

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 rate for SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year to one address in U. S., Canada or Mexico, on receipt of seven dollars. To foreign countries within Postal Union, eight dollars and fifty cents 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. It 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, 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 specially requested to notify the publishers in case of any failure, delay, or irregularity in receipt of papers.

NEW YORK, SATURDAY, SEPTEMBER 23, 1893.

Contents.

(Illustrated articles are marked with an asterisk.)

Agricultural inventions, recent.....	205	Inventions, recently patented.....	205
Alopecia, treatment of.....	199	Irrigation canal, a cemented.....	202
Ancient, Phoenician.....	201	Lamberton, Dr. Robert A.....	203
Arizona ruins, remarkable.....	204	Measure, units of.....	204
Asteroids, photographic discovery of.....	198	Milk cooler, Merz's.....	197
Bacteria and colds.....	200	Mountainering.....	194
Barrel cover, inside, Friedrichs & Plöge's.....	197	Notes and queries.....	205
Castor oil.....	203	Paster for iron pulleys (5367).....	205
Charcot, Jean Martin.....	200	Patent Office building, proposed new.....	194
Cholera a nitrite poisoning.....	198	Patent Office models, damage.....	199
Cigar tip cutter, a.....	198	Patents granted, weekly record.....	206
Copper plate printing press.....	197	Peach fever.....	199
Docks, Southampton, England.....	196	Pineapple, ferment of the.....	194
Electric wire guide block, Alexander's.....	196	Preservative fluid, a.....	204
Exposition, Columbian—Morse twist drill exhibit.....	193	Railroad trains, apparatus to prevent collisions of.....	201
General view.....	193	Rain making, dynamite.....	200
Rider hot air engine exhibit.....	196	Rubber tire, a good.....	199
Eureka (Tempered Copper Co. exhibit).....	196	Sulphuric acid as a preservative.....	198
Leather belt exhibit, Alexander Bros.....	197	Shortland.....	204
Art pottery exhibit of Wm. Galloway.....	200	Snake bite remedy.....	202
Hammer and edge tool exhibit of Fayette R. Plumb.....	200	Steam boiler, the Wood.....	202
Notes.....	195	Steam, the decomposition of.....	196
Fuel of ocean steamers.....	195	Sugar industry, progress of the.....	203
Furniture springs, Cary's patent.....	203	Telephone, the long-distance.....	194
Harkness, William.....	201	"Towers of Silence," India.....	203
Harvesting rice and wheat.....	203	Trees, big, in a mining country.....	202
		Wreck ship, Limespolis, the.....	204
		Watermelons, how to test.....	198
		Waterways, need of improved.....	204
		Water works pressures (5366).....	205
		World's Fair attendance (5369).....	205
		Zinc, German production of.....	194

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT No. 925.

For the Week Ending September 23, 1893.

Price 10 cents. For sale by all newsdealers.

I. ANTHROPOLOGY.—Parsee Funeral and Towers of Silence.—An interesting paper by a Parsee on the Parsee funeral ceremony and on the disposal of the dead.....	14776
Marriage in Burma.—Interesting notes on the Burmese marriage relations.....	14779
II. ARCHITECTURE.—Handy Tables of Dimensions of Joists and Rafters for Common Purposes.—By H. MAACK.—Tables for use by the practical builder in determining the size of joists and rafters.....	14784
Sparrow's House, Ipswich.—A famous house, dating back to Tudor times.—1 illustration.....	14788
III. BOTANY.—The Source of the Oxygen in Air.—The role of plants in affecting the composition of the atmosphere.....	14790
IV. CIVIL ENGINEERING.—The Tide Indicator at Rouen.—Establishment of a tide indicator near the summit of an accumulator tower at Rouen.—3 illustrations.....	14785
V. COLUMBIAN EXPOSITION.—The World's Columbian Exposition.—The French National Holiday.—Notes on the celebration of the French national holiday, on July 14.—1 illustration.....	14775
VI. ELECTRICAL ENGINEERING.—The Gas Engine as Applied to Electric Light Work.—By GEORGE A. FARWELL.—A practical paper on the results attained in running an electric light plant by Otto gas engines.....	14786
Underground Wires for Electric Lighting and Power Distribution.—By Prof. D. C. JACKSON.—The laying of conduits for heavy currents in cities and elsewhere.....	14787
VII. ELECTRICITY.—Distances at Great Distances.—A recent paper on the transmission of telegraphic signals without wire.—3 illustrations.....	14787
Legal Units of Electrical Measure.—Recommendations adopted at the International Congress of Electricians, at Chicago, fixing the legal units.....	14786
The World's Electrical Congress.—Addresses at the Electrical Congress at Chicago.—Striking tributes to America.....	14788
VIII. GEOGRAPHY.—The Geographical Position and Height of Mount Saint Elias.—By Dr. T. C. MENDENHALL.—Great importance of Mount Saint Elias in determining the United States boundary.—Summary of its height and position.—1 illustration.....	14780
Through the Yanets Gorges.—A river journey in the interior of China.....	14779
IX. GEOLOGY.—Theories of the Origin of Mountain Ranges.—By Prof. JOSEPH LE CONTE.—Conclusion of the address of the retiring president of the American Association.—3 illustrations.....	14776
X. INTERNATIONAL LAW.—The Bering Sea Decision.—Decision of the great international court at Paris.....	14785
Some Unrealized Annexation Projects.—By W. A. CURTIS.—Interesting notes of the history of America, with possibilities of future annexation.....	14780
XI. MECHANICAL ENGINEERING.—The Limitation of Engine Speed.—By CHARLES T. PORTER.—A plea for the safety of high speed of flywheels.....	14784
XII. MISCELLANEOUS.—Canary Rosewoods.—Plants from the Canary Islands, producing essential oils.....	14781
The Cotton Industry.—Popular description of the cultivation and shipping of cotton.—4 illustrations.....	14782
The Sand Frame Trick.—An apparatus used for different tricks in magic.—1 illustration.....	14786
XIII. NATURAL HISTORY.—A Luminous Cephalopod.—A cuttlefish giving beautiful phosphorescent light.—2 illustrations.....	14779
XIV. TECHNOLOGY.—Alcohol from Peat.—Applicability of peat moss for the production of alcohol.....	14790
Extraction of Oils.—Different oils of commerce.—Their factors and tests.....	14789
Pyroxyline Solvents.—A new series of solvents for pyroxyline.....	14790
XV. ZOOLOGY.—The World's Columbian Exposition.—The International Zoological Congress.—A short address by Dr. C. V. RILEY on problems of zoology.....	14786

A NEW PATENT OFFICE BUILDING PROPOSED.

A bill has been introduced in the Senate by the Hon. Mr. Faulkner, providing for the erection, in Washington, of a new building for the Patent Office at a cost, land included, not exceeding three and a half millions of dollars. It is to be fireproof in construction, to be built on the south side of Pennsylvania Avenue, the area of the grounds to be not less than 80,000 square feet, or about two acres. The Secretary of the Interior, the Commissioner of Patents, and the Chief of Engineers, Gen. Casey, are constituted a commission, authorized to make the necessary contracts for the construction, select the plans, and take charge of the work.

The present Patent Office was erected for the special purposes of the bureau, and is sufficiently large for all its needs; but the Patent Office is not allowed to occupy its own building. When the Department of the Interior was created, the new secretary was allowed to occupy rooms in the Patent Office, and to him was given the oversight of that bureau. From year to year the various secretaries have plundered the Patent Office of its rooms, until now the bureau has so little space, its business has so greatly increased, that it is overcrowded in all its parts, and the transaction of business is greatly impeded.

No entreaties of the Commissioners of Patents have availed to induce the Secretaries of the Interior to withdraw from the Patent Office building, and the only recourse appears to be the erection of a new structure. Whether the bill will pass through Congress remains to be seen. But if it does pass, and if a new building is constructed, there is no more certainty the Patent Office will be allowed to occupy or retain it than in the case of the present building. Furthermore, it will be several years before the new structure can be ready for occupancy, and till then the present choked, inadequate and unhealthy quarters must be endured by the examiners and the members of the Patent Office force. We are sorry for them. The present Patent Office is one of the finest edifices in Washington. It is of the Doric order of architecture, 433 feet long, 331 feet wide, 75 feet high. The grounds are more than twice as large as those proposed for the new edifice.

It will be seen by the correspondence in another column that serious damages are being done to the Patent Office models by their removal to another building.

German Production of Zinc.

Germany produces more zinc than any other country in the world; the exportation of zinc is accordingly very heavy, amounting to 28,000 tons, against an importation of not quite 9,000 tons. The main zinc production district is in Upper Silesia, where the metal is made from calamine, and also more and more from zinc blende, by distillation. The smelting of zinc blende has led here, as in other places, to the establishment of very perfect arrangements for utilizing and preventing the deleterious effects of the sulphurous acid generated in the roasting of the ore. In Germany, in 1890, 139,000 tons of zinc were smelted, in which work 9,271 men were employed. The value of the output was 62,000,000 marks (\$15,500,000 approx.), of which 64 per cent was produced in Upper Silesia; 20 per cent in the Arnshurg district; and the remainder in the government districts of Düsseldorf and Aachen (Aix-la-Chapelle), and the kingdom of Saxony. The ore in the western parts of the country is in the main zinc blende. The smelting of zinc is made very difficult, in most localities, by the presence of other metals in the ore. However, by a careful preparation of the ores and purification of the zinc obtained, this difficulty has been overcome. By the use of regenerative gas heating furnaces and well adapted condensers the cost of production has been reduced and loss of metal prevented. With the smelting of zinc, a small production of cadmium is connected.—*Kuhlows.*

Mountaineering.

The question of the proper diet for mountaineering is an interesting and important one. Dr. Wilson recommends bread, tinned meats, sardines, jam, cheese, gingerbread, nuts, chocolate, raisins, and dried prunes, and for beverages, cold tea, cold coffee and either red or white wine. On a stiff day's mountaineering it is usual to take five meals—some light refreshment at 2 or 3 a. m. before starting, such as a cup of bouillon or of bread and milk; three meals out of doors, composed of such articles as those enumerated above; and a good dinner on returning in the evening. The writer recommends climbers "to eat as much as possible on the way up" and to drink as little as possible between meals. Drinking glacier water is to be avoided, and on the Swiss mountains it should not be forgotten that many tempting-looking streams will be found to be polluted by cattle, perhaps at some point higher up and out of sight.

Under the heading of "Hints Medical and Surgical" Dr. Wilson gives some simple but sound and valuable advice. Mountain sickness must be combated by frequent halts, and if very obstinate by descending.

The sufferer is not likely to be affected more than once in the same season. Snow blindness may be prevented by wearing colored spectacles, and if it occurs, should be treated with a solution of cocaine and chloride of zinc. Sunburn may be prevented by the application of ointments or powders, lanoline and oxide of zinc being especially valuable. Frostbite may be combated by rubbing the affected part with snow and then wrapping it in cotton wool or flannel. Exhaustion may be obviated by small quantities of easily digested food and a glass of champagne. Sprains are best treated by heat to the part and afterward rest. Blisters on the feet may be prevented by soaping the insides of the stockings and rubbing the parts with spirit lotion.

We might pursue this fascinating subject further, but must pause for the present. Mountaineering possesses a curious and unique charm for those who have once felt its attraction. Year by year the same persons return to the same Alpine haunts to find the same charm in peak and pass and valley. "Age cannot wither nor custom stale their infinite variety." Especially to the brain worker is mountaineering to be commended, but let him see that he recognizes and accepts the conditions of the sport, and that he does not mar a most delightful pastime by ignorance or temerity.—*The Lancet.*

Success of the Long-distance Telephone System.

The *Western Electrician* says: The recent storm that swept over the East and South was the cause of much distress to telegraph companies, and, in view of the severity of the storm and the wide latitude which it covered, it is not surprising that communication between different sections of the country should have been temporarily severed. The newspapers were among the principal sufferers, and it was impossible for a time to ascertain the extent of the calamity. The service between New York and Chicago was completely prostrated, and Western papers were unable to obtain news or send dispatches to the East.

The *Chicago Evening Post*, however, hit upon the idea of using the long-distance telephone lines, and three columns of news was received in this manner from the New York representative. It is a subject of congratulation for the telephone company that its wires sustained the strain which practically destroyed the telegraph companies' lines.

Construction is responsible for the endurance of the telephone lines, which are built with a view to resist storms, so that they may always be relied upon. The New York-Chicago line is 950 miles long, and is built in the most substantial manner. The poles are of cedar and chestnut, 35 feet and upward in length and averaging about 45 to the mile, making the total number of poles 42,750. They are braced in every way that will tend to add to their stability. The hard-drawn copper wire used weighs 435 pounds to the mile, and the circuit contains 826,500 pounds of copper, or about four times more than would be used for ordinary telephone service in that distance. The line has been in successful operation since last October. Prior to that time the limit of successful transmission did not exceed 500 miles. Now every principal city between Boston and Milwaukee is included in the system.

At present the company is building south from Chicago to Cincinnati, and an office has just been established at Dayton, O. That the long-distance telephone is a practical success and of exceptional value in emergency cases, or where quick personal communication is desirable, there is no room for doubt.

Ferment of the Pineapple.

Mr. R. H. Chittenden has a paper in the *Transactions* of the Connecticut Academy of Arts and Sciences (1893, p. 281) in which he states that the ripe pineapple contains a very powerful proteid-digesting principle, and that the juice also possesses in a remarkable degree the power of curdling milk. The juice appears to contain three distinct proteids. Two of these are separable from the acid juice by heat alone, one at about 75° C., the other at 100° C., while the third is not coagulable by heat, but is precipitated by acetic acid and potassium ferrocyanide. The proteid-digesting power of the juice is manifested in fluids of all reactions, acid, alkaline, and neutral, the ferment being in this respect a trypsin rather than a pepsin; it acts, however, most strongly in a neutral solution. The proteolytic ferment may be separated from pineapple juice by saturation of the neutralized fluid by sodium chloride or magnesium sulphate, the former being the preferable method. It appears to be a mixture of a globulin and a protease.

THE Broadway cable cars, New York City, are lighted with ordinary coal gas, instead of petroleum. The gas is first condensed. In the big power house on Sixth Avenue the gas is first run through a condensing engine, which forces it into a boiler-shaped steel receiver. From there it is drawn, as required, through pipes into the car house adjoining on Seventh Avenue, where the holders underneath the cars are charged. Each holder carries enough of the gas to light a car twelve hours.