

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

Remit by postal or express money order, or by bank draft or check.
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. Sold by all newsdealers throughout the country. See prospectus, last page.
Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to any address in U. S., Canada or Mexico, on receipt of seven dollars. To foreign countries within Postal Union, nine dollars a year.

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. To builders and all who contemplate building this work is invaluable. Has the largest circulation of any architectural publication in the world.

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, \$5.00 a year; combined rate for BUILDING EDITION, SCIENTIFIC AMERICAN and SUPPLEMENT, \$9.00 a year. To foreign countries, \$11.50 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 specially requested to notify the publishers in case of any failure, delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, AUGUST 29, 1891.

Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as 'Alkali works, damage from', 'Metals, pure, insolubility of in acids', 'Banana, the', 'Meteoric shower, the August', etc.

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 817.

For the Week Ending August 29, 1891.

Price 10 cents. For sale by all newsdealers.

Table listing sections I through XIII, including 'AERONAUTICS', 'ARCHITECTURE', 'ASTRONOMY', 'BIOGRAPHY', 'BOTANY', 'CHEMISTRY', 'CIVIL ENGINEERING', 'FRUIT CULTURE', 'MISCELLANEOUS', 'PHOTOGRAPHY', 'PHYSICS', 'RAILROAD ENGINEERING', 'TECHNOLOGY'.

THE FAST TRIP OF THE TEUTONIC.

Although it is by about an hour and a half only in a voyage of more than five days and a half that the Teutonic has beaten all previous passages across the Atlantic, the record is more impressive when we note in comparison the progress made in the past twenty-five years in increasing the speed of ocean steamships. In 1866 the Scotia was a record breaker when she made the trip in 8 days, 2 hours, and 48 minutes. From 1873 to 1880 the best records were between 7 and 8 days, but in 1889 the Alaska was styled the Atlantic greyhound on first making the trip in less than 7 days, her time being 6 days, 18 hours, and 37 minutes. This time was further successively reduced by the Oregon, America, Umbria, and Etruria, but it remained for the City of Paris to first make a record below 6 days, when, in 1889, she made the voyage in 5 days, 19 hours, and 18 minutes, a record first broken this month by both the Majestic and the Teutonic.

To those who, reasoning from these data, conclude that we shall continue to go on in the same ratio, lessening the time required to cross the Atlantic by the building of more powerful steamships, an extended consideration of the difficulties involved would be superfluous. Something will probably be gained, it is true, and it is semi-officially announced that the Cunard Company has prepared plans for the building of a twelve thousand ton steamer, designed to make the voyage in five days, but the greatly increased power that will be required, and the added strength called for in the machinery, to make this gain of a few hours in a ship designed to be commercially successful, present problems to be solved only by the highest engineering skill. The beautiful workmanship and the tremendous power of such great engines as those of the Teutonic and Majestic seem indeed to represent about the acme of present attainment, and the utilization of steam has reached a point hitherto unknown, but he would be a bold man who would, for these reasons, attempt to set a limit to the possibilities of the future.

"ALLEGED DECEPTIONS IN GERMAN STEEL WORKS" CORRECTED.

The proceedings in the Prussian courts of Essen, quoted in these columns, 8th inst., from a statement published on an erroneous report in the London Iron and Steel Trades Journal, were an action brought by the state to prosecute both the author and editor of a local partisan paper on charges of violation of the statutes regulating the privileges of the press. They were indicted for writing and promulgating articles assailing the honor and integrity of a number of citizens, residents of Bochum, both of private and of official standing, charging them with malice aforethought in incensory language with fictitious crimes against the fiscal laws for the purpose of disseminating hatred among the different classes and religious denominations of society and for inciting insurrection. One of the calumnies went to show that the Board of Assessors of Taxes, in connivance with the city authorities in all their numbers, including in their capacity as members of the Common Council the Director-General and some officers of the Bochum Verein, a society for mining and cast steel manufacture, to grossly undervalue the income of every one of their number, and many of their favorites, especially Protestants, some as high as 90 per cent, and to overestimate the people of the middle and lower grades of income, especially Catholics. All the libeled parties appeared on summons as witnesses for the state with straightforward, clear and overwhelming testimony.

The author in his defense evinced great antagonism in violent attacks upon one person especially, the director-general of the steel works, Louis Baare, who stood ready to support separate and aggravating charges of outrages committed upon himself and the great industrial institute he represents. To impair his testimony the defendant charged him with using counterfeit stamps upon inferior and rejected rails and other railroad material, thus making it pass for good. The state's attorney finding that a denunciation to that effect had been made before a magistrate the day previous, temporarily withdrew the separate charges concerning offenses against Baare, in order to avoid delay by postponing the case pending the investigation of the new matter. The latter resulted in the dismissal of the deponent's charge, which during the further course of proceedings was declared unfounded. The defendants were convicted of all the charges preferred, found guilty, and sentenced to a term of imprisonment. Baare, in behalf of the Bochum Verein, had in the meantime deposited in court documentary evidence proving that stamps were regularly and legitimately made at the works upon order and for the proper use and convenience of contracting parties and their representatives, who stamped with them their tested material on acceptance.

The Prussian ministerial department of railroads has published since a table, showing from railroad statistics the accidents which occurred each of the last six years, numbering in all 2,672 cases, of which there

was only one wherein a broken rail was a cause, and that only from being struck by a broken wheel.

Contradiction of the felonious charge has followed from railroads named in the same. The stenographic reports of the court proceedings, and state documents published in German official papers, are the sources of the foregoing narration of this much abused affair.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The first session of the fortieth meeting of this body was held in Washington, August 19. Prof. Goodale, of Harvard, relinquished the presidency to Prof. Prescott, of the University of Michigan. Eight addresses were delivered by the several vice-presidents before their respective sections, the subject of Vice-President Stevenson, of New York, being a study of the Chemung and Catskill groups in relation to the geology of the State of New York. E. W. Hyde, of Cincinnati, addressed the Section of Mathematics and Astronomy on "The Evolution of Algebra;" Prof. J. A. E. Nipher, of St. Louis, the Section of Physics on "Functions and Nature of the Ether of Space;" Prof. R. C. McKenzie, of the Agricultural College of Michigan, the Chemical Section on "Alchemy;" Prof. Thomas Gray, of Terre Haute, Ind., the Mechanical Section on "Problems in Mathematical Science;" Prof. Joseph Jastrow, of Madison, Wis., the Anthropological Section on "The Natural History of Analogy;" and Prof. John M. Coulter, President of the Indiana University, the Biological Section on "The Future of Systematic Botany."

The evening was devoted in part to the annual address of the retiring president, Prof. George L. Goodale, of Harvard, on "Some of the Possibilities of Economic Botany."

The programme of the second day included papers in all except the mechanical section. A technical paper on "A Measure of the Reliability of Census Enumeration" was read by Alexander S. Christie, of Washington. "A National University, Its Character and Purposes," and "The Science and Art of Government" were titles of papers by Lester F. Ward, of Washington. W. J. McGee read a paper on "The Southern Old Fields," followed by one by Colonel Hinton on "Agriculture by Irrigation; Some Social Economic Possibilities." C. R. Dodge read a paper on "The Needs of the American Flax-Fiber Industry," and exhibited samples of flax.

The Biological Section was much interested in "Another Chapter in the History of the Venus Fly Trap," by Dr. J. M. MacFarlane, of Edinburgh. Among other papers read in this section were "Notes on the Physiological and Structural Changes in Cayuga Lake Lampreys" and "The Transformation of the Vermilion Spotted Newt," Simon H. Gage; "On the Kinds of Motion of the Ultimate Units of Contractile Living Matter," John A. Ryder; "A New Nectria," Byron D. Halstead; "The Flora of Carmen Island," Joseph N. Rose; "Uses of the Fermentation Tube in Bacteriology, with Demonstrations," Theobald Smith; and "The Foraminifera, with a New Device for the Exhibition of Specimens," James M. Flint.

In the Geological Section the topics were: "Source of Supply to Lateral and Medial Moraines," by John T. Campbell; "New Meteoric Iron from Arizona containing Diamonds," A. E. Foote; "Post-Glacial Anticlinal Ridges near Ripley and Caledonia, New York," G. K. Gilbert; "Purposes of Mountain Building and their Relationship to the Earth's Construction," Warren Upham; "Notes on an Extinct Volcano at Montreal, Canada," Henry Lampard; "On a New Horizon of Fossil Fishes," E. D. Cope; "On the Age of the Mount Pleasant, Ohio, Beds," Joseph F. James; "Preliminary Report of Observation at the Deep Well near Wheeling, W. Va.," William Hallock; and "The Eureka Shale of Northern Arkansas," T. C. Hopkins.

In the Astronomical Section the topic was "Latitude of the Sayre Observatory," the title of a paper by C. L. Doolittle, and "The secular variation of terrestrial latitudes," by George C. Comstock. Among other papers in this section were: "On a digest of the literature of the mathematical sciences," Alexander S. Christie; "Groups of stars, binary and multiple," G. W. Holley; "Note on some recent photographs of the reversal of the hydrogen lines of solar prominences," by J. A. Brashear; and "Standardizing photographic film without the use of a standard light," Frank H. Bigelow.

Among the papers before the Chemical Section were: "Preliminary notes on the influence of swamp waters on the formation of the phosphate nodules of South Carolina," Chas. T. Reese; "Land and river phosphate pebbles or nodules of Florida," E. T. Cox; "A latent characteristic of aluminum," Alfred Springer; "The influence of negative atoms and groups of atoms on organic compounds," Paul G. Freer; "The calculation of the boiling points of isometrics from their moment of inertia," and "The determination of the true position of the carbon atoms in organic compounds by means of analytical mechanics," Gustavus Hinrichs;