notices to scurry about and provide wood boxes which must be kept inside the walls, without any regard for the comfort, convenience, or health of the occupants.

Most private stables in this city have convenient apartments for the coachman's family, which is largely composed of young children, whose health must be jeopardized by inhaling, night and day, the steaming, odorous atmosphere which always emanates from the manure and bedding of the stable, but which has heretofore been stored outside the building.

We would recommend the health board, as the warm season is approaching, to look into the matter, and see if it did not make a mistake in passing the resolution preventing the use of out of door manure pits, and its rigorous enforcement, and if it would not be wise to rescind that ordinance at once and institute in its place as a sanitary measure a resolution *requiring* the refuse of stables to be deposited outside the walls. And might it not properly go so far as to require that it shall be deposited in brick or stone lined vaults, secured with iron doors, as formerly used, and to which plan we have never heard any objection advanced?

The following extracts from the *Monthly Bulletin* for February, issued by the Iowa State Board of Health, bears somewhat on this subject. It may be well for our health board to procure a copy, and read the entire report:

We had an experience a few years ago that led us to the conclusion that stable manure—especially the straw and litter from horse stables—was specially adapted to the reception and propagation of diphtheria germs under favorable circumstances. We were then county physician, and had charge of the county jail. In the south end of the court house, in the basement, the jailer, with several children, lived. East and a little north from the jailer's quarters was located a fountain with a basin perhaps four feet in depth and thirty feet in diameter. This, in the fall, was filled with straw and horse manure to prevent the freezing of the pipe, the water having been turned off. In the latter part of the winter, or early spring, spontaneous heat was generated. Steam and a very offensive odor were generated, and the wind being largely in the east was carried into the living rooms of the jailer and through the cells. After this had continued three or four days, diphtheria of a most fatal and malignant type broke out in the jailer's family. There were two or three deaths, and almost every member of the family was more or less affected. Quite a number of the prisoners also had diphtheritic exudation upon the tonsils, and there was a general condition of debility and prostration. At the time we believed the exhalations from this manure pit were the cause of the sickness, and we have believed it ever since. The *Medical News*, January 21, 1888, contains, on page 82, an article confirming our opinion. It is as follows: "A writer in the *British Medical Journal* of December 17, 1887, remarks that the works of Klebs, Ferrand, and others show that straw and manure heaps play a considerable part in propagating diphtheria. An army surgeon has tried to prove by statistics to what extent these statements are reliable. He has collected the following facts: In the French army, diphtheria causes three times as many deaths in cavalry regiments as in the infantry. This affection is most prevalent in the cavalry barracks in Paris, which are in the vicinity of stables belonging to Paris omnibus companies, and near a large depot for manure. In the German army, the same proportion exists, there being three more deaths from diphtheria in the cavalry regiments than in the infantry," etc.

Another Timber Raft.

Mr. Leary, the log raft champion and promoter, is, according to the *Timberman*, rapidly consummating his plans to make another attempt to stem the tide with a timber raft from Nova Scotia to New York. His raft is being built in the shape of a ship, with six masts and a large spread of canvas. This is merely a readoption of the principle on which timber rafts were built in Maine half a century ago, and sailed across to England. The voyages were uniformly successful, only one being lost; but the exposure and sufferings of the crew were so severe that this plan of transporting timber was finally abandoned because seamen would not risk their lives across the Atlantic. Mr. Leary expects that his new raft, which will be a solid mass of logs chained and spiked together, in the crude shape of a vessel, will be ready to launch by August.

A Remedy for Bedbugs.

A correspondent writes to the *British Medical Journal* as follows: "The best remedy for bugs in hospitals is a bug trap made by boring a series of holes in a piece of wood with a gimlet, and placing this under the mattress of each cot. The piece of wood is to be placed periodically into a basin of boiling water. This is an Indian hospital plan."

Engineering in Japan—the Kioto-Fu Canal Works.

Since 1869, when the central government was transferred to Tokio, the city (old capital) of Kioto began to decline. In order to recover and to flourish the city, Governor Mr. Kitagaki planned a work of constructing a canal from the lake of Biwa to the city of Kioto, the main objects of which are: 1. Creating an amount of mill powers for city manufactures. 2. Opening of a route of canal navigation from lake Biwa (500 sq. miles, 280 ft. above sea, and 30 miles from sea) to Osaka Bay (a commercial center) through Kioto. 3. Irrigation of neighboring rice field. 4. As a source of water works, such as water supply, sanitary works, etc.

Accordingly, an accurate survey of the district began in 1881, and the route and estimate of the canal works were settled in 1883.

In November, 1883, a consulting meeting was held, and upward of sixty chief citizens who were present all agreed to the proposed plan of the governor.

In 1884, city assembly was opened to discuss and decide the matter.

With the agreed decision of the assembly, the governor asked central government for the permission of actual undertaking, the permission of which was given in January, 1885.

Canal works office was accordingly made up, consisting of engineers and clerks. In March, 1885, actual setting out of center line was commenced, the route of which is as follows:

a. Intake—Land reclamation with excavated debris, dredging, breakwater, etc. Quantity of water 300 cu. ft. per sec. Velocity of water about 3 ft. per sec.

b. Open Canal—Width 28-19 ft., depth of water 5 ft., length 592 yards, with a regulating lock at center. Completed.

c. Tunnel No. 1—Passes through range of Nagarayama. Nature of rocks met with were clay slate, hornstone, sandstone, and quartz porphyry. It is 14 ft. high, 16 ft. wide, 6 ft. deep. Length 2,672 yards, with a working shaft 146 ft. deep at a point 807 yards from the west entrance. Shaft sinking commenced October, 1885, reached tunnel in March, 1886. Works from western entrance commenced March, 1886, and met exactly with heading from the shaft in July, 1887. Works from eastern entrance commenced September, 1886. At present about 1,950 yards already excavated, and to be completed till November, 1889. The tunnel is worked by Belgian system. Slope 1 in 3,000. *Longest tunnel in Japan.*

d. Open Canal—Through Yamashina district with cuttings and embankments, something like open canal *b*, slope from $\frac{1}{2000}$ to $\frac{1}{3000}$. Almost completed.

e. Tunnel No. 2—Passes through a hill at Yamashina, 140 yards long. Completed.

f. Open Canal—Just like canal *d*. Length, together with *d*, is 4,500 yards.

g. Tunnel No. 3—Passes through Hino-oka range. Nature of rocks met with are clay slate, sandstone, and diorite. Commenced March, 1887; to be completed April, 1889. Length 912 yards. Section and slope is same as tunnel No. 1.

h. Open Canal and Dam—Length 300 yards. Already completed.

Here the canal is divided into two:

Main Canal for Navigation.

i. Canal Incline—Length 600 yards. Slope 1 in 15. In construction.

j. Open Canal—Length 2,000 yards. 60 ft. wide, 5 ft. deep. Level.

k. Kamagawa and Takasegawa Junctions—A regulating lock just same as the entrance lock is to be constructed here. From this point to Osaka Bay is navigable now.

Total length 12,000 yards.

Total work will be completed in November, 1889.

Branch Canal for Water Power, Irrigation, etc.

1. *Tunnel No.* 4—150 yds. long, 8 ft. dia. Completed.
2. *Open Canal*—300 yds. long, 8 ft. wide.
3. *Aqueduct*—300 ft. long. Made up of 13 series of brick arches.
4. *Open Canal*—550 yds. long.
5. *Tunnel No.* 5—200 yds. long. Same as tunnel No. 4.
6. *Open Canal*—Width 20 to 30 ft. Slope 1 in 3,000. Length 10,000 yards.
7. *Kogawa Junction*—Kogawa is an old canal.

Slope from 1 to 5 is $\frac{1}{127}$.

Of the total estimate, which amounts to $1,250,000 (actual amount will be something less), annual estimate of the sum to be spent for coming year is discussed and decided by city assembly, with approval of governor, and actual calculation of past year is then reported to the assembly.

City assembly consists of twenty representatives, of which seven serve as committee for one year, and works in detail are submitted to them.

Of the total sum of money, about a quarter came from central government, and a third from public property (given from Mikado in past year) of inhabitants of Kioto, and remaining sum, amounting to about five hundred thousand dollars, is to be directly or indirectly imposed, partly upon number of houses, and trade and land taxes of Kioto inhabitants (250,000 in number).

TANABE SAKURO, M.E.,
Engineer in Chief, Kioto-Fu Canal Works.
Kioto, February, 1888.

A Submerged Forest.

During the late violent storms in the Channel the sea washed through a high and hard sand bank near the Isle of St. Malo, France, nearly four meters thick, laying bare a portion of an ancient forest which was already passing into the condition of coal. This forest at the beginning of our era covered an extensive tract of the coast; but with the sinking of the land it became submerged and covered up by the drifting sand. Mont Saint Michel once stood in the middle of it. The forest had quite disappeared by the middle of the tenth century. Occasionally, at very low tides after storms, remains of it are disclosed, just as at present. It is believed that some centuries ago the highest tides rose about 12 meters above the level of the lowest ebb. Now the high water level is 15·5 meters above the lowest.

Coral Reefs and Islands.

A lecture was recently delivered by Mr. John Murray, at the Royal Institution upon "The Structure, Origin and Distribution of Coral Reefs and Islands." One of the most important of oceanographical facts, the lecturer remarked, is the continual struggle being carried on beneath the sea between vital and chemical forces. The sea water is continually dissolving calcareous *debris*, the extent of solution varying with the temperature, pressure, amount of carbonic acid gas held in solution, and other local conditions. On the other hand, coral reefs, although principally formed of dead organisms, are covered externally, especially on the seaward side, with myriads of mouths continually employed in extracting carbonate of lime from the sea water.

The organisms by which the absorption of this carbonate is effected furnished what Mr. Murray termed "the most gigantic and remarkable accumulation of organic life upon the face of the earth." The lecturer therefore pointed out that the best method of arriving at an accurate conclusion concerning the vexed question of the formation and distribution of coral reefs and "atolls" would consist in making an elaborate study of the various influences exerted in the struggle of solution *versus* secretion by all the naturally occurring phenomena. Mr. Murray consequently illustrated his lecture by a series of photographic slides, recording miscellaneous observations made upon the subject during the expedition of H. M. S. Challenger. In this way he first showed the irregular configuration of the sea bottom, drawing attention to the numerous dome-shaped expanses reaching comparatively near to the surface, and also to the geological structure of the islands in midocean, rising like mountain peaks from the ocean bed. Among the more important circumstances tending to control the conditions of pelagic life, the lecturer mentioned the influence of prevalent winds, and also the ever-varying composition of sea water.

Thus the prevalent winds of the tropical oceans cause the warm surface water to be continually driven westward, with the result that the waters on the eastern coasts of continents are considerably warmer and better adapted for the sustenance of polyps than on the western coasts. Coincident with, if not a consequence of, this result, coral is generally found in very great abundance on the eastern coasts of continents, and but rarely on the western. The composition of sea water is not only affected by the amount of the constituent salts held in actual solution, which usually bear a mutually constant ratio, but is also considerably modified by the presence or absence of minute calcareous or siliceous organisms. These remain near the surface during the night and in calm weather, but while the sun is hot or rough weather prevails they sink to a depth of from 80 to 100 fathoms. In such enormous numbers do these organisms exist in tropical seas that Mr. Murray computed that a mass of sea water with a superficial area of one square mile and a depth of 100 fathoms would yield 16 tons of carbonate of lime, while he estimated that the total amount held both in suspension and in solution reached the almost inconceivable amount of 628,340,000,000,000 tons.

As all these organisms sink to the bottom after death, they give rise to enormous calcareous and siliceous deposits, and, therefore, the next point to which the lecturer directed attention was to the nature of deposits on ocean beds at different depths. The objects of most general interest found in deposits at great depth are the ear bones of whales, the remains of sharks' teeth, and sponges, which are all usually found in manganese nodules.

The larger bones of the cetaceans, Mr. Murray said, do not appear to resist solvent action so well, while of the sharks' teeth only the dentine generally remains. Shells of any size do not appear among the deposits until much shallower depths are reached, while the depths at which reef-building animals appear vary from 5 to 50 fathoms, according to the temperature and supply of food. The lecturer remarked that the reef-building animals are not absolutely confined to the few species to which naturalists attribute the formation of coral, while single polyps have been observed to attain a diameter from one-eighth of an inch to a foot or more under favorable conditions. Naturally the polyps on the outside of the reef procure the best food, and this is especially the case on the windward side of the reef, while the water reaching the interior is much poorer in carbonate of lime, and consequently possesses less nutrient value and a higher solvent action.

Based upon these observations, Mr. Murray suggested a theory antagonistic to the generally accepted one of Mr. Darwin, which, he reminded his hearers, referred the formation of reefs off the mainland, and also of the lagoons of atolls, to the subsidence of the intermediate ocean bed, presumably of volcanic origin, which had also been equally covered with coral. The lecturer, however, said he considered that reef formations start from a central mass, and, in accordance with the inferences deduced from observation, increase on the exterior side, owing to the better supply of food, while the interior becomes more or less dead, and is gradually dissolved away by water reaching it from which a large proportion of the carbonate of lime it is capable of holding in solution has been removed by the living polyps on the exterior of the reef. In this way a continually enlarging hollow circle of reef would be formed, and would account for the regular circular formation of the Minerva and similar reefs. Irregularities might arise, Mr. Murray said, from either currents or prevalent winds providing one part of the reef with a better food supply, and so insuring a faster growth, or else the reef may have been formed by encircling a number of smaller reefs, which would account for the projections of coral in the lagoons in some atolls. By a number of photographs of coral islands Mr. Murray showed that the general appearance and growth of vegetation on these islands are quite compatible with this theory. The exterior portion of the reef is always rough and barren, while the vegetation grows down to the water's edge, and even into the water, on the lagoon side. The coral island naturally does not reach more than four or five feet above the surface of the water, but the height of the island may be increased by volcanic forces raising it up, or by the accumulation of "blown" sand and rock upon it. The lecturer considered that the Bermudas, although attaining an elevation of 200 feet, have been formed from coral islands by the latter method.

The Simonds Metal Rolling Machine.

In this week's issue of the SUPPLEMENT we give a very fully illustrated article on this remarkable machine, which is the invention of Mr. George F. Simonds, of Fitchburg, Mass. We have before us some of the specimens of work done by this machine, and the range already covered is from a shoe calk for lumbermen's boots to a car axle. The most beautifully finished specimens of work accomplished are the steel balls, of which any number of sizes are produced, and these are perfect spheres, and are made with great rapidity, one machine, attended by two workmen, having a capacity of 850 solid two inch steel balls a day. During a recent visit to the works in Fitchburg, Mass., we were shown several of these machines in operation on all sizes of work, the most interesting operations being the rolling of threaded chair screws and solid steel balls. There is practically no waste, as only enough steel is used by the machine to complete the article, and this process bids fair to supplant many where drop forgings were used. The experimental works of the company are at Fitchburg, Mass., but plants will shortly be established in all parts of this country.

Gen. Quincy A. Gillmore.

Major-Gen. Quincy A. Gillmore, distinguished as a soldier and civil engineer, died at his home in Brooklyn, on Saturday, April 7, 1888. He was born at Black River, Loraine County, O., February 28, 1825. He entered West Point, and graduated therefrom in 1849, standing high in the class. He was assigned by virtue of his class rank to the corps of engineers. After assisting in the construction of Forts Calhoun and Monroe at Hampton Roads, he returned to West Point, and from 1852 to 1855 acted as assistant instructor in military engineering. He served through the war with high ability, receiving the title of major-general of volunteers for meritorious work done against Charleston with the tenth army corps, then under his command. His other services during the war were numerous. At its conclusion, he accepted the charge of the division of the South, and after receiving the regular commission of major-general, he resigned in 1865 for the purpose of pursuing the profession of engineer. Both for the government and for corporations and municipalities, his services have been in great demand. His work on cements and mortars is one of the classic books of the profession. Among his more recent engagements may be mentioned his connection with the Kings County Elevated Railroad. This road, destined to do so much for the city of Brooklyn, was on the point of completion at the time of his death. He was the engineer of the company. He was also one of three commissioners appointed to examine the new Croton aqueduct. He leaves a wife and four sons.

Utilization of Drill Holes.

A novel method of conveying power to mines is described in a recent number of the *Colliery Engineer* as being in use at the Shenandoah mines, Pennsylvania, in which, as the lower level of the Mammoth seam had been, in 1883, nearly worked out, it became advisable to develop new workings. To convey power to these, an 8 in. hole was drilled from the surface to the seam, a depth of 244 ft., and when finished this hole was lined with a $5\frac{5}{8}$ in. casing pipe, through which was passed a $\frac{7}{8}$ in. steel wire rope, transmitting the power required for hauling purposes below. A second borehole, 6 in. in diameter and 118 ft. deep, was also put down, and through it was passed two 2 in. pipes to be used as a speaking tube and for a bell wire, to permit of communication between the engine house and below ground.