# 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.

#### 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. \$4.00 a year to foreign countries belomeint 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 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.

The Architects and Splendid illustrated periodical, issued monthly, containing foot p ans, 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 voice in vork 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, 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, \$1.00 a year.

#### Export Edition of the Scientific American,

Export Edition of the Scientific American,
in which is incorporated "LA AMERICA CIENTIFICA E INDUSTRIAL," or
Snanish edition of the Scientific AMERICAN, published monthly, uniform in size and typography with the SCIENTIFIC AMERICAN. Every number contains about 30 pages, profusely illustrated I list te finest scientific,
industrial export paper published. It circulates throughout Chba, possessions—wherever the Spanish language is speken The SCIENTIFIC
AMERICAN EXPORT EDITIEN has a large guaranteed circulation in all
commercial places throughout the world. \$3.00 a year, post paid to any
part of the world. Single copies 25 cents.

The Manufacturers and others who desire to secure foreign trade, may
have large and handsomely displayed announcements published in this
edition at a very moderate cost.

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

To The safest way to remit is by postal order, express money order, raft or bank check. Make all remittances payable to order of MUNN (action).

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

NEW YORK. SATURDAY, JANUARY 26, 1895.

## Contents.

## (Illustrated articles are marked with an asterisk.)

1894
Horses, the color of
Illumination, artificial
Inventions recently patented.
Lucifer match inventor.
Micrograph, the\*
Microgropical exhibition, a.....

(Illustrated articles are marked with an asterisk.)

Aquarium fishes, foods of 58
Artificial limbs, improved\* 52
Bacteriolory, progress in 55
Bicycle brake, a pneumatic\* 59
Bicycle, progress of 51
Books and publications, new 61
Boulevard Lafayette, New York\* 49
Careprillars, tons of 55
Comet, Edward Swift's 52
Comet, Edward Swift's 52
Comets due in 1895. 58
Commerce, interstate 57
Connete, a bridge of 57
Dennison, the late A L 51
Diphtheria anutoxine, attack on 51
Electric railway conduit, Burgher's\* 59
Electroplating iron ships\* 55
Electroplating iron ships\* 56
Elect Street car fares, cheap, Philastelphia
Hea and coffee culture. Hawaii.
Telautograph, the, in Europe
Tempering edge tools (6357)
Thistile, the Russian
Vault light, (1opp)\*
Vault light, (1opp)\*
Voice, the American
War ships, Chinese, repairing\*
Word filler (6368).

# TABLE OF CONTENTS OF

# SCIENTIFIC AMERICAN SUPPLEMENT

No. 995.

For the Week Ending January 26, 1895.

Price 10 cents. For sale by all newsdealers.

I. BIBLIOGRAPHY.—The Choice of Books.—The present aspect of the world of literature.—Thereading and selection of books..... . 15907 II. BIOGRAPHY.—Count De Lesseps.—Biographical note and por-trait of the great Frenchinan recently deceased....... 

IV. CHEMISTRY. - A New Series of Nitrogen Compounds. - A new series of compounds containing a closed ring of four nitrogen atoms and one carbon atom...

V. CIVIL ENGINEERING.—Straightening a Leaning Chimney.—An
interesting description of a remarkable operation, recently per-

formed. 15886

The Water Supply of Saint Raphael and Frejus.—Recent introduction of the improved water system in these places, utilizing ancient work of the Romans.—2 illustrations. 15897

ELECTRICITY. 2004. VI. ELECTRICITY.—Electric Accumulators Under Pressure.—A very interesting series of experiments on the production of a con-

 MECHANICAL ENGINEERING.—Eight Horse Power Oil Engine.—An explosion engine of English build.—Its construction describ\_cd.—3 illustrations described. -3 illustrations

MINCELLA NEOUS.—The Newspaper and the Art of Making It.—
By CHARLES A. DANA.—Full text of the veteran editor's Cornell

University paper.

XI. RAILROAD ENGINEERING.—The Transandine Railway and Interandine Trunk Lines.—By COURTENAY DE KALB.—The railroad across the Andesnew nearly completed.—A review of the route.

15996

Toute.

XII. SANITARY ENGINEERING. Improved Methods of House Drainage.—A very important paper by an eminent consulting engineer on the sanitation of dwellings.

XIII. TECHNOLOGY.—Emery Wheels.—By W. SAMUEL WORSSAM.—The manufacture of emery wheels and the processes used in their seglomeration.

## AMERICAN FIREARMS IN GERMANY.

The German government is celebrated for its care of its people. Its laws are enacted and applied to the whether threatened by impure foods or other causes. Sometimes the German laws affect the importation of hence are seldom brought. American goods. The German inspection of the smaller class of firearms has operated to completely prevent the sale of American guns.

The German laws provide for the proving by actual firing test of all firearms exposed for sale in that counand locks must be tested in official testing establishments, and if approved must be stamped. The law describes the testing, which, according to circum-governments, and as no newspaper men were present, stances, consists in a single or a double shooting trial. no publicity has heretofore been given to this interest-Any parts of the piece which fail to stand the trial are destroyed by being sawed into or by being broken up.

The law admits as valid the proof marks of the Belgian government "proof house," and also the proof telautograph representatives wrote back and forth for marks of the Gun Makers' Company, of London, and an hour and a half without any trouble. The French of the Birmingham "proof house." The effect is that government was represented by three engineers, who American guns are practically excluded from the German market. To secure admission the trade should which the writing was electrically reproduced was 312½ arrange for the establishment of a proof house whose miles, and all agreed that it was a wonderful spectacle mark or stamp should be acceptable to the German to watch in Paris the instantaneous reproduction of government. As it now stands, all American guns the movements of a pen in the hands of a man writing have to be subjected to trial in Germany, and the expense has proved to be prohibitive. Since the acceptance of the English and Belgian proof marks, the busi-There is an excellent opportunity for the gun trade of us the German market. It might have an excellent effect upon the home product if action were taken in the direction of proving arms for our domestic trade.

## THE STATUTES OF LIMITATIONS IN PATENT SUITS.

To the doctrine of diligence in prosecuting cases within the Patent Office is now superadded by a recent mation of the need of diligence in suing for damages for infringement. It is held that the statutes of limitation of the different States apply in the defense of actions at law for damages for infringement of patents. The decision, dated January 7, 1895, was delivered by Mr. Justice Brown. The case is entitled Campbell v. City of Haverhill.

The action was brought to recover damages for infringement of the claims of a patent, which infringeat law, brought in the United States Circuit Court in of France. the district of Massachusetts. The Massachusetts laws tions applied to this case. The Supreme Court upholds the Circuit Court.

The United States Revised Statutes, section 721, declare that "the laws of the several States, except, etc., . . . shall be regarded as rules of decision in Vinay, the president of the society, spoke in terms of trials at common law, in the courts of the United warm praise of Dr. Elisha Gray and his wonderful in-States, in cases where they apply." This section has been repeatedly held to apply to the statutes of limiup as to whether this section would apply in cases; such as a patent case, based entirely on the United States statutes. In the words of the decision it is expressed thus: "It may be well questioned whether there is any sound distinction in principle between cases where the jurisdiction is concurrent and those , where it is exclusive in the Federal courts. The section.

limitations does apply, and a quantity of decisions are plication of arts of peace to those of possible war. quoted to illustrate the subjection of rights created by Congress to various laws of individual States.

not settled long ago, for it has never been presented logistics, strategy and campaigning, the use of artildirectly to the Supreme Court until now. There were lery and infantry, the minor tactics of war and many two cases found bearing directly on it, but they were other similar problems. And in the course on military site ways. The reason why the Supreme Court has systems of fortifications, sea coast defenses, hasty in that the majority of patent cases are brought for modern ordnance, military electric installation, etc. present infringement of a live patent and ask for an These courses will terminate with examinations, and a formaces. 3 illustrations. These courses will terminate with examination formaces. 3 illustrations. These courses will terminate with examination xIV. TRAVEL AND EXPLORATION.—Domestic Life in Japan.—

By MARY BASIL Browne.—A charming description of the domestic life in Japan and the causes of the happiness found there. 1880 little money in an accounting—the injunction is the ular army officer in charge of the department.

object principally sought. But in the case just spoken of, the patent had expired and damages were sought for infringements committed during its life. Such conservation of the health and lives of the populace, actions are generally regarded as of little value to any one except the lawyers and masters or referees, and

## The Telautograph in Europe.

From private advices received in Chicago, the Western Electrician learns that the long-expected test of Gray's telautograph over the long-distance telephone The law passed in 1891 states that the barrels line between Paris and London came off on the night of December 15, and resulted in a great success. The line is under the control of the French and English ing and important event.

Some delay at the outset was caused by a broken wire at the Paris end, but after this was remedied the were delighted with the result. The distance over in London.

Of the 3121/2 miles of line, 23 miles is submarine cable and 51/2 miles consists of buried conductors at Paris. ness in American guns has come to a standstill. All of the English land line is overhead. Current was supplied, at the London end, by a battery of bichrothis country to take some action which will open for mate cells, two rows in parallel, the voltage being 57, while at Paris there were storage batteries and Callaud cells, the latter being arranged four rows in parallel, the potential being 63 volts. The resistance of the circuit was 716 ohms and the capacity was 11 microfarads. The platen resistance at each end was 550 ohms. The difference in voltage at the ends of the line was merely an incident due to convenient arrangement of the decision of the United States Supreme Court an affir batteries. No change from ordinary conditions was made in the machines or adjustments, except in the Morse relays.

The actual counted speed of transmission was 18 words in 36 seconds at one time and 22 words in 40 seconds at another, the average number of letters in each word being five. The writing was perfectly legible, but somewhat ragged at very high speed.

The French minister of posts and telegraphs, with the officers of his staff, visited the laboratory at Paris ments were committed between October 10, 1877, and and inspected the machines, appearing to be much December 20, 1880, and was begun more than six years interested. One of the department engineers will after the last date of infringement. It was an action make an official report of the test to the government

The telautograph was exhibited and explained at a declare that a limitation of six years applies to all special meeting of the Societe Internationale des actions of tort-that such actions must be begun within Electriciens in Paris on December 18. M. J. Voisenat, six years of the time when the acts were committed, a telegraph engineer, delivered the lecture, which was The Circuit Court decided that the statute of limita-|illustrated by elaborate diagrams and by the actual operation of a set of the machines. About 300 persons were present and all were greatly interested and eager to obtain samples of the electrically transmitted writing. At the conclusion of the lecture A. Postel-

Mr. Cushing, in a recent letter, makes amusing allutation of different States. The question then came sion to the difficulties experienced by the Frenchmen in pronouncing American names. Dr. Gray is known purely within the jurisdiction of the Federal courts, as Eleezi-g-r-r-ray and Mr. Cushing has become Monsieur Coosteen.

# Military Science at Yale University.

The Sheffield Scientific School of Yale University offers this year two interesting courses of instruction in "Military Science and Tactics" and in "Military tion itself neither contains nor suggests such a distinc- Engineering." The first course is obligatory upon the whole senior class in all departments. The study in The court holds that an action for infringement of a both courses will be carried on for the most part by patent should involve no privileges denied to the lectures, though practical instruction in drill will be plaintiff side in other actions. It holds that it would given in the School of the Soldier and School of the be an anomaly to establish a class of actions subject Company, if a number of students desire it. The names to no statute of limitations. If this were the law, of the three most distinguished students in this deusers of patented inventions, perhaps innocent of any partment are sent to the adjutant-general of the army wrong intention, might be "fretted" by actions and are published in the Army Register, and also are brought against them after all their witnesses are sent to the adjutant-general of the State to which the student belongs. The object of the instruction of both The court, therefore, finds that practical consideral these courses of study, it is stated, is to disseminate tions are favored by their decision that the statute of military information and to awaken interest in the ap-

The courses propose to take up and discuss such topics as military economy, the American military It may very pertinently be asked why this point was problem, modern war on field and map, statistics and Circuit Court cases and were decided in exactly oppo-!engineering lectures will be delivered on such topics as never decided the question until now lies in the fact trenchment, military bridges, ballasting machines, injunction and an accounting. Proverbially, there is special military certificate will be awarded by the reg-