Scientific American.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors. PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

A. E. BEACH.

O. D. MUNN.

TERMS FOR THE SCIENTIFIC AMERICAN

The Scientific American Supplement

is a distinct paper from the Scientific AMBRICAN. 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 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 Hates.-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.

Building Edition,

Building Edition. THE ARCHITECTS AND BUILDERS EDITION OF THE SCIENTIFIC AMER-ICAN is a large and splendid illustrated periodical, issued monthaly, con-taining theor 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 archi-tectural work in great variety. To builders and all who contemplate build-ing this work is invaluable. Has the largest circulation of any architec-tural publication in the world. Single copies 25 cents. By mail, to any part of the United States, Canada or Mexice, \$2.56 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, \$3.06 a year.

Spanish Edition of the Scientific American. Spaniss Edition of the Scientific American. LA AMERICA (ENTIFICA E INDUSTRIAL (Spanish trade edition of the SCIENTIFIC AMERICAN) is published monthly, uniform in size and typo-graphy 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 posses-sions-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, 31 Broadway, New York. The safest way to remit is by postal order, express money order, with the bank check. Make all remittances payable to order of MUNN & CO.

NEW YORK, SATURDAY, MAY 17, 1890.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT

No. 750.

For the Week Ending May 17, 1890.

Price 10 cents. For sale by all newsdealers

THE COPYRIGHT BILL FAILS TO PASS.

resentatives by a vote of 126 to 98 disproves the asserwas asked to make it a law.

be a publishers' bill, and to be strongly opposed to the seven yards. this side the ocean at all.

was due to the action of Mr. Payson, of Illinois, by three yearly crops of cotton. which was struck out the provision that foreign books should be printed in the United States to obtain a copyright.

But was it not logical and reasonable to divest it of this clause, its passage being asked on the plea that it was to benefit authors?

The promoters of the measure have all along maintained that the author has as clear a right to the possession and free disposal of the work of his brain as the producer of any other kind of marketable merchandise. They insisted that it was dishonest to take a market, would have given him leave only on condition from the already fruitful cotton plant. that he accepted the terms of publishers on this side the water. How he would be in any wise bettered by such an arrangement it is hard to see; how the cause of that international honesty of which so much has been said would be advanced by such an arrangement, is equally obscure.

To the ordinary mind the bill which has been defeated looked simply to self-interest, to the interest of a small class of the community, to wit, to the publishers, as against the many. It would, in fact, have tended to raise the price and consequently restrict the sale of the reprint, that boon to hungry readers. If that was not the aim of the promoters of international copyright, it would assuredly have been the result of the measure they sought to have made a law.

A FIBER FROM COTTON STALKS.

The result of the formation of the jute bagging trust has been to array against it the powerful Farmers' Alliance, now numbering, it is claimed, over two million members in the South and West. When the trust was first formed, the price for bagging was advanced from seven to twelve and fourteen cents a yard, though the price since then has fallen very much from the latter figures. The Southern planters requiring bagging for their cotton made up their minds on no account to make any purchases from the jute bagging trust, and some of them, in order to keep this vow, have used other bagging which entailed a net loss of a dollar on every bale sent to market. The high price of jute bagging, as well as the bitter war between the planters and the trust, have greatly stimulated the production of substitutes. Pine needles, bear grass, palmetto, and Spanish bayonet fibers have all been employed, but the product has been far from satisfactory. The bagging made from pine needles has been more extensively used, perhaps, than any other, but it is apt to stain the cotton, and it tears easily. Cotton sheeting is used, but this also is not strong enough, and the insurance companies object to it as not offering sufficient protection to the cotton in case of fire. As a further indication of the desperate shifts to which planters have resorted rather than use jute bagging, it may be said that

stalks by means of a breaker. It is said, however, that The defeat of the copyright bill in the House of Rep- | the bark can also be stripped off by hand, or the stalks may go through the machine in their natural state, and tion so often made in certain quarters that the senti- the rollers will do the work just as thoroughly. The ment of the public is growing more and more favorably main feature of the fiber-producing machine consists in disposed to the measure, for, remembering that the the forward and backward movement of the rollers, vote on the measure last session was almost a tie, it which action separates the fiber while the water underwould seem that longer consideration of its merits has neath washes out the glue. The advocates of the new increased rather than lessened the opposition to its process claim that they can pay \$2 a ton for cotton passage. Nor will the fate of this bill appear under stalks delivered at railroad stations, and make from served, when its characteristics and intent are criti- them a bagging which can be sold at 7½ cents a yard, cally examined. It purported to be an "authors" bill. a price at which they claim jute bagging cannot be In their name it was drawn up, in their name Congress, manufactured at a profit. The article produced from cotton fiber weighs about two and a quarter pounds to On examination it proved, instead of an authors', to the yard, and the average requirement for a bale is

interest of the general public, giving the publishers; A cotton exporter recently stated that the bagging the right to increase the cost of foreign books-a vir-|made from cotton stalks which he had examined retual monopoly or patent for 42 years; indeed, the sembled jute so closely that even a person who was foreign author being left to accept whatever terms accustomed to handling cotton would not readily dewere offered him or be debarred from publishing on tect the difference. It will not stain the cotton, and will show marks easily. It is said that the annual The promotors of the bill seem agreed that its defeat yield of stalks will produce bagging sufficient to bale

Should the new fiber stand the test of general use, it is easy to see that a new and extensive industry has been opened up. Cotton stalks have heretofore been considered a nuisance by planters, but if they can be made into a bagging for the baling of cotton, a great step in advance will be made. No one dreamed a few years ago that oil as well as other valuable products could be produced in paying quantities from cotton seed, but this utilization of the seed forms one of the most striking as well as one of the most important of recent advances in manufacturing. The public will foreign author's works without compensation. Yet doubtless watch with much interest, to see if still anthe law they recommended, instead of opening a free other new and important product is to be developed

Opening of the New Dry Dock at the Brooklyn Navy Yard.

The Simpson dry dock, which has already been described and illustrated by us (see SCIENTIFIC AMERI-CAN, November 30, 1889) was formally opened on Friday, May 9, in the presence of a number of spectators, including many visitors and invited guests from Washington, Baltimore, and Philadelphia, as well as representative naval officers, engineers, and others of the vicinity. Promptly at 10:30 A. M. the dock was flooded, and in one hour and five minutes was full. The caisson was then lightened by the ejection of some of its water ballast and floated to one side. The U.S. monitor Puritan was next placed in the dock, the caisson was replaced and the large pumps started, emptying the dock and leaving the ship upon the keel and bilge blocks. A very elegant collation was then tendered the visitors. In all respects the occasion may be termed a success, and the officials of the Brooklyn Navy Yard are to be congratulated on this last addition to their plant.

Keeping at it.

It is a great mistake to suppose that the best work of the world is done by people of great strength and great opportunities. It is unquestionably an advantage to have both these things, but neither of them. quoting from the Manufacturer and Builder, is a necessity to the man who has the spirit and the pluck to achieve great results. Some of the greatest work of our time has been done by men of physical feebleness. No man has left a more distinct impression of himself on this generation than Charles Darwin, and there have been few men who have had to struggle against such prostrating ill health. Darwin was rarely able to work long at a time. He accomplished his great work by having a single aim, and putting every ounce of his force and every hour of his time into the task which he had set before him. He never scattered his energy, he never wasted an hour, and by steadily keeping at it, in spite of continual ill health and of long intervals of semi-invalidism, he

 Indians. now in operation at Lawrence, Kan.—Its present work and future prospects, with graphic illustrations 9 illustrations 1987 V. ELETTRICITYResistance of Hydrogen and Other Gases.—By E. VILARTA research upon the resistance of different gases to the electric discharse.—An investigation of orignality and merit. 11975 V. HOROLOGY.—The Alarm Watch.—The history of the alarm watch, with illustrations of a new system of sounder for a watch	cotton has been received in New York baled with willow sticks and iron hoops, so that it was necessary to open the bales with an ax. Reliable advices from Augusta, Ga., recently received seem to indicate that the want of a satisfactory substi- tue for jute bagging has been met by producing a fiber from cotton stalks. Mr. William E. Jackson, a lawyer of Augusta, has given a good deal of time and attention to developing the process. He commenced experimenting with a machine patented to produce certain South American fibers by running cotton stalks through it and then submitted the fiber to a carding machine, and the result was an article which closely resembles what is known as jute butt yanks. Mr. Jackson then sent a bale of this material to a bagging factory at Paterson, N. J., and proceeded thither himself, and the bagging which was produced under his direction has been declared to be an excellent article. A detailed description of the process by which the fiber has been obtained cannot be given at this time, but it is known that the bark is removed from the	did a great work, and has left the impression upon the world of a man of extraordinary energy and working capacity. Success is rarely a matter of accident; al- ways a matter of character. The reason why so many men fail is that so few men are willing to pay the price of self-denial and hard work which success exacts. Burning of the Great Singer Sewing Machine Works. The great works of the Singer Sewing Machine Co., at Elizabethport, N. J., were seriously damaged by fire on the 6th of May. The main building, with its valu- able contents, including millions of needles, several thousand finished sewing machines, and an immense stock of partly finished machines, tools, etc., were de- stroyed. The loss is estimated at \$750,000. Rebuilding will be at once commenced, and temporary structures erected for the immediate resumption of regular work. The entire area occupied by the company is 32 acres. The main building was 230 feet long, 60 feet wide, with aunex 800 feet long, 50 feet wide, 4 stories high,
examination -24 illustrations 1197	But it is known that the bark is removed from the	annex 500 feet long, 30 feet wice, 4 stories high.

Microscopical Reception.

The annual reception of the Department of Microscopy of the Brooklyn Institute took place on the 8th Honduras was shown by H. Hensoldt, Ph.D. The other convenient places. The public is greatly pleased inst. The occasion was one of considerable interest. beautiful diplay of colors for which these gems are at the discarding of the complicated machinery of There were 72 exhibits shown under as many micro- noted was here exhibited in a section of the thinness ticket selling as practiced under the old system. scopes. The number of guests present exceeded 1,000; of tissue paper. Foot of the emerald spider, by the to the members of the department.

The following list of exhibits is so long as to preclude the possibility of giving a description of each one.

Volcanic dust from Java eruption. Fell on the bark Arabella, August 28, 1883, 1,000 miles from Java. Lat. 5° 37" S.; long. 88° 58" E. Ringworm of scalp, prepared to show its effect on the hair. Foot of silkworm. Callimome regius, a parasitic fly, exhibited by Mr. Henry Fincke. Peptic glands from the cardiac region of the pendages are used by the insect to saw a fine slit in a stomach of the frog, Dr. Heber N. Hoople. Skin of eel, scales in situ, shown by polarized light, by Mr. William Finney. Micro photograph, Declaration of Independence, Prof. W. Le Conte Stevens.

Section of pallasite (meteorite), from Kiowa County, Kansas, shown by Mr. George F. Kunz. The Kiowa County meteorites numbered twelve in all, of which lime. Shown by polarized light. The blood of snake, six were pallasites (a spongy iron filled with olivine).

Pollen of the century plant, from a plant in the conservatory of the late Wm. Darlington, Pittsburg, Pa. Age at bloom fifty-one years. Was shown by Mr. W. G. Bowdoin. One hundred and twelve different varieties and species of diatoms arranged on one slide were shown by Mr. G. D. Hiscox.

Dr. Herbert Fearn exhibited a section of human kidney. Double injected. Arteries and malphigian tufts injected red, and veins injected blue. In the nee, curator. lighter portions were seen the uriniferous tubules. A section of melaphyre from Bas Matachin, Isthmus of Panama, was shown by Mr. Thomas B. Briggs. This is one of the very hard rocks encountered in the excavation of the proposed Panama canal. Melaphyre was described as a fine-grained brownish-black aggregate of plagioclase, augite, olivine, magnetite, and delessite or chlorophocite. Mr. James Walker exhibited a section of prehnite, from the glacial drift of Brooklyn. A vertical section of human scalp, showing hairs, etc., in situ, was shown by Dr. C. K. Beldin. The exhibits of Mr. George E. Ashby consisted of a transverse compensation. The Hon. A. F. Zeberger, ex-collector section of leaf (pine needle) of Scotch fir and spiracles of customs, has been made treasurer, and W. K. Acker-(breathing pores) and tracheæ (air tubes) of silkworm. The aeration of the blood in insects is provided for by road, auditor. the introduction of air into every part of the body. through a system of minutely distributed air tubes.

was shown by Mr. Joseph Ketchum. Rutile crystals in legislation, Edwin Walker; foreign exhibits, W. T. quartz, from North Carolina, and artificial crystals of Baker; catalogues and printing, Rollin A. Keys; cadmium, constituted the exhibit of Mr. George M. Mather. Mr. Frank Healy presented polycystina from Springfield, Barbados, and butterfly scales arranged to form a bouquet of flowers. Quartz crystals, from Herkimer Co., New York, were shown by Mr. Charles chairmen of the standing committees constitute the Ronfeldt. Pond life formed the exhibits of Mr. Stephen executive committee. Helm and Mr. C. H. Taylor. Spore cases of fern from New Zealand were shown by Walter H. Kent, Ph.D. Transverse section of petiole (leaf stalk) of carrot, by first Monday in June, 1890, and on the proposition to Mr. William W. Laing. Pollen of moon flower, by Mr. change the name of the fair to "The World's Colum-William Lowey. Mr. Edward C. Chapman exhibited a bian Exposition." transverse section of stem of beech. A beautiful cluster of gold artificial prisms, and aurified cloth were shown by Dr. A. J. Watts. The cotton fiber of the latter specimen has been replaced by gold, a substitution similar to that which has taken place in petrified Prof. E. J. James, of the University of Pennsylvania, wood.

Crystals of proustite, "ruby silver," from Chili, S. A., were shown by Dr. Joseph H. Hunt. This silver ore ment in railroad management has been going on in contains 65 per cent of the metal. The illumination Hungary. As a result, a new system of passenger was effected by means of a paraboloid condenser. tariffs was worked out and put into operation on the Ancient iridescent glass from Cyprus was shown by first of August, 1889. The method adopted was that reflected and polarized light, by Mr. Geo. M. Hopkins. commonly known as the zone-tariff system, in which the Foraminifera, the skeleton remains of a low order of rates are fixed, not according to the number of miles animal life, chiefly marine, formed the exhibit of Mr. traveled by the passenger, but according to the number William Potts. Section of granite, by polarized light, of zones traversed or entered upon during the journey. and cyclosis (circulation) of protoplasm in cell of |Starting from a given center, the railroads are divided chara, one of the fresh water algæ, were shown by into fourteen zones or stretches. The first zone includes

by Mr. J. D. Mallonee. Iron sand from Shelter Island; verse section of spines of echinus. The saws of saw-fly formed the exhibit of Mr. H. S. Woodman. These apleaf, in which the eggs are deposited.

Artis H. Ehrman. Sulphide of nickel, from Chili, S. A., by Mr. F. L. Lathrop. Crystals of oxalate of double stained, showing the corpuscles and their nuclei, by Frederick J. Wuling, Ph.G., and the seed of gentian, by Mr. John H. Royael, complete the list of very interesting objects shown on this occasion.

The officers of the department, under whose administration the preparations were made for the reception, were Rev. J. L. Zabriskie, president; Mr. Geo. M. Mather, vice-president; Mr. George E. Ashby, secretary; Mr. Edward C. Chapman, treasurer; Mr. J. D. Mallo-

The newly elected officers are : Mr. H. S. Woodman, president; Dr. S. E. Stiles, vice-president; the other officers having been re-elected.

Progress of the Chicago World's Fair.

The officers' salaries have been fixed. The president is to receive \$6,000 annually; vice-president, \$12,000; treasurer, \$5,000; and auditor, \$5,000. Vice-President Bryan receives a larger salary because it is expected that he will relieve President Gage of most of the work. Second Vice-President Potter Palmer declined any man, formerly President of the Illinois Central Rail-

The members of the ten standing committees met and elected the following chairmen: Finance, Ferd Transverse section of peduncle of yellow water lily W. Peck; grounds and buildings, De Witt C. Cregier; transportation, Stuyvesant Fish; fine arts, C. L. Hutchinson; machinery and electric appliances, De WittC. Cregier; ways and means, Otto Young.

The president, first and second vice-presidents, and

A meeting of stockholders has been called to vote an assessment of 18 per cent on the stock, payable the

Letter Postage Principle for Railroad Fares. At a recent meeting of the American Academy of Political and Social Science, held in Philadelphia, said :

For the last nine months a most interesting experi-

The railroad tickets are now placed on sale like postopaque; Mr. George A. Street. A section of opal from age stamps at the post offices, hotels, cigar shops, and

The most interesting thing, however, in this experithe array of instruments was very fine indeed, and the same exhibitor. In the latter object the two combs ment is the way in which the passenger traffic has ininterest manifested in the exhibits was very gratifying used by the spider in arranging the lines of his web are creased under the stimulus of the new rates. The numseen in rare perfection. Mr. Henry S. Gibson showed | ber of passengers during the last five months of 1887 the eggs of bot fly. A transverse section of ovary of was 2,389,400; during the same period of 1888 it was Rhododendron pontium was shown by Dr. Hugh M. 2,381,200; while for the same period of 1889-the first Smith. Torbernite crystals, a cupreous phosphate of period under the new system-it was 5,584,600, an inuranium, from Cornwall, England, was exhibited by crease of over 133 per cent. The receipts from the Mr. J. W. Freckelton. Dr. S. E. Stiles showed a trans- traffic under the new system were over 18 per cent greater than under the old. In other words, passenger traffic will respond to lower rates, a thing which some railroad managers have denied.

It would be well for our own railroad managers who Dr. J. M. Van Cott, Jr., exhibited a large number of complain that passenger traffic is not profitable to look sections illustrating human tissue. Elytron (wing into the matter. The American people, reputed to be cover) of jewel snout beetle, from Brazil, S. A., by Mr. the most restless in the world, do not have nearly as many passengers per head of the population as England, and it is far exceeded in the number of passengers to miles of railway by half a dozen countries of Europe.

----Shell Mounds of Florida.

Colonel Joseph Wilcox, one of the managers of the Archæological Museum of the University of Pennsylvania, recently gave a short account of his explorations in the Florida shell heaps. He said he had never traveled in any part of the United States that presented so many remains of the former race as Florida. The mounds were of two classes. Along the coast and the banks of the rivers they were composed of shells, while those away from the rivers and the sea are made of sand. These mounds are of prodigious size, some of the largest being twenty to thirty acres in extent, and twenty to forty feet in height. The shell mounds are composed almost exclusively of oyster shells, a large conch, which was evidently eaten, being the next most plentiful. Many of the latter have a hole broken in the top, through which it is probable the animal was drawn. The shells in one of the mounds he examined varied from those of the present day, partaking of the character of those of the Pliocene fossils, and indicate that the mound was made a very long time ago. He exhibited a collection of objects from Florida, including two gold beads, and a superb fragment of pottery that was thought to be of Georgia manufacture. In commenting upon this piece, which he presented to the museum, he said that the Greek fret, the scroll work, and many forms of classical decoration are to be discovered on the American pottery, and if we want to study the beginning of classic art, we should study the aboriginal art of America, an art that was nipped in the bud by the terrible Spanish invasion.

Themuseum, although only organized last year, is so well cared for by its friends that its collection is now second to none in the country.

Ether.

The so-called pure commercial article always contains various impurities which, on spontaneous evaporation, remain behind as an ill-smelling residue. Sulphur is detected by shaking up the sample in question in a test tube with a drop of pure bright mercury. If the quantity of sulphur is very small the surface of the mercury is merely rendered dull and gray. If there is much sulphur, the entire liquid turns gray or black. Pure chloroform does not reduce alkaline permanganate unless a trace of alcohol is present. Bertram Blount (Analyst) describes a series of impurities in so-called pure reagents. P. Lohman (Pharm. Zeitung and Chemiker Zeitung) discusses the purity of commercial reagents required in chemico-legal investigations. Zinc and sulphuric acid can easily be obtained free from arsenic. Hydrochloric acid which fulfills the requirements of the Pharmacopaia may contain traces of arsenic. Hydrochloric acid freed from arsenic by means of tin is usually stanniferous. Chloric acid may contain arsenic, and usually contains baryta.

Prof. Franklin W. Hooper. A transverse section all stations within 25 kilometers of the center; the secthrough head of larva of newt, showing cerebrum, ond, all more than 25 and less than 40, etc.; each zone eyes with lens and retina, tongue and lower jaws, cartilaginous bones and blood vessels, was exhibited by Mr. Ludwig Riederer.

Rev. J. L. Zabriskie's exhibit consisted of : Teeth of zone. mosquito, showing eleven teeth at the extremity and How radical a change this system implies for a large upon the thin edge of each flattened, bristle-like part of the traffic can be seen in the extreme cases, i.e., mandible; the ovipositor of the narrow winged katydid, polarized, showing two saws, two sheaths, and The fare for all stations in the fourteenth zone, which India, which fell March, 1853, shown by polarized capital, are 8, 5 80, and 4 gulden respectively for the ed the exhibit of Mr. Albert A. Hopkins.

Peckham. The tip of the sting is broken off on enter- cents. ing the skin, and the poison from the gland below is doptera, opaque; shown by automatic revolving stage; 'now only 92.

after the first up to the twelfth being 15 kilometers long,

in those in which the reduction has been the greatest. two stylets. A section of meteoric stone from Segowlee, includes all stations more than 225 kilometers from the presented the cases of patients in whom there had been light; and meteoric iron from Toluca, Mexico, etched three classes, corresponding to \$2.88, \$2.08, and \$1.44. supply defects in the leaders of the hands, to which to show the Widmanstattian and Nauman lines, form- If we had the same rate in this country, it would be complete mobility had been restored. This case has possible to buy a railroad ticket to Chicago from New previously been impossible. In the case of another Stinging hairs of nettle were shown by Prof. W. C. | York for \$2.92. The fare to Philadelphia would be 29 patient Professor Gluck removed a tumor from the

The simplification of the tariff is very great. Under inserted ivory, and no shortening ensued. In another pressed through the tube of the sting into the flesh. the old system, the number of distinct tickets which had case he removed a large piece of nerve in the groin and Scales of thirty varieties of South American lepi- to be kept in every large office was nearly 700. It is inserted catgut, and the functions remained completely satisfactory.

Achievements of Surgery.

At the Surgical Congress at Berlin, Professor Gluck, or, as we should perhaps better say, wide. Tickets are of Berlin, gave (says Dalziel) an exhibition showing a sold by zones, being good for all stations within the most valuable advance in surgery, namely, the successful substitution of catgut, ivory, and bone freed from chalk, for defects in bones, muscles, and nerve sinews. The juices of the body are sucked up in the inserted material, thereby establishing the junction of the separated ends, without any shortening of the part. He an insertion of from six to ten centimeters of catgut to thigh, causing a considerable defect in the bone. He