

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., Canada or Mexico... \$3 00
One copy, six months, for the U. S., Canada or Mexico... 1 50
One copy, one year, to any foreign country belonging to Postal Union... 4 00

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 the U. S., Canada or Mexico, \$6.00 a year to foreign countries belonging to the Postal Union. Single copies, 10 cents.

Building Edition.

THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMERICAN is a large and splendid illustrated periodical, issued monthly, containing floor plans, perspective views, and sheets of constructive details, pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and architectural work in great variety.

Spanish Edition of the Scientific American.

LA AMERICA CIENTIFICA E INDUSTRIAL (Spanish trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number of La America is profusely illustrated. It is the finest scientific, industrial trade paper printed in the Spanish language.

MUNN & CO., publishers, 361 Broadway, New York.

The safest way to remit is by postal order, express money order, draft or bank check. Make all remittances payable to order of MUNN & CO.

NEW YORK, SATURDAY, AUGUST 6, 1892.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Legal decision—right of way', 'Locomotive, a new climbing', 'Mars, new map of the planet', 'Mechanical devices, new', 'Mill, roller, the "grim"', 'Over one mile deep', 'Patents—death of inventor', 'Patents granted, weekly record', 'Press, hydraulic, Taylor's', 'Riverizing, a new mill for', 'Railway appliances, some new', 'Railway master mechanics' meeting', 'Rodinal', 'Rheumatism, acute', 'Santa Maria, the', 'Telephone, the Simpson acoustic', 'Ties, metallic, in Belgium', 'Tornado, deflections of a', 'Vessels of Columbus', 'Water, depth of, acoustic method measuring', 'Weather signs, clouds as'.

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 866

For the Week Ending August 6, 1892.

Price 10 cents. For sale by all newsdealers.

Table listing various articles such as 'BIOLOGY.—Long-Tailed Japanese Fowls.—Interesting example of cultivated animal peculiarities.—Fowls with tails of immense length.—1 illustration.', 'CHEMISTRY.—A New Gaseous Incandescent Lamp.—By H. N. WARREN.—A lamp utilizing the catalytic action between a mixture of gas and air and metallic platinum, making possible the production of designs.—1 illustration.', 'CIVIL ENGINEERING.—A Short History of Bridge Building.—By C. R. MANNERS.—A supplement to this elaborate article, with interesting examples of typical and historical bridges not referred to in the main paper.—4 illustrations.', 'ELECTRICITY.—A Fatal Thunderbolt at Bourges, France.—A most remarkable lightning discharge, and its effects on the clothing of one of the victims.—2 illustrations.', 'METALLURGY.—Blue Brass.—A method of coloring brass a deep blue, with notes of the alloy best suited for its operation.', 'MISCELLANEOUS.—A London Ivory Sale.—A very curious auction sale taking place four times a year in London.—A graphic account of the entire proceeding, and of the general properties of the material and its uses in commerce.—1 illustration.', 'NAVAL ENGINEERING.—Oil Engine and Launch.—An oil gas engine, and the launch propelled by same, built in England.', 'PSYCHOLOGY.—Mental Evolution in Man and the Lower Animals. By ALICE BODINGTON.—Extraordinary instances of animal intelligence in elephants, the chimpanzee, and other animals.—Curious examples of human mental operations.—A most interesting presentation of the subject.', 'TECHNOLOGY.—Decorating Ramie.—Chemical treatment of ramie fiber by a new series of salts.', 'Lamp Black and Bone Black.—By HENRY J. WILLIAMS.—Method and entire process of these products, their composition, and quality.—1 illustration.'

ELECTRIC BOATS AND CARRIAGES AT THE COLUMBIAN EXPOSITION.

An attractive feature at the World's Columbian Exposition will be the navigation of the lagoons by pleasure boats. The visitor will have the double enjoyment of a sail and excellent water views of the wonderful buildings and other exterior objects of the great exposition. The committee charged with the selection of boats best suited for this particular purpose were in doubts as to which their approval should be given, and with a view of settling the matter they invited several different makers to bring forward specimens of their boats and join in a practical trial of merits on the waters of the grand basin. The preliminary trial took place on the 14th of last month.

It was understood by the competitors that the concession or right of running boats should be awarded to the parties whose vessels made the least noise and gave out the least heat and smoke. The prime object of the directors was to secure the comfort of the visitors. More than this, the expectation is that hundreds of thousands of people will patronize the boats, and the share of the proceeds coming to the exposition will be large.

At the trial above mentioned four specimen boats were on hand. Meeker & Co. presented a fine steam launch named the Isabella; Willard & Co., an excellent steam launch, the America, capable of accommodating fifty passengers; the Electric Launch and Navigation Co. entered their specimen electric boat the Electra, and the Columbian Launch Co. brought forward their electric launch the Volta. As a result of the trial it is understood the committee were satisfied that while all the boats performed excellently well, the boats of the Volta class better answered to all the conditions of comfort, speed, safety, and facility of management than the others, and it is expected the contract will be awarded to the Volta owners. We understand they claim to be able to run their boats on one storage of energy, as fast as the rules permit, for a period of twenty-four hours. The expected requirements of the directors are that about fifty regular boats will have to be provided, each capable of carrying 28 passengers, also a number of smaller extra boats for use on call. So much for electricity on the water.

Electricity as applied to the propulsion of land carriages in place of horses will form another interesting item in the wondrous electrical department of the great fair.

Mr. Willard A. Smith has charge of this class of exhibits, which will be located in the great transportation building. Mr. Smith says:

"A special place will be provided in the rear of the transportation exhibits building for showing electric carriages in operation. These vehicles will not be heavy lumbering affairs, but will be built for use on common roads. They are now in use in Europe and are a success. American inventors are in the field, and will have some fine carriages on exhibition. The road between the transportation annex and Stony Island avenue is well adapted for the exhibit. There will be a line of trees, vines and shrubbery along the fence, making the road very pleasant in every respect. The railroad tracks will be removed and a fine pavement laid. Up and down this road the carriages will run, and people will be surprised to learn that for centuries money has been uselessly tied up in horse flesh."

The removal of horses from the street cars and the propulsion of the latter by means of electricity already has been accomplished in many of our towns and cities. The day seems to be near at hand when this marvelous agent will be still more extensively employed in connection with pleasure carriages and vehicles of all kinds. In fact, the electrical omnibus now exists in London and has been illustrated in these columns. Independently of the greater convenience of such vehicles, the removal of horses from the streets will be a boon to the public, thereby preventing the accumulation of filth and promoting the general health. In New York and Brooklyn the air is at present contaminated with the daily droppings from some fifty thousand animals. This manure, in the form of fine dust, pervades every nook and corner of the dwellings, penetrates the clothing, and enters the eyes, ears and nostrils of the inhabitants, forming irritating centers from which diseases result. The electrical wagon will bring many advantages to modern civilization.

A NEW MAP OF THE PLANET MARS.

The close resemblance, in so many details and conditions, of the planet Mars to the earth has long made it one of the most interesting of the heavenly bodies, and speculation as to whether or not it is inhabited by beings similar to those living upon the earth has been long indulged. On the 3d of August the planet was closer to the earth than it had been at any time during the past fifteen years, and its unusual brilliancy for the week preceding caused it to be observed with the utmost attention at most of the observatories in the world. The great Lick telescope, at the Mount Hamilton Observatory, California, was used to its full capacity in this work, and for several days observations of the

most valuable character were obtained, the near approach of the planet, and its consequent brilliancy and size at this time enabling the observers to utilize the full powers of the instrument with the most interesting results.

A correspondent of the N. Y. Sun, writing from the observatory, under date of July 31. says: The drawings by all the astronomers exhibit numerous changes in the principal characteristics since the celebrated sketches made by the Milanese astronomer Schiaparelli. Many of his almost fanciful details are shown to have no existence in reality. None of the so-called canals are doubled, or geminated as he depicted them. All of these curious streaks, whatever they may be, are broad strips, and not narrow lines, just as they were seen through the Lick telescope two years ago, and in fact just as they have been ever since the great Washington refractor was first turned on the planet in 1874.

This will be a disappointment to those who have found in the existence of these canals, and particularly in the announcement that they all were seen to be doubled, indisputable evidence that Mars was inhabited by human beings. The most startling of all the Mount Hamilton observations are those made on the two tiny moons of the planet, which were discovered by Asaph Hall in Washington during the opposition of 1877, and which have since been seen at brief intervals and only in the largest telescopes. Not only have these little attendants, by all odds the faintest planetary bodies to be seen anywhere in the sky, been in plain view for the greater part of July, but the astronomers regularly observed their eclipses in the shadow of Mars.

It was learned from Prof. Holden that the satellites are seen to disappear in eclipse upon reaching the line of shadow with almost the same instantaneous effect which is seen when the dark limb of the moon passes over a bright star in the sky. Within two-tenths of a second the whole body of the moon is seen to be immersed in the shadow cast out into space by the globe of Mars.

It is almost impossible to convey a proper idea of the insignificant size of the little satellites, or of the extraordinarily small scale upon which their orbits are drawn. The inner satellite is probably about eight miles in diameter, the outer one about twenty. The first is less than 4,000 miles from the surface of the planet and the other about three times that distance. To a man in Mars they would each appear about one fifth the size of our full moon, and they revolve so rapidly about the planet that the inner one appears to move through the sky from west to east, and consequently rises in the west. It completes one revolution in less than eight hours, so that it seems to be "new" three times a day.

It has only been possible heretofore to estimate the size of these bodies by comparing the amount of light reflected by them with that reflected from the planet Mars itself, whose size is known. But now, by means of these eclipse observations, we have a direct measure of the size, since it is found that each of the satellites moves its own diameter in about two-tenths of a second, and we can easily tell from our knowledge of their orbits just what space in miles each of them moves through in that time.

MOSES S. BEACH.

The death, at Peekskill, N. Y., July 25, of Mr. Moses S. Beach, though it had been for some time looked for, brought with it a sense of the temporary character of even the most lasting of human friendships—a realization of the transitoriness of life's longest associations. For nearly half a century, or for about the whole period of time which has marked the life history of this paper, Mr. Beach was, until stricken by his last illness, a familiar figure in our office, and he always brought a friendly countenance, the air of one living an active and useful life, and a keen appreciation and sound judgment of the intricacies and problems of many branches of business.

Mr. Beach was in his 70th year, and his death was from paralysis, with which he was stricken three years ago, since which he had been living in a helpless state on his country place at Peekskill. He was an older brother of Mr. Alfred E. Beach, one of the proprietors, and at present, as for many years past, an active working editor of this paper. The two brothers were for several years owners in partnership of the New York Sun, Moses S. Beach finally selling this property to its present proprietors.

Although Mr. Beach was known principally as a business man whose full time was always needed for the proper direction of his varied and important interests, he yet found the opportunity to be considerable of an inventor, as shown by the records of the Patent Office, where a half score or more of patents appear in his name. They related principally to printing and stereotyping—the feeding of roll paper instead of flat sheets, apparatus for wetting the paper before printing, cutting off the sheets, etc. Some of his inventions in this line facilitated the adaptation of newspaper presses to the printing of both sides of the sheet, while