Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, one year, for the U. S. or Canada $3 00
One copy, six months, for the U. S. or Canada 1 50
One copy, one year, to any foreign country belonging to Postal Union, 4 00
Remit by postal or express money order.

Australia and New Zealand.—Those who desire to receive the SCIENTIFIC AMERICAN, for a little over one year, may remit £1 in current Colonial bank notes. Address

MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, $5.00 a year, for U. S. and Canada. $6.00 a year to foreign countries belonging to the Postal Union. Single copies, 10 cents. Sold by all newsdealers throughout the country.

Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to any address in U. S. or Canada, on receipt of *seven dollars*.

The safest way to remit is by draft, postal order, express money order, or registered letter.

Australia and New Zealand.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for a little over one year on receipt of £2 current Colonial bank notes.

Address MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

NEW YORK, SATURDAY, JULY 7, 1888.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 658.

For the Week Ending July 7, 1888.

Price 10 cents. For sale by all newsdealers.

A DISSOLVING ISLAND.

The Dominion steamer Alert recently left Halifax, N. S., with men and material for the erection of a lighthouse, for the third time, on the west end of Sable Island.

The rapid disappearance of this remarkable island is one of the present marvels of the North Atlantic. Year by year it lessens in extent, threatening soon to be submerged, and its existence at no distant day promises to be as great a mystery as the location of the mythical Atlantis.

Mr. S. D. Macdonald, F.G.S., who, in the interest of science, has made himself personally acquainted with this island, making a special study of the various transformations it has undergone from its earliest history, and who has just returned, after noting its most recent changes, called the attention of Admiral Lyons to the rather startling fact that not only has the northwest submerged bar traveled in pace with the retreating west end, but has also changed its direction, swerving eastward, and now bears almost due north, or at right angle to the island proper, as shown by its 17 miles of breakers in bad weather. This renders the chart of the North Atlantic, reissued during the present year, widely inaccurate, showing an error of from 7 to 10 miles in the longitude of the outer portion of this bar. Further, this chart gives height of sand hills as 150 feet, when in no instance could Mr. Macdonald find a hummock having an elevation of 80 feet. This also misleads as to distance.

The lighthouse will not be completed probably before August next. In mean time navigation becomes exceedingly dangerous from the fact of those changes and errors of the chart being unknown to mariners.

Within a comparatively short space of time, dating back but a few years previous to the founding of the life saving station, it has decreased in length from 40 miles to 19½, in breadth from 2¼ miles to less than 1 mile.

The future of this island is everything but cheering to the navigator, and should those destructive forces now in operation continue, in not a very remote period the sea will claim this island as its own.

The site for the new lighthouse is well chosen on a broader portion of the island, as near as possible under the circumstances to that ever dangerous northwest bar whose presence has been so terribly felt, and in whose secret lies the fate of many a missing mariner.

In our SUPPLEMENT, No. 436, we gave an interesting paper, read some time ago by Mr. Macdonald before the Institute of Natural Science, Halifax, in which various facts relating to the condition of Sable Island, and the progress of its submergence, were set forth.

POSITION OF THE PLANETS IN JULY.

VENUS

is morning star until the 11th, and then becomes evening star. She is conspicuous, not by her presence, but by her absence from the sky in the month of July. She is in superior conjunction with the sun on the 11th at 2 h. P. M. She then passes beyond the sun, changing from his western to his eastern side, and is at her greatest distance from the earth. Her lesser light is entirely hidden in the sunbeams during the entire month. This beautiful star is in conjunction with Mercury on the 8th, when morning star, and in close conjunction with Saturn on the 27th, when evening star. Venus rises on the 1st at 4 h. 18 m. A. M. On the 31st she sets at 7 h. 33 m. P. M. Her diameter on the 1st is 9″.8, and she is in the constellation Gemini.

JUPITER

is evening star. He is a brilliant object in the southeastern sky in the early evening, and reaches the meridian at 9 h. P. M. on the 1st. He changes his course on the 24th, moving eastward and approaching the red star Antares, which is southeast of the planet. Jupiter sets on the 1st at 1 h. 44 m. A. M. On the 31st he sets at 11 h. 44 m. P. M. His diameter on the 1st is 41″.2, and he is in the constellation Scorpio.

MARS

is evening star. He is in quadrature with the sun on the 22d, and is, at that time, on the meridian at sunset. He will be in fine position for observation during the whole month. He is in conjunction with Spica on the 3d, passing 1° 32′ north of the bright star, and is also approaching Jupiter. Mars sets on the 1st at 11 h. 59 m. P. M. On the 31st he sets at 10 h. 33 m. P. M. His diameter on the 1st is 10″.6, and he is in the constellation Virgo.

URANUS

is evening star. He is in quadrature with the sun on the 4th, at 4 h. P. M. Uranus sets on the 1st at 11 h. 48 m. P. M. On the 31st he sets at 9 h. 51 m. P. M. His diameter on the 1st is 3″.6, and he is in the constellation Virgo.

MERCURY

is evening star until the 12th, and after that time morning star. He is in inferior conjunction with the sun on the 8th, at noonday, and reaches his greatest western elongation on the 29th, at 2 h. A. M., when he is 19° 31 west of the sun, and favorably situated for being seen by sharp sighted observers. Mercury sets on the 1st at 7 h. 55 m. P. M. On the 31st he rises at 3 h. 27 m. A. M. The diameter of Mercury on the 1st is 11″.4, and he is in the constellation Gemini.

SATURN

is evening star. He is of little account during the month, for his period of visibility has closed, and he is hidden in the sun's rays. Saturn sets on the 1st at 9 h. 3 m. P. M. On the 31st he sets at 7 h. 17 m. P. M. His diameter on the 1st is 15″.6, and he is in the constellation Cancer.

NEPTUNE

is morning star. He rises on the 1st at 1 h. 59 m. A. M. On the 31st he rises at 0 h. 4 m. A. M. His diameter on the 1st is 2″.5, and he is in the constellation Taurus.

Venus, Saturn, Uranus, Mars, and Jupiter are evening stars at the close of the month. Mercury and Neptune are morning stars.

NEW YORK HARBOR.

Two bills of much importance have recently passed Congress: One preventing the dumping of ashes and refuse within the limits of the port; the other laying down anchorage limits for every class of vessel, so that the fullest room may be left for passing traffic.

Thirty thousand dollars has been appropriated to carry the former into effect under the management of a naval officer, to be known as a supervisor, to be directly responsible to the U. S. Engineer Department, and a similar amount will probably be approved for anchorage purposes.

Each of these departments to be effectual will require ceaseless vigilance, stern uprightness, and business methods of the highest order.

Unscrupulous contractors and local politicians have for many years been defying the Pilot Commissioners and all others having the welfare of this national harbor at heart.

Fortunately, the bills are so framed that ample power is given to whoever may be placed in charge to enforce them to the fullest.

The Secretary of the Navy will doubtless detail officers fully able to suppress the jobbery and vandalism now so rife. These gentlemen with able assistants, a proper corps of harbor and shore inspectors, and a flotilla of swift cheap launches, will strike terror on all wrong-doers.

Their movements should be ubiquitous—here and everywhere, at all hours of the day and night.

No scow should be loaded without a permit, nor leave the dock without notifying the supervisor, and a sworn statement should be made as to time and place of loading and discharge.

The commissioner in charge of street cleaning should heartily co-operate.

Confiscation of the property and a heavy penalty should immediately follow disobedience of orders.

As regards anchorage, most accidents arise from want of established and enforced limits. At present, vessels spread themselves over the harbor. They drop their anchors with any length of chain that suits them, dragging if too short, and taking unnecessary room if too long. No harbor in the world is so destitute of common care and mooring appliances as the port of New York.

The duties needed to reform this state of affairs are essentially naval, have not and should not have any bearing on military knowledge or services, and for this reason it is to be hoped that the officers selected to fill these important posts may possess great activity and high nautical judgment, so that when questions bearing on the welfare of the port arise and come up for discussion, they may be able to speak wisely and authoritatively.

Telegraphing by the Clouds.

Admiral Sir W. Hunt Grubbe has recently made some interesting experiments at the Cape of Good Hope on the sending of signals by means of the rays of an arc lamp reflected by the clouds.

The luminous fascicle from a 100,000 candle arc lamp was directed against the clouds by means of a reflector, and interrupted according to the heliographic code. The dispatch could be read with ease at Cape Town.

Other experiments were made by a vessel of the navy sent out to sea, and the signals could be read from a distance of 50 miles. This method affords a possibility of sending signals at sea, and might prove useful in favorable weather for ships in danger.—*La Lumiere Electrique.*

LONDON, June 23.—The patents of an American invention, known as the Cyclone Pulverizer, were purchased here to-day for France, Italy, and Belgium for £40,000. The venders were Erastus Wiman, of New York, and associates, and the purchaser was Gustave Drolet, representing a French syndicate.—*Dispatch in the N. Y. World.*

Speed of Railway Trains.

What is the fastest railway time ever made? is a question much easier asked than answered, and the answer, if it could be definitely given, aids but little in arriving at the speed practically attainable in regular railway business. Extremely high rates of speed, perhaps equaling, if not surpassing, any that have been attained since, were achieved in the very earliest days of railroading. In 1841, Mr. I. K. Brunel, the constructing engineer of the Great Western Railway, of England, and who afterward built the Great Eastern, advertised to run from Bristol to London in two hours, which was at the rate of sixty miles an hour, and Mr. R. Dymond, F.S.A., has stated in *Notes and Queries* that in 1846 he traveled with Brunel over the South Devonshire Railroad at a speed of seventy miles an hour. The first specially fast express train ever run was in 1846, on the Great Western road, under the management of Brunel, and was known as the "Flying Dutchman," which name it has since retained. It made the distance of 193 miles from London to Exeter in four and a half hours, with five stops, the full running speed of the train between stations being at the rate of 63·9 miles per hour. The schedule time of the same train, forty years later, is sixteen minutes short of the time then made, but less time is deducted for stops, and the full running speed is only 55·1 miles per hour. The best time ever reported for this train was May 11, 1848, in a run from London to Didcot, 53 miles in 47 minutes, when it is said that a speed of 76 miles per hour was attained for a portion of the distance, the weight of the engine and train being 240,000 pounds, while the weight of the engine and train as now regularly run, with eight cars, is 525,000 pounds. A recently published statement gives the schedule time of a regular train of the Great Northern Railway, of England, for 105½ miles, at 53·6 miles per hour; and for "the Flying Scotchman," a regular train on the East Coast route, from London to Edinburgh, 392¼ miles, the speed is 48 miles per hour, there being five stops and the total time being 8 h. 55 m. The fastest regular train on the Continent of Europe is said to be that between Bordeaux and Paris, on the Orleans road, the distance of 359 miles being made in 9 h. 6 m., with ten stops, and the full running speed being 43¾ miles per hour.

Probably one of the fastest trains ever run in this country was a special on the West Shore line, from Buffalo to Jersey City, on July 9, 1885, making a distance of 422½ miles in 9 h. 23 m. On a section of 61 miles of this distance, made in 56 minutes, the speed is reported to have reached a rate of 71·6 miles per hour. The weight of the engine and train was 311,000 pounds. On the New York Central, the Sunday newspaper train has been run 440 miles from New York to Buffalo, at a speed of 45¼ miles per hour, making the total distance in 9 h. 30 m., and running from Syracuse to Rochester, 81 miles, in 85 minutes, or at the rate of 57 miles per hour, and numerous examples can be quoted of speeds about equaling this, it being nothing extraordinary for regular trains to attain a speed of 60 miles an hour and slightly over for short distances. One of the best authenticated tests of locomotive performance was a trial in 1885, over the Bound Brook route from Jersey City, where the weight of the engine and train was 370,000 pounds, and the trial was made in regular service. The tests were made by engineers who published full reports, which were also published in leading English papers, showing consumption of fuel and all details, the engine being built at the Baldwin Locomotive Works, and having coupled drivers only 68 in. in diameter. In this test it was shown that the slip of the driving wheels was practically nothing, and the indicator cards gave a speed as high as a mile in 46 seconds, or equal to 78·26 miles per hour.

The attainment of such exceptionally high speeds, however, for very short distances has but little of practical value; such apparent feats in railroading are really quite old, and are not to be compared in importance or in difficulty with what is now being accomplished every day by the "Limited" trains between New York and Chicago. The distance by the Pennsylvania road is 912 miles and by the New York Central it is 977 miles, and the time in each case is only 23 hours, with heavy trains making several stoppages. Considering distance, time, and quality of work, these trains are undoubtedly entitled to precedence in any proper comparison with the best fast trains operated by railroads anywhere else in the world.

Protection to Manufacturers and Bottlers.

The New York legislature at its last session so amended the law as to containers as to protect the owners of bottles, boxes, siphons, and kegs by prohibiting their use or sale by other parties. Hereafter, all traffic in containers is met with a heavy penalty, and junk dealers especially are prohibited from handling any of the articles having marks or devices branded, stamped, engraved, blown, or otherwise produced. The owners are required for their own safety to file a description of their trade marks and containers in the office of the county clerk and with the Secretary of State.

New Vestibule Trains.

The four "vestibule" trains on the Atchison, Topeka, and Santa Fe's new Chicago line are said to be the finest and most luxurious yet seen in the West, embodying many improvements on the famous original vestibule train. Each train consists of one baggage car, a mail car, a second class coach, two first class coaches, composite or parlor smoking coach, one dining car, and two sleeping coaches, or nine vestibule coaches in each train. The cars were built by the Pullman Palace Car Company, and are lit with the electric light and heated with steam from the engine. The sleeping cars, 60 ft. long, are furnished in Louis XV. design, with mahogany and English antique oak.

They are elaborately upholstered in peacock blue silk glace plush. The composite or parlor smoking car is in two apartments, the reading section containing a library, writing desk, etc., and is finished in silk glace plush and gold brown, with easy lounging chairs, sofas, ottomans, etc., as well as with movable wicker settees. The woodwork is of English antique oak in Moorish design and elaborately carved. The dining cars are finished in French antique oak, elaborately carved, and in addition to the other conveniences, contain inclosed sections for private parties, very elaborate buffet, and a wine room. No wood is exposed in the kitchen.

The first class coaches are finished in mahogany, with high back sofa seats, upholstered in maroon and old gold mohair plush. Each coach has gentlemen's toilet and ladies' toilet and dressing rooms. The second class coach is finished in native ash with Moorish designed ceilings, rattaned sofa seats, and closet and toilet rooms. The trucks have 42 in. steel-tired paper wheels. The entire length of each train will be about 600 ft.—the longest vestibule train ever seen in this or any other country. The electric lighting system comprises a small Brotherhood engine and dynamo, which is placed in the baggage car, occupying a space of about 3 ft. by 5 ft., and from which the wires are led through the train, thus charging the storage batteries that are carried under the cars. Each car is thus electrically independent of the others. The interior fittings are silver plated.

Improved Process of Tinning.

An improved process for coating metals with tin, by Borthel and Moller, of Hamburg, is said to possess the advantage of preventing, or at least delaying, oxidation. The process can be employed with special advantage for tinning cast iron cooking utensils, household and other implements of cast iron, as the employment of poisonous enamel is avoided and a much higher degree of polish attained. The process can also be employed for protecting architectural or other iron decorations from rusting by the coating of tin or other metal, without detriment to the sharpness of the form, as is the case with the customary oil or bronze paints. In order to produce a perfectly even coating of tin on cast iron, the same is first provided with a thin coating of chemically pure iron, regardless of the form of the casting. This coating is produced in galvanic manner in a bath composed as follows: 600 grammes of sulphate of iron, $FeSO_4$, are dissolved in 5 liters of water, to which we add a solution of about 2,400 grammes of carbonate of soda, Na_2CO_3, in 5 liters of water. The precipitate of ferro-carbonate ($FeCO_3$) resulting is dissolved in small quantities in so much concentrated sulphuric acid until the fluid has a green color. The bath is then rendered aqueous by adding about 20 liters water. Blue litmus paper dipped in the bath must assume a deep claret color, and red litmus paper remain unchanged.

The objects to be provided with a coating of chemically pure iron are placed in the bath opposite to the anode of cast or wrought iron or iron ore, and both parts connected to the corresponding poles of a dynamo machine, electric battery, or other appropriate source of electricity. In a very short time the objects placed in the bath are covered with a coating of iron, the thickness of which depends on the duration of the action of the bath or the strength of electric current. The coated objects are then well rinsed in clear water, dried, then painted with, or immersed in, a solution of ammonia in chloride of zinc or chloride of zinc alone, and then immersed in a vessel containing molten tin. The tin adheres with great tenacity to the prepared surface, and the surplus of tin can be readily removed by a brush or in other manner. If the object to be tinned is of such size, or so complicated in form, that it cannot be readily immersed in molten tin, it can be placed in a galvanic tin bath, which can be readily made in any desired size, and be provided with a layer of tin of desired thickness, which, after having been painted either with a solution of chloride of zinc or ammonia in chloride of zinc, can be heated to such a degree that the tin is equably melted on to the object.

In like manner objects cast or made of lead or other readily melting metal, which would lose their form by melting when immersed in molten tin, are, previous to tinning, provided with a coating of pure iron, and are then provided with a coating of tin in a galvanic bath, as mentioned above, without being subjected to heat for melting the layer of tin deposited on the same. With objects of wrought or rolled iron, or which do not require the before described treatment—*id est*, the production of a coating of chemically pure iron—it will be sufficient to carefully clean the same and paint them with a solution of ammonia in chloride of zinc or a concentrated solution of chloride of zinc. This tinning process combines the advantage of simple manipulation and the great durability of the coating with cheapness of manufacture, which is partially attained in the saving in tin.

Economy of High Pressure Steam Jackets.

According to the *Revue Industrielle*, M. P. Guzzi, an Italian engineer, has recently introduced a system of constructing steam engines in which the jacket is supplied with steam of a higher pressure than that used inside the cylinder. The high pressure steam is generated by a small boiler constructed on Perkins' system, which is placed inside the furnace of the main boiler. In this way steam is obtained at a pressure of about 220 pounds per square inch, with a corresponding temperature of about 390 degrees Fahr., and with this steam the jackets are supplied, and when condensed in these it drains back into the boiler. By this arrangement the initial condensation in the cylinder is materially reduced, with a corresponding improvement in the efficiency of the motor, as the following figures, taken from an engine when working as described above, and when working under normal conditions, show:

	Jacket using steam at a pressure of 176 lb. per sq. in.	Jacket working under normal conditions.
Date experiment	February 24, 1886.	February 20, 1886.
Duration of test	6 hours 18 minutes.	7 hours 11 minutes.
Mean effective pressure in main boiler	56·6 lb. per sq. in.	56·2 lb. per sq. in.
Mean indicated horse power	25·9	25·67
Consumption of water per indicated horse power per hour	19·6 lb.	23·5 lb.

This engine has now been working for about eighteen months, but in other cases, to avoid the risk arising from high pressure steam, it has been proposed to substitute for the steam the vapor of linseed oil, which boils under atmospheric pressure at about 700 degrees Fahr.

Contagious Diseases.

Scarlet fever, a contagious disease producing a large annual mortality, is produced by a specific poison which emanates from the person of the patient, and can be caused by no other means, and this poison is remarkable for the tenacity with which it affixes itself to objects, which, if portable, may convey it long distances, and for its tenacity of life, which renders it difficult to destroy. Diphtheria, also a contagious disease, and largely fatal, may also arise from other causes than contagion, notably from fermenting filth, and requires, not only isolation, but cleanliness for its extinction. Typhoid fever and Asiatic cholera, while not directly communicable from person to person, are spread by the dejecta of their victims, which contaminate the water supply, and thus an efficient disinfection of these dejecta is a very desirable thing to accomplish. Small pox may be exterminated by vaccination, and this, I am happy to concede, is a fact on which the public requires less information than most others, albeit these are skeptics here. It is evident if the public knew how diseases arise and are disseminated, it would be prepared to more heartily and effectually second the endeavor of sanitarians to limit and subdue them. In proportion to its knowledge of sanitation would its zeal increase.—*G. A. Collamore, M.D.*

The Perekop Canal.

The Cronstadt *Messenger* gives the following details concerning the canal through the Perekop Isthmus in the Crimea: "The canal will traverse Gontchar and Sivasch from Perekop to Guenitchesk. It will be 111 versts or 74 miles in length. Its breadth will be 65 feet and its depth 12 feet. The works will be directed by Major-General Jilinsky and the French engineers Messrs. Essant and Carouzot. At both ends of the canal ports are to be established for coasters. The necessary funds (85,000,000 rubles) for the work are already appropriated. The Perekop canal will form the line of shortest communication between Guenitchesk and the ports of the northern coast of the Black Sea. At present Marioupol is 434 miles from Odessa. When the canal is opened, it will be only 295."

The Population of Paris.

The statistical bureau of the municipality of Paris has just issued the returns as to the population of the city and of the department of the Seine at the end of 1886. These returns put the total population of the department at 2,961,089, of whom 2,344,450 were resident in Paris itself. At the beginning of the century the total population of the Seine was only 631,585, so that it is now more than four times larger than it then was, increasing to 1,200,000 in 1840 and to 2,400,000 in 1876. It has, therefore, increased by about 600,000 in the last ten years.