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NEW YORK, SATURDAY, MARCH 27, 1880.

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SHIP RAILWAYS FOR ISTHMUS CROSSINGS.

The superior advantages of a ship railway for the Isthmus of Darien were considered at some length in the SCIENTIFIC AMERICAN for August 2, 1879, in connection with a forcible paper on the same subject by Captain Eads. Attention was then called to the fact that this distinctively American plan of solving the isthmian difficulty had commended itself to American engineers long before the success of the Suez Canal gave a speculative impetus to canal projects for uniting the great oceans by way of Central America.

And now that M. de Lesseps is urging so vehemently his scheme for a sea-level canal at Chagres, the ship railway project has again risen to prominence. This not solely because of the theoretical favor it commands from capable engineers, but also because of the practical commercial interest called out by the bill before Congress, looking to the actual construction of a ship railway across the Isthmus, and its ultimate control by the United States.

In the current issue of the SCIENTIFIC AMERICAN SUPPLEMENT will be found an extended reply by Captain Eads to the argument of M. de Lesseps, before the House Canal Committee, in favor of the Chagres canal, and a clear statement of the advantages of a ship railway instead. Captain Eads maintained that a substantial and durable ship railway could be built at half the cost of a canal with locks, and a quarter of the cost of a tide-level canal, with a saving of from two-thirds to three-fourths the time required for constructing a canal. The railway would have the further advantage of capacity to move ships of maximum tonnage four or five times faster than would be possible in a canal, thus allowing many more ships to pass each way in a given time; while the cost of maintenance and operation would be less than with a canal. With this superior capacity for meeting the varying demands of commerce, both as to the size and the number of the vessels transferred from ocean to ocean, a ship railway can be built and operated where a canal would not be possible; and, being above ground, it is possible to estimate with great accuracy what it would cost and how long it would take to build it. A canal, on the contrary, is strictly a hydraulic construction, involving the control of water and the execution of works under water, with liability to irruptions of water, making an accurate estimate of the time and cost of construction an impossibility.

Captain Eads illustrated his plan to the House Committee by means of drawings. The proposed railway led into the water to the depth of 30 feet, along an incline having a grade of 1 in 100; a cradle being thereby submerged for the reception of the ship to be transported across the Isthmus. The railway consisted of 12 steel rails, weighing 70 lb. to the yard; the wheels under the ship's cradle being 3 feet apart and bearing a maximum pressure of 5 tons, with capacity to withstand a pressure of 20 tons. The number of rails and the great weight of the ship, he insisted, would make derailment impossible; and the great number of wheels under the cradle would so equalize the oscillation that there would be no perceptible motion in the ship's cabin. Touching ability of ships to withstand the strain of land transportation, Captain Eads said that any vessel thought capable of withstanding the gales and hurricanes of the Atlantic and Pacific oceans, was capable of being carried on this railway with absolute safety—indeed, with as much safety as a child in its mother's arms. His plan had been received with favor by Mr. E. J. Reed, the Chief Constructor of the British Navy; Mr. John Roach, Mr. Henry Steers, and a great number of the most eminent engineers of America.

As in the case of his successful improvement of the mouth of the Mississippi River, Captain Eads proposes to assume all the risk. Having demonstrated the practicability of a ship railway for the Isthmus, by transporting thereon a vessel of maximum tonnage from ocean to ocean, he asks, in the bill referred to, that the United States shall guarantee the payment of an annual interest of six per cent on the cost of construction, and acquire thereby the right to regulate the tariff of tolls.

The well earned reputation of Captain Eads as a practical and thoroughly scientific engineer, and the support he commands from engineers of high rank, furnish the highest assurance that the plan he proposes is feasible; and its manifest economy should have great weight in determining what kind of trans-isthmian route shall be adopted. If, at the cost of one canal, three or four railways of equal capacity can be built along as many different lines, it will be a queer commentary on American thrift and business capacity if M. de Lesseps persuades American capital to invest in his canal.

EVILS OF NEGLECTING COLD IN THE HEAD.

In a paper read by Dr. D. B. St. John Roosa of this city, at the recent meeting of the Medical Society of the State of New York, he stated that the most frequent origin of chronic diseases of the lachrymal passages, of the conjunctiva, and of the middle ear, is in a neglected "cold in the head." It is generally conceded that no person in perfect health, except under extraordinary circumstance, takes cold, and yet the majority of mankind have, at some time, suffered from cold in the head. The popular idea that a cold in the head is an insignificant affair is founded on the fact that most of the people recover to such an extent that they are able to go about afterward and engage in their ordinary avocations without special notice, at the time, of the consequences of the disease, which may even then be settled upon them. He believed that very many of the maladies which prevented men and women from reaching the allotted period of three score and ten have their origin in these colds;

and that many serious affections which act as an impediment to the success of their victim are dated from a cold in the head.

He described the suffering incident to an acute attack of cold in the head, and of the impossibility of having repeated attacks without producing serious local changes—not only local change, but a permanent impairment of nutrition. To correct all this, special attention must be paid to individual hygiene, and if the evil consequences of neglected cold in the head were to be abolished, the abolition must come through a public sentiment properly educated upon this as upon all other sanitary questions. The family physician must warn the people everywhere, as opportunity offers, of the danger in this direction, and of the means by which it is to be avoided. The first great precaution to be taken by each individual is to keep himself in a good general condition, and to do that he must studiously avoid all that tends to disorder the skin and the functions of all the organs of the body. Children must be clothed in flannel all the year round, and must be made to know that the staples of diet are milk, bread, meat, vegetables, and fruit, and that tea, coffee, and pastry of all kinds are to be used only as the greatest of luxuries, and therefore in small quantities and at long intervals. The community can only become healthy as individuals become healthy, and all the reforms necessary to make Memphis and Granada places in which yellow fever never comes may be adopted; but if the control cannot be obtained of the bodies of, and the modes of living of the individuals in those and all other places, evils not so suddenly fatal, but none the less in the end dangerous, and all the time injurious to their well being, will certainly exist.

A PLAN TO MAKE NEW YORK A FRESH WATER PORT.

Mr. James Cochrane, "formerly of the U. S. Navy," gravely proposes to convert New York harbor into a millpond, for the benefit of commerce and the improvement of public health.

His plan is not very coherently presented in the pamphlet he sends us, but it is possible to make out several of the changes he wishes to effect.

In the first place, he would build at the Narrows, and at Throgg's Neck, on the Sound, artificial dams with locks, which would shut out the ocean tides and convert the bay and the waters communicating therewith into a many-armed fresh water lake, with a level five or six feet above the present level of the water at high tide.

Among the benefits promised by the change are these:

The vast area of flats along the Jersey shores would be permanently flooded, putting an end to their malarious exhalations.

The depth of water could be regulated, and would be uniform, thus saving that portion of the large expenses involved in handling freight at the wharves, due to rising and falling tides.

The danger and cost of ferry bridges would be obviated, with much of the difficulty and danger now attending the navigation of ferryboats.

The water of the port would be fresh, and fatal to barnacles and ship worms, making the port a desirable one for shipping awaiting freight.

The flow of the river would be steadily toward the sea, so that the tedious anchor watch might be dispensed with.

The surplus water could be used as the source of mechanical power.

The aggregate saving promised for the plan proposed amounts to millions of dollars every year, and millions of lives in time not stated. But the greatest benefit is modestly withheld. In comparatively few years the vast areas of waste water from Newark Bay to Throgg's Neck would be filled up by river silt, and under proper cultivation would furnish all the garden truck required by the surrounding cities. The value of such reclaimed land would be enormous; while the narrow channels that would carry off the inflowing fresh water would probably be ample for the needs of all the commerce that would seek New York as an inland port.

A ZOOLOGICAL NOVELTY.

The first elephant born in this country made its appearance, March 10, in the elephant house of Cooper & Bailey's circus in Philadelphia. It was a female, 4 feet 6 inches long, 35 inches high, and weighed 213½ pounds. The event was not unexpected, though the period of gestation—twenty months and twenty days—was somewhat briefer than was anticipated.

The mother, Hebe, sometimes called "Baby," is one of the five performing elephants whose tricks have been witnessed by circus-goers in every large town in the country. She is 23 years old, weighs 8,000 pounds, and was imported from Ceylon in 1865. Her keeper suspected her condition over a year ago, called the attention of several Philadelphia scientists to the fact, and arranged for examination, which was made by Professor Joseph Leidy, of the University of Pennsylvania; Professor Penrose, of the University of Pennsylvania; Dr. Brinton, of Jefferson College; Dr. F. F. Maury (now deceased), of Jefferson College; Professor Allen, of the University of Pennsylvania; Dr. Henry Chapman (coroner's physician), of Jefferson College, and a number of other eminent physicians. It was then decided that the period of gestation would be complete about the middle of the present month. Naturally the event has not lessened the interest which physicians and naturalists have taken in the case, and it is probable that a paper on the subject will

be presented to the Academy of Natural Sciences of Philadelphia.

The mother and infant are both doing well, the latter sucking like any other mammal, folding its trunk back over its head, as described by all reputable naturalists. The birth of elephants in captivity is not an uncommon occurrence in India. Unfortunately no one appears to have been present to witness the accouchement.

CHEMICAL REPULSION.

In a paper read on the 13th of January before the Royal Society, Dr. E. J. Mills claimed to have discovered a new order of chemical phenomena, which he has provisionally designated as "chemical repulsion." If a thin layer of a solution of chloride of barium be distributed evenly between two plates of glass placed horizontally (excess being removed by pressing the plates together), and then dilute sulphuric acid be brought into contact with it through a perforation made in the upper plate, precipitation takes place and continues progressively and uniformly from the perforation as a center; forming an increasing circle, for instance, if the perforation be circular. If the sulphuric acid be introduced through two perforations in the upper plate, two circles are formed, but as their circumferences approach each other development is retarded between the perforations, the figure of advance being no longer circular, but oval, and, however long the experiment may be continued, there always remains a line of demarkation of "no chemical action" between the two figures. When there are perforations at the four points of a square and one in the center, the center circle, having, as it develops, no way of escape from the surrounding four, eventually forms a square figure bounded by repulsion lines. Dr. Mills considers that the phenomena observed afford proof of two propositions: (1) That chemical action can take place at a distance; and (2) that two or more chemical actions, identical except in position, completely exclude one another.

Statistics Versus the "Big Farm Scare."

A great deal has been said about the multiplication of big farms in this country, and doleful predictions have been uttered by those professing to believe that the United States are destined to repeat the experience of England and Ireland in the monopoly of the land by a few. That there is no real danger of such an issue is clearly shown by the following statistics, which the *Tribune* compiles from the several census reports.

In 1850 the average size of farms in the United States was 203 acres; in ten more years the average was four acres less, and at the last census a further reduction of 47 acres appeared, and farms averaged only 153 acres. The decline between 1860 and 1870 was so general that the only exceptions in all the States and Territories were—an increase in California from 466 to 482 acres, from 94 to 133 in Massachusetts, and from 25 to 30 in Utah. Prior to 1850 land monopoly had some claim to existence in California; in ten years the average size of farms was diminished by a reduction of just 4,000 acres! In Texas the reduction was in the first decade from 942 to 591 acres, and in the second to 301 acres. The next census is expected to show a further decline. Minnesota had 157 farms in 1850, 18,181 in 1860, 46,500 in 1870, and now claims more than 68,000, and her farmers are not much frightened in view of the competition of half a dozen "monster" wheat farms! There were 5,364 farms of more than 1,000 acres each in 1860; in 1870 there were only 3,720. In the same period the number from 500 to 1,000 acres declined from 20,319 to 15,873, while all the classes of smaller farms increased, the ratio of increase getting larger as the scale of size descended.

The Mind in Eclipse.

At a recent meeting of the Medico-Legal Society, in this city, Dr. George M. Beard read a paper on "The Problems of Insanity," in which he said: "It is a paradox of astronomy that the sun may best be studied during an eclipse; and in psychology the mind may be studied best when it is eclipsed."

"Insanity is a disease of degrees; there is no plain dividing line between sanity and insanity. Insanity may be divided into two kinds—intellectual insanity, embracing forms in which there are delusions, and emotional insanity, in which there are no delusions. Insanity is a barometer of civilization, and as we advance higher in the arts and sciences so will insanity become more prevalent among us. Intense application, brain work, and indoor life are the agencies which most frequently bring it about. With savages or barbarians there is little or none of it. The intellectual activity of the women of to-day is another great cause of insanity. What the mother is, so will the child be in an intenser degree."

"Insanity is increasing most perceptibly in Europe and America among the poorer classes. Civilization grinds hardest on the poor, shutting them up in close houses, with bad air and poor food, and compelling them to struggle for existence. The brain cannot always bear up under the strain, for they have few recreations and amusements which can be indulged in for the relaxation of their minds. A diagnosis in cases of insanity is most difficult. The physician must know the subject psychologically; know he thinks, what he thinks, and all about his general disposition, passions, etc. The probabilities of cure in the case of insane persons depend greatly upon the advancement of the disease when the treatment is begun. It is better if the patient can

be treated out of the asylum, and if he is not confined or isolated altogether from the world, narcotics and stupefying remedies should not be used when their use can be avoided. Until a comparatively short time our inventions have tended to an increase rather than to a decrease of insanity. Of late, however, the inventions have been in the opposite direction, tending to give us more ease and rest, as, for example, the telephone, elevated railroad, and the electric light. If the latter is perfected, it may also enable us to breathe a purer air. An improved system of education, with less 'cramming,' would tend to reduce the increase of insanity. The eclipse of the mind cannot be predicted like the eclipse of the sun, but, with study, men may learn to detect it in its first stages, and, if treated early, it need rarely become serious."

Artificial Diamonds at Last.

Professor Story Maskelyne, who examined Mr. Jame MacTear's presumed "diamonds," an account of which was published on page 88, present volume, has written the following letter to the *London Times* on those produced by Mr. Hannay:

"SIR: A few weeks since I had to proclaim the failure of one attempt to produce the diamond in a chemical laboratory. To-day I ask a little space in one of your columns in order to announce the entire success of such an attempt by another Glasgow gentleman."

"That gentleman is Mr. J. Ballantine Hannay, of Woodbourne, Helensburg, and Sword Street, Glasgow, a Fellow of the Chemical Society of London, who has to-day sent me some small crystallized particles presenting exactly the appearance of fragments of a broken diamond."

"In luster, in a certain lamellar structure on the surfaces of cleavage, in refractive power, they accorded so closely with that mineral that it seemed hardly rash to proclaim them even at first sight to be diamond. And they satisfy the characteristic tests of that substance. Like the diamond, they are nearly inert in polarized light, and their hardness is such that they easily scored deep grooves in a polished surface of sapphire, which the diamond alone can do. I was able to measure the angle between the cleavage faces of one of them, notwithstanding that the image from one face was too incomplete for a very accurate result. But the mean of the angles so measured on the goniometer was 70° 29', the correct angle on a crystal of the diamond being 70° 31' 7". Finally, one of the particles, ignited on a foil of platinum, glowed and gradually disappeared exactly as mineral diamond would do."

"There is no doubt whatever that Mr. Hannay has succeeded in solving this problem, and removing from the science of chemistry an opprobrium so long adhering to it; for, whereas the larger part of the great volume recording the triumphs of that science is occupied by the chemistry of carbon, this element has never been crystallized by man till Mr. Hannay achieved the triumph which I have the pleasure of recording to-day. His process for effecting this transmutation, hardly less momentous to the arts than to the possessors of a wealth of jewelry, is on the eve of being announced to the Royal Society."

"I am, Sir, your obedient servant,

"N. STORY MASKELYNE.

"Mineral Department, British Museum, Feb. 19."

Nashville's Centennial.

The hundredth anniversary of the settlement of the city of Nashville, Tenn., will be celebrated by the holding of an exhibition of the arts and sciences, beginning April 23 next and continuing until May 29.

The Citizens' Centennial Commission announce that active preparations are making for a first-rate exhibition, and that a wide-spread interest in the undertaking is already aroused, giving promise of a display which shall excel anything Nashville has seen before. The Exhibition buildings are in the heart of the city, easy of access, and amply provided with facilities for the display of manufactures, machinery in motion, inventions, works of arts, and natural products.

The reception of exhibits will begin April 5 and close April 22. Exhibitors of running machinery are requested to have their exhibits in place by April 17. Applications for space should be made to Mr. B. J. McCarthy, chairman of the committee on assignment, space, etc., and for general information to Dr. G. S. Blackie, corresponding secretary, Nashville, Tenn.

Manufacturers of articles finding or seeking a market in the South will find this a good opportunity for placing their wares before a large and thrifty portion of the Southern public. Nashville is not only an important railway center, but is in the heart of a region rapidly increasing in commercial and manufacturing importance. No premiums are offered, and there is no charge for space.

An International Leather Show.

An International Exhibition of leather and leather goods, furs and pelts, tanner's materials, shoe and leather machinery, and the like, is contemplated from May to November, 1881, at Frankfort-on-the-Main. The circular of the provisional committee states, that this exhibition is intended to bring together from all parts of the world all the different raw materials, and to show in successive stages the manner and means of their being manufactured and adapted to the wants of man. It will show how art and science and labor and capital have been constantly and quietly working

for the advancement of civilization in this industry, fully as much as in any other.

Frankfort-on-the-Main has been selected as the central city of Germany, and a committee composed of prominent men in the principal industries, with men of science and art, will do all they can to make it a most complete and successful exhibition.

Steam Dredges Wanted for Erie Canal.

State Engineer, Horatio Seymour, Jr., reports the serious filling up of the State canals and the great need of steam dredges for the removal of the accumulating mud.

Many streams empty into the canals, carrying in time of freshets a large amount of mud and gravel. Every city and village along the line pours in more or less sewage. Offal is thrown out from boats, and through every city and village ashes and every other rubbish are thrown into the canal. This material which accumulates during the year, as a rule, must be within a few days removed in the spring. Every year a portion of this deposit is taken out, but the time is so limited, and the difficulty of handling it is so great, that there is not as much removed as comes in.

The consequence is that the canal has gradually been filling up. In order to allow boats to draw 6 feet of water, the levels of the canals have been raised, making it necessary to lift up the bridges to allow boats to pass under. The Erie survey of 1876 showed that the bottom of the canal had been worn away in the center under the boats to more than 7 feet in depth, but at the sides deposits existed varying from 6 inches to 2 feet high, and extending over one half of the bottom. The amount of this deposit was estimated to be about 900,000 cubic yards. This has increased since that time to about 1,000,000 cubic yards. Last spring a great effort was made on all the divisions to clean out the prism, but the time was so short (18 days) that not more than 100,000 yards were removed. Although but a small part of the whole deposit was removed, this work had a marked effect upon navigation, as the boatmen will testify. The whole of this material can be taken out by dredges, in the summer, without interfering with navigation, in four years, at a cost of about 12 cents a cubic yard, which will give to the canal a uniform depth of 8 feet. Experience shows that it cannot be well removed by hand, except at very great cost. Last spring, \$30,000 was spent on the Western Division for removing deposits. This sum would have purchased a dredge and paid the expenses of working it two years. The Champlain Canal is in an especially bad condition.

Household Water Motor.

In Zurich, Switzerland, the use of a portable water power, so to speak, is being extensively used for household purposes. Firewood, for example, is to be sawn into convenient lengths for burning. A small sawing machine on wheels is drawn by two men to the front of a house. They connect by a flexible tube with the nearest hydrant; the water flows to the machine; the saw dances, and cuts up the wood with surprising rapidity. A portable turbine has also been invented, and employed in many places in the same city, in driving a Gramme machine for the production of electric light. Water is very abundant in Zurich; but there are other towns in which this domestic water power could be advantageously introduced. Where it is any object to keep a record of the water used an indicator showing the quantity might be affixed to the machine.

The Best Fire Apparatus.

Norwich, Conn., is supplied with water from an artificial pond three and a half miles from the city. It is brought to the city in pipes by gravity pressure. The city is provided with two way hydrants located not more than 600 feet apart. A water pressure is obtained at the hydrants equal to 85 lb. to the square inch, which will throw an effective fire stream over any building in the place. Chief Carrier relies entirely upon the hydrant pressure. He uses four-wheel hose carriages, 600 feet of hose on each reel, and twenty men to each company. He has four steamers, but they only respond to second alarms, and have not been called out in a year and a half. The department controls all fires by means of the hydrant streams. This is the cheapest and best fire service to be obtained—fire streams direct from hydrants. Cities putting in waterworks should keep this point in view.

Onions.

From our own experience, and the observation of others, we can fully indorse the testimony of the St. Louis *Miller*, on the healthful properties of the above esculent. Lung and liver complaints are certainly benefited, often cured, by a free consumption of onions; either cooked or raw. Colds yield to them like magic. Don't be afraid of them. Taken at night all offense will be wanting by morning, and the good effects will amply compensate for the trifling annoyance. Taken regularly they greatly promote the health of the lungs and the digestive organs. An extract made by boiling down the juice of onions to a sirup, and taken as a medicine, answers the purpose very well, but fried, roasted, or boiled, onions are better. Onions are a very cheap medicine, within everybody's reach, and they are not by any means as "bad to take" as the costly nostrums a neglect of their use may necessitate.

M. THOLLON has recently observed, by the aid of his spectroscopic of high dispersive power, a solar protuberance whose height equaled one-sixteenth of the diameter of the sun, or about 55,000 miles.