

Scientific American.

ESTABLISHED 1845

MUNN & CO., EDITORS AND PROPRIETORS.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

TERMS FOR THE SCIENTIFIC AMERICAN.

(Established 1845.)

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, postage prepaid, £0 16s. 5d. 4.00

Remit by postal or express money order, or by bank draft or check.

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

The Scientific American Supplement

(Established 1876)

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, \$3.00 a year, for the U. S., Canada or Mexico, or \$1 4s. 5d. for foreign countries belonging to the Postal Union. Single copies 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page. Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year in U. S., Canada or Mexico, on receipt of seven dollars. To foreign countries, eight dollars and fifty cents a year, or £1 1s. 11d., postage prepaid.

Building Edition of Scientific American.

(Established 1885.)

THE BUILDING EDITION OF THE SCIENTIFIC AMERICAN is a large and splendidly illustrated periodical, issued monthly, containing floor plans and perspective views pertaining to modern architecture. Each number is illustrated with beautiful plates, showing desirable dwellings, public buildings and architectural work in great variety. To architects, builders, and all who contemplate building this work is invaluable. Single copies 25 cents. By mail, to any part of the United States, Canada or Mexico, \$2.50 a year. To foreign countries, \$3.00 a year, or £0 12s. 4d. Combined rate for BUILDING EDITION with SCIENTIFIC AMERICAN, to one address, \$4.00 a year. To foreign countries, \$5.50 a year, or £1 6s. 5d. Combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN and SUPPLEMENT, \$4.00 a year. To foreign countries, \$5.50 a year, or £2 3s. 2d., postage prepaid.

Export Edition of the Scientific American

(Established 1878)

with which is incorporated "LA AMERICA CIENTIFICA E INDUSTRIAL," or Spanish and Portuguese SCIENTIFIC AMERICAN, published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number contains about 100 pages, profusely illustrated. It is the finest scientific industrial export paper published. It circulates throughout Cuba, the West Indies, Mexico, Central and South America, Spain and Spanish possessions wherever the Spanish language is spoken. THE SCIENTIFIC AMERICAN EXPORT EDITION has a large guaranteed circulation in all commercial places throughout the world. \$3.00 a year, or £0 12s. 4d., postpaid to any part of the world. Single copies, 25 cents.

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

NEW YORK, SATURDAY, SEPTEMBER 25, 1897.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as Africa, possible trade with, 199; Air compressor and cooler, 201; Alaska, information about, 198; Angle borer, McCoy's, 201; Animal holding device, Ralston's, 196; Bicycle handle, Muir's, 201; Bicycle saddle, and seat post, 201; Boat, the Knapp roller, 201; Books, new, 205; Brazing apparatus, Dupes's, 201; Dam, the Hemet, Cal., 200; Electrical books, our library of, 197; Electric cabs in London, 197; Electropneumatic circuit closer, Batchelor's, 201; Elevator, fall of an, 199; Elevator, the modern, 194; Floods in Germany and Austria, 201; Gas burner, Barney's, 201; Gas exhausting apparatus, Olan's, 201; Glass cutting apparatus, Seiter's, 196; Grate bar, Stroh's, 196; Gunning apparatus, Burland's, 201; Hairs for transit instruments, 202; Holtz machine, a large, 203; Howard, Leland O., 195; Indian, origin of the American, 195; Inventions recently patented, 201; Irrigating works, California, 200; Mauna Loa, a trip to, 199; Mus, the influence of, 197; New York rapid transit, 194; Notes and queries, 205; Oil can, Bell's, 201; Patents granted, weekly record of, 205; Pile driving, curious obstruction to, 196; Polar expedition, the Wellman, 196; Railroad tie, Miller's, 196; Rubber substitutes, 196; Science notes, 212; Steam engine, Schmidt's, 201; Turbines, powerful horizontal, 193; Water wheels, a pair of great, 193; Wheat as a source of prosperity, 194; Wood for ships' interiors, 204.

TABLE OF CONTENTS OF

Scientific American Supplement

No. 1134.

For the Week Ending September 25, 1897.

Price 10 cents. For sale by all newsdealers.

Table listing contents of the supplement with page numbers. I. AGRICULTURE.—The Silo, 18130; II. ARCHÆOLOGY.—The Orange Theater, illustration, 18131; III. BIOLOGY.—The Tension Upon the Spokes, 18121; IV. BIOGRAPHY.—Alfred Marshall Mayer, The completion of the interesting biographical study by Prof. STEVENS, 18127; V. BOTANY AND HORTICULTURE.—Dendrobium Victoria Regina, Lohrer, 1 illustration, 18130; Conditions of Plant Growth, 18129; VI. DAIRY FARMING.—Preventing Milk Spoilage, 18134; VII. ECONOMICS.—Improvident Civilization.—A plea for the application of scientific methods to the amelioration of socio-economic defects and disorders.—II. Decadence of Races.—By RICHARD T. COLBURN.—A continuation of this important address, 18128; Our Great Grain Crop.—Future of the business.—The movement of the cereal foods in the western hemisphere.—Their production, transportation, duties and consumption.—By Dr. WILLIAM P. WILSON, director of the Philadelphia Commercial Museums.—A most interesting article, in view of the present rise in wheat, which bids fair to add so much to the material prosperity of the country, 18120; VIII. ELECTRICITY.—Automatic Extinction of Lamps, 18121; Submarine Telegraph.—A French transatlantic cable.—By HENRY HAYNIE.—A popular description of the working of a modern transatlantic cable.—2 illustrations, 18124; The Massena Water Power Electrical Generating Plant.—A description of an important new power plant for utilizing the St. Lawrence River.—5 illustrations, 18125; IX. ENTOMOLOGY.—The Spread of Land Species by the Agency of Man, with Especial Reference to Insects.—By LELAND O. HOWARD.—A paper read before the zoological section of the American Association for the Advancement of Science, 18132; X. EXHIBITIONS.—The Paris International Exhibition of 1900.—2 illustrations, 18126; XI. FIRE EXTINGUISHMENT.—The Control of Fire.—An interesting paper by Mr. SIMON BRENTANO, who is an expert upon fires, 18122; XII. MECHANICAL ENGINEERING.—The Paris International Exposition of 1900.—A description of the methods of demolishing the old buildings and the construction of new piling.—2 illustrations, 18126; XIII. MECHANICS.—British Association.—Address in mechanics.—Address delivered by Mr. G. F. DEACON, who referred to the recent progress which has been made in mechanical science, 18121; XIV. MEDICINE AND HYGIENE.—A Note on Some of the Requirements for a Sanitary Milk Supply.—By WILLIAM T. SEDGWICK, 18125; XV. MISCELLANEOUS.—The Automatic Gas Distributer.—A coin-controlled gas meter giving a definite amount of gas.—1 illustration, 18123; The Automatic Lunch Counter in Leipzigerstrasse, Berlin.—An ingenious nickel-in-the-slot restaurant in which both solid and liquid refreshments are vended by coin-controlled devices.—2 illustrations, 18119; Engineering Notes, 18133; Electrical Notes, 18133; Miscellaneous Notes, 18133; XVI. SCIENCE.—Science and Humanity.—By W. J. MOORE.—A continuation of a paper read before the American Association for the Advancement of Science, 18121; XVII. TEXTILES.—Heating and Ventilation by Moistened Air in Spinning Mills.—6 illustrations, 18122; XVIII. VETERINARY SCIENCE.—Some Anatomical Peculiarities of the Horse, 18130.

DELAY OF NEW YORK RAPID TRANSIT.

It is doubtful if the gentlemen who compose the Supreme Court Commission have ever carried a more serious responsibility than that just now incurred in deciding the fate of the plans for rapid transit which were prepared by the New York Rapid Transit Commission. It is now about eighteen months since the first set of plans were rejected by this court, mainly on the ground that the cost was too great. In the interim the commission has gone carefully into the question, with the intention of offering amended plans to the court which should embody its suggestions and avoid the objections raised by the justices. The amended plans have cut down the total cost one-half, or from about sixty million to less than thirty million dollars, and the grievances of property holders on Broadway have been met by abandoning that thoroughfare altogether and adopting a parallel route on Elm Street. It is to be hoped that a decision will be rendered at the earliest possible date, for the reason that the consolidation of the present several municipalities which will constitute Greater New York will take place on the first day of January, 1898, and if the immediate construction of the proposed lines is to take place, the contracts must be let before that date.

With the close of the year the present governing bodies of the city will cease to exist, and before any progress could be made with rapid transit it would be necessary to form a new commission and begin over again the tedious preliminary work.

Should the judgment of the commission be unfavorable or should it be rendered too late for the commencement of construction, the city will find itself exactly where it started many years ago, and all the time, trouble and expense to which it has been put will have gone for nothing.

A new and certainly unlooked for obstruction has developed in the recent action of the Park Board. Before the road can be built it is necessary to secure not only the consent of the Supreme Court Commission but also of the Park Board, the latter having the power of veto as regards such part of the route as passes under the public parks. This is a wise provision, and in this case the Park Board has suggested that the location of the loop at the Battery be changed so as to avoid certain large trees which are over the site of the proposed structure. Under ordinary circumstances the change could no doubt be made, the curve being swung a little one way or the other for the purpose. As it happens, however, the law does not permit any change to be made in the plans after they have once been approved by the Mayor and the Board of Aldermen, and if the Park Board should insist upon this revision of the line, small as it is, the whole work of securing the necessary consent will have to be gone over again. But this is a slow process, and the delay (for reasons given above) will imperil the success of the whole scheme. This being the case, it becomes a question between the sacrifice of a few trees at the Battery and the indefinite postponement of a great public work of which the city stands in sore need. None can be more solicitous than we are for the extension of tree planting in this city and the preservation of the few that we have; but in the present dilemma we think the few trees which are threatened at the Battery should not stand for a moment in the way of an urgent public necessity affecting the welfare of the capital city of the country.

It was only a few months ago that we were urging the Board to remedy defects in the Harlem Speedway which threatened the life of every tree that might be planted therein. If the Board will be content to sacrifice the two or three trees at the Battery to a great public necessity, and direct its energies to removing the impediments to the growth of trees on the three mile planting spaces of the Speedway, it will serve the present and future interests of New York City to far better effect than by its present well meant but ill advised obstruction of rapid transit.

In our last issue we illustrated the handsome subway recently opened in Boston—a work that was not projected until some years after the Rapid Transit Commission of New York had commenced its labors. It is mortifying to reflect that, even at this late hour, the consummation of a similar work in the metropolis is in danger of indefinite postponement.

THE SAFETY OF THE MODERN ELEVATOR.

The recent fall of an elevator in one of the most modern of the New York office buildings, details of which are given on another page, has again directed public attention to the question of the safety of elevators in general, and it is possible that a degree of uneasiness may be excited which is out of all proportion to the event. The comparative novelty of the elevator and the fact that it carries its passengers in midair invest it with ideas of greater risk than are commonly associated with other methods of conveyance, as by train, car or steamship. As a matter of fact, statistics show that, for the number of passengers handled, the accidents are fewer on first class elevators than upon street car lines or railroads. It is claimed that the American Tract Society building elevators alone handle more passengers

in one day than leave and enter New York in the same time over the tracks of the New York Central Railroad; and it is a fact that the total number of elevator passengers on all the elevators of the city per day is many times greater than the total number of passengers entering or leaving New York City in twenty-four hours. The loss of life, in proportion to the number of passengers carried, is, however, remarkably small, the average fatalities in bona fide passenger elevators due to defects in the same for the past few years in New York City being scarcely one per year—a figure which gives an extraordinarily small fraction of one per cent per annum on the total number carried.

The disablement or loss of life which results from the fall of an elevator is directly due to the same physical cause—suddenly arrested motion—as that which occurs in a railroad collision; yet the passenger who steps aboard an elevator with a passing thought as to the distance he is suspended above ground, will sit with perfect equanimity in a railroad car that is rushing through a crowded train yard at a speed of from eighty to one hundred feet a second.

To win the public confidence and maintain it is the first care of the leading manufacturers of elevators, and there is no part of the mechanism that shows such careful thought as the devices which guard against an actual fall or a too rapid descent of the car. In most cases, where the safety devices have failed, it will be found that the mishap was due to ignorance or carelessness on the part of the operators or engineers. The efficiency of the most perfect device is, after all, largely determined by the human element, which is more or less inseparable from the operation of all so-called automatic appliances. The owners of such buildings as this should exercise the greatest care in the selection of the mechanics who are responsible for the oversight of the elevator mechanism; and they should select men who are capable not merely of running the plant in its normal operation, but of safely adjusting it in all cases of emergency.

WHEAT AS A SOURCE OF PROSPERITY.

"It is an ill wind that blows nobody good," and while we sincerely regret the loss which has fallen upon less favored countries, it is certainly for us a fortunate coincidence that the abundance of our own harvests this year should have been marked by a simultaneous scarcity in the other wheat growing countries of the world. Not only has the comparative failure of foreign crops raised the price and increased the demand in the great importing countries, but a favorable season has so filled our granaries that the United States and Canada will have no difficulty in supplying their share of the 411,200,000 bushels which the best authorities claim will be the probable requirement of European countries. Their probable export this year will be 360,000,000 bushels, which would be 202,000,000 bushels more than was ever before exported from these countries to Europe, and an increase of over one hundred per cent above the exports of the year ending July 31, 1897. With wheat at a dollar a bushel, the truly enormous wealth that will be poured into the lap of the farmer is at once evident.

From such figures as these, it is easy to realize how vastly the prosperity of the country is affected by the prosperity of the farmers. The wealth which has come so suddenly—and to thousands of our farmers the harvest will bring a positive fortune—will much, if not most of it, be circulated broadcast through the land. It will go, and has already gone, to pay off the mortgage which has hung like a millstone about the neck of the husbandman. It will be spent in the purchase of much needed machinery, in the rebuilding or repair of farm buildings and in the fencing of lands. The payment of long standing debts at the country and city stores will lighten the burden upon retail dealers, and in wholesale warehouse and retail store the pulses of trade are already beating with something of their old-time vigor. The orders that are flowing in from the various jobbing houses will be followed by heavy shipments of goods throughout the country, and thus the railroads, which have already profited by the transportation of the wheat, will profit again by carrying the merchandise which the wheat has enabled the farmer to purchase. To the increased activity of the various manufacturing industries which supply this increased demand must be added the greatest boon of all—a restored commercial confidence and a quickened credit.

From a contemplation of present good fortune it is natural to look forward and ask what are the prospects for the future. Are we to lapse again into the old stagnation or can we reckon upon a continuance of some degree at least of the present agricultural prosperity? The question has been recently discussed in a comprehensive address before the Pennsylvania State Millers' Association by Dr. William P. Wilson, director of the Philadelphia Commercial Museums. The address is given in full in the current issue of the SUPPLEMENT. In addition to its very complete statistics of the export trade in wheat and flour, the address comprises an exhaustive review of the conditions of the countries from which the world's supply of these staples is derived. It is encouraging to learn that during the last five