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(Illustrated articles are marked with an asterisk.)

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Table listing contents of the supplement by category: I. AGRICULTURE AND FARMING, II. BIOLOGY, III. CHEMISTRY, etc., with page numbers.

THE COPYRIGHT BILL FAILS TO PASS.

The defeat of the copyright bill in the House of Representatives by a vote of 126 to 98 disproves the assertion so often made in certain quarters that the sentiment of the public is growing more and more favorably disposed to the measure, for, remembering that the vote on the measure last session was almost a tie, it would seem that longer consideration of its merits has increased rather than lessened the opposition to its passage.

On examination it proved, instead of an authors' bill, to be a publishers' bill, and to be strongly opposed to the interest of the general public, giving the publishers the right to increase the cost of foreign books—a virtual monopoly or patent for 42 years; indeed, the foreign author being left to accept whatever terms were offered him or be debarred from publishing on this side the ocean at all.

The promoters of the bill seem agreed that its defeat was due to the action of Mr. Payson, of Illinois, by 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 foreign author's works without compensation.

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.

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.

Reliable advices from Augusta, Ga., recently received seem to indicate that the want of a satisfactory substitute 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.

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

stalks by means of a breaker. It is said, however, that the bark can also be stripped off by hand, or the stalks may go through the machine in their natural state, and the rollers will do the work just as thoroughly. The main feature of the fiber-producing machine consists in the forward and backward movement of the rollers, which action separates the fiber while the water underneath washes out the glue.

A cotton exporter recently stated that the bagging made from cotton stalks which he had examined resembled jute so closely that even a person who was accustomed to handling cotton would not readily detect the difference. It will not stain the cotton, and will show marks easily. It is said that the annual yield of stalks will produce bagging sufficient to bale three yearly crops of cotton.

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.

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 AMERICAN, 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.

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.

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 valuable contents, including millions of needles, several thousand finished sewing machines, and an immense stock of partly finished machines, tools, etc., were destroyed. The loss is estimated at \$750,000.

**Microscopical Reception.**

The annual reception of the Department of Microscopy of the Brooklyn Institute took place on the 8th inst. The occasion was one of considerable interest. There were 72 exhibits shown under as many microscopes. The number of guests present exceeded 1,000; the array of instruments was very fine indeed, and the interest manifested in the exhibits was very gratifying 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. *Calimome regius*, a parasitic fly, exhibited by Mr. Henry Fincke. Peptic glands from the cardiac region of the 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 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 malpighian tufts injected red, and veins injected blue. In the 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 leucite 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 section of leaf (pine needle) of Scotch fir and spiracles (breathing pores) and tracheæ (air tubes) of silkworm. The aeration of the blood in insects is provided for by the introduction of air into every part of the body through a system of minutely distributed air tubes.

Transverse section of peduncle of yellow water lily was shown by Mr. Joseph Ketchum. Rutile crystals in quartz, from North Carolina, and artificial crystals of 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 Ronfeldt. Pond life formed the exhibits of Mr. Stephen 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 Mr. William W. Laing. Pollen of moon flower, by Mr. William Lowey. Mr. Edward C. Chapman exhibited a 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 wood.

Crystals of proustite, "ruby silver," from Chili, S. A., were shown by Dr. Joseph H. Hunt. This silver ore contains 65 per cent of the metal. The illumination was effected by means of a paraboloid condenser. Ancient iridescent glass from Cyprus was shown by reflected and polarized light, by Mr. Geo. M. Hopkins. Foraminifera, the skeleton remains of a low order of animal life, chiefly marine, formed the exhibit of Mr. William Potts. Section of granite, by polarized light, and cyclosis (circulation) of protoplasm in cell of chara, one of the fresh water algæ, were shown by Prof. Franklin W. Hooper. A transverse section through head of larva of newt, showing cerebrum, 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 mosquito, showing eleven teeth at the extremity and upon the thin edge of each flattened, bristle-like mandible; the ovipositor of the narrow-winged katydid, polarized, showing two saws, two sheaths, and two stylets. A section of meteoric stone from Segowlee, India, which fell March, 1853, shown by polarized light; and meteoric iron from Toluca, Mexico, etched to show the Widmanstättian and Nauman lines, formed the exhibit of Mr. Albert A. Hopkins.

Stinging hairs of nettle were shown by Prof. W. C. Peckham. The tip of the sting is broken off on entering the skin, and the poison from the gland below is pressed through the tube of the sting into the flesh. Scales of thirty varieties of South American lepidoptera, opaque; shown by automatic revolving stage;

by Mr. J. D. Mallonee. Iron sand from Shelter Island; opaque; Mr. George A. Street. A section of opal from Honduras was shown by H. Hensoldt, Ph.D. The beautiful display of colors for which these gems are noted was here exhibited in a section of the thinness of tissue paper. Foot of the emerald spider, by the same exhibitor. In the latter object the two combs used by the spider in arranging the lines of his web are seen in rare perfection. Mr. Henry S. Gibson showed the eggs of bot fly. A transverse section of ovary of *Rhododendron pontium* was shown by Dr. Hugh M. Smith. Torbernite crystals, a cupreous phosphate of uranium, from Cornwall, England, was exhibited by Mr. J. W. Freckelton. Dr. S. E. Stiles showed a transverse section of spines of echinus. The saws of saw-fly formed the exhibit of Mr. H. S. Woodman. These appendages are used by the insect to saw a fine slit in a leaf, in which the eggs are deposited.

Dr. J. M. Van Cott, Jr., exhibited a large number of sections illustrating human tissue. Elytron (wing cover) of jewel snout beetle, from Brazil, S. A., by Mr. Artis H. Ehrman. Sulphide of nickel, from Chili, S. A., by Mr. F. L. Lathrop. Crystals of oxalate of lime. Shown by polarized light. The blood of snake, 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. Mallonee, curator.

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 compensation. The Hon. A. F. Zeberger, ex-collector of customs, has been made treasurer, and W. K. Ackerman, formerly President of the Illinois Central Railroad, auditor.

The members of the ten standing committees met and elected the following chairmen: Finance, Ferd W. Peck; grounds and buildings, De Witt C. Cregier; legislation, Edwin Walker; foreign exhibits, W. T. Baker; catalogues and printing, Rollin A. Keys; transportation, Stuyvesant Fish; fine arts, C. L. Hutchinson; machinery and electric appliances, De Witt C. Cregier; ways and means, Otto Young.

The president, first and second vice-presidents, and chairmen of the standing committees constitute the executive committee.

A meeting of stockholders has been called to vote an assessment of 18 per cent on the stock, payable the first Monday in June, 1890, and on the proposition to change the name of the fair to "The World's Columbian Exposition."

**Letter Postage Principle for Railroad Fares.**

At a recent meeting of the American Academy of Political and Social Science, held in Philadelphia, Prof. E. J. James, of the University of Pennsylvania, said:

For the last nine months a most interesting experiment in railroad management has been going on in Hungary. As a result, a new system of passenger tariffs was worked out and put into operation on the first of August, 1889. The method adopted was that commonly known as the zone-tariff system, in which the rates are fixed, not according to the number of miles traveled by the passenger, but according to the number of zones traversed or entered upon during the journey. Starting from a given center, the railroads are divided into fourteen zones or stretches. The first zone includes all stations within 25 kilometers of the center; the second, all more than 25 and less than 40, etc.; each zone after the first up to the twelfth being 15 kilometers long, or, as we should perhaps better say, wide. Tickets are sold by zones, being good for all stations within the zone.

How radical a change this system implies for a large part of the traffic can be seen in the extreme cases, *i. e.*, in those in which the reduction has been the greatest. The fare for all stations in the fourteenth zone, which includes all stations more than 225 kilometers from the capital, are 8, 5-80, and 4 gulden respectively for the three classes, corresponding to \$2.88, \$2.08, and \$1.44. If we had the same rate in this country, it would be possible to buy a railroad ticket to Chicago from New York for \$2.92. The fare to Philadelphia would be 29 cents.

The simplification of the tariff is very great. Under the old system, the number of distinct tickets which had to be kept in every large office was nearly 700. It is now only 92.

The railroad tickets are now placed on sale like postage stamps at the post offices, hotels, cigar shops, and other convenient places. The public is greatly pleased at the discarding of the complicated machinery of ticket selling as practiced under the old system.

The most interesting thing, however, in this experiment is the way in which the passenger traffic has increased under the stimulus of the new rates. The number of passengers during the last five months of 1887 was 2,389,400; during the same period of 1888 it was 2,381,200; while for the same period of 1889—the first period under the new system—it was 5,584,600, an increase of over 133 per cent. The receipts from the 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 complain that passenger traffic is not profitable to look into the matter. The American people, reputed to be 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.

The museum, 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 chemicolegal investigations. Zinc and sulphuric acid can easily be obtained free from arsenic. Hydrochloric acid which fulfills the requirements of the *Pharmacopœia* 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.

**Achievements of Surgery.**

At the Surgical Congress at Berlin, Professor Gluck, of Berlin, gave (says Dalziel) an exhibition showing a 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 presented the cases of patients in whom there had been an insertion of from six to ten centimeters of catgut to supply defects in the leaders of the hands, to which complete mobility had been restored. This case has previously been impossible. In the case of another patient Professor Gluck removed a tumor from the thigh, causing a considerable defect in the bone. He inserted ivory, and no shortening ensued. In another case he removed a large piece of nerve in the groin and inserted catgut, and the functions remained completely satisfactory.