

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

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. Sold by all newsdealers throughout the country. See prospectus, last page.

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.

Single copies 25 cents. By mail, to any part of the United States, Canada or Mexico, \$2.50 a year. To foreign Postal Union countries, \$3.00 a year. Combined rate for BUILDING EDITION with SCIENTIFIC AMERICAN, to one address, \$5.00 a year. To foreign Postal Union countries, \$6.50 a year. Combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN and SUPPLEMENT, \$9.00 a year. To foreign Postal Union countries, \$11.00 a year.

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. It circulates throughout Cuba, the West Indies, Mexico Central and South America, Spain and Spanish possessions—wherever the Spanish language is spoken. \$3.00 a year, post paid to any part of the world. Single copies 25 cents. See prospectus.

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.

Readers are especially requested to notify the publishers in case of any failure, delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, JUNE 16, 1894.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Air, compressed, devices', 'American Association, 43rd meeting', 'Ants as bridge builders', etc., with corresponding page numbers.

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 963.

For the Week Ending June 16, 1894.

Price 10 cents. For sale by all newsdealers.

Table listing detailed contents of the supplement, including sections like 'I. AGRICULTURE', 'II. ASTRONOMY', 'III. BIOGRAPHY', etc., with page numbers.

OPENING OF THE FIELD MUSEUM.

The great Field Columbian Museum was opened June 2. The beautiful Art building of the Columbian Exposition, held at Chicago last year, has been utilized. On Oct. 26, 1893, Marshall Field, one of Chicago's merchant princes, subscribed \$1,000,000, and the success of the Museum was assured. Donations poured in rapidly and the various States of the Union vied with foreign countries in supplying objects for the Museum.

HOW TO PREVENT AND EVADE INSANITY.

The last number of the Alienist and Neurologist contains an interesting article by Dr. Wm. W. Ireland, of Edinburgh, on the above subject. He holds that persons accustomed to mental cultivation and discipline have great advantages in escaping from the taints of insanity. He thinks that mathematics is a very healthful exercise for a disturbed mind.

PASSENGER RAILROAD TRAFFIC IN NEW YORK AND LONDON.

According to a recent article in the Railroad Gazette, the steam city railroads of London earn only \$73,000 a mile, while those of New York City earn \$300,000 a mile per annum. It appears the New York railroads carry a far larger number of passengers and run quicker and make more stops than the London roads.

FREE ELECTRICITY.

According to a writer in the New York World, there are a number of places in the city of Brooklyn where electricity may be had free of charge, by simply connecting wires between water mains and gas pipes where they enter buildings.

It is said that in some cases electricity enough to run fans and sewing machines, to the extent of over one H. P., can be had; it is stated that the gas pipe in almost any house near the trolley lines will give seven amperes and 300 volts, sufficient to run seven ordinary electric fans or furnish power for seven 16 candle lights.

THE LIMITATION OF VIVISECTION.

The benefits derived from vivisection are incontestable, but like some other good things, vivisection is often wrongfully used. The general public and even members of the medical profession are ignorant of the extent of vivisection and of the methods of its practice. In order to promote interest in this subject, a society, having headquarters in New York City, has been formed, entitled: "The Society for the Protection of Animals Under Vivisection."

THE ENGINEER'S WORK IN MODERN BUILDINGS.

The profession of architect as relating to the designing of buildings has occupied a position intermediate between that of a profession and of an art. It has related to the production of the beautiful, and the architectural enthusiast has often placed his field of work on a par with music, and has regarded it as the crystallization of all that is best in the plastic and designing arts.