THE POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported for the Scientific American.]

The usual weekly meeting of the Polytechnic Association of the American Institute was held, at their room, in the Cooper Building, this city, on Thursday evening, March 14, 1861, Professor Mason in the chair.

PLOWING THE PRAIRIES.

Mr. JESSE FRYE exhibited a model of a "steam horse of-all-work," and a series of gang-plows, especially intended for plowing the Western prairies. The principle of the plow is intended to avoid both bottom and land-side pressures. The track of the wheels is plowed up after they pass, leaving the whole surface of the land perfectly light. By plowing from twenty to thirty-four feet wide, the expense of plowing is to be very much reduced, but three men being required to plow 160 acres per day. The subject was referred to a committee, consisting of Messrs. Butler, Dibben and Johnson.

COTTON.

The PRESIDENT exhibited a specimen of the yellow cotton, brought originally from China in the form of nankeen. It was transferred to Georgia; but it was found that it intermixed with the white cotton, so that its cultivation was laid aside. Its fiber is light and short, rather more twisted than that of ordinary cotton. A specimen of cotton purporting to come from Peru, upon microscopic examination proved not to be a true cotton, the fiber not having the screw form. In the Astor Library he had found the English Parliamentary reports complete from the day they commenced printing their reports down to the last session. Commencing with the volume for 1836, in which are the first reports relative to the cotton culture in India, he had carefully examined all the reports to 1846, and would proceed to examine these subsequently made. In the first paper upon the subject, the success in the culture of American cotton is attributed to the high intelligence of the overseers, mentioning also the peculiar adaptation of the very slender fingers of the Creoles for taking the cotton cleanly from the pod. After various experiments, at enormous expense, in the East Indies, for ten years, it was advised that the cotton produced, on account of the inequality of the length of the staple, and its extreme tenderness, be sent to the Canton market, being unfit for the British market. The failure was attributed, first, to the utter incompetency of the natives to be trained to neat and orderly work, and they say that nothing but the most strict oversight and perfect authority of the men who command over those that do the labor, can produce anywhere a successful crop to compete with the American cotton. The second difficulty was their periodical rainy and dry seasons; whereas here the Blue Ridge, extending from New York to Texas, is a regular provider of rains through all the period from the planting of the cotton until it is fully ripe, and the cotton region rarely suffers from drouth. Another remarkable fact is that while the cottons here improve under culture, in India they decline with improved culture. The reports also confirm the statement that the perrennial cottons are unfit for the market, and the culture of the cotton trees has been abandoned.

Dr. STEVENS said that the characteristics of cotton may be best understood by considering its object, which is to preserve and distribute the cotton seed. The cell of the fiber is originally hollow; but collapses, which gives it a twisted and flattened form, thus introducing more air into the mass. One function of the flax fiber is to transmit silica to the plant. The silica is transmitted in the form of silicate of potash; and when the silica is used the potash is deposited between the cells of the fiber, or even within the cavities of the cells. The cotton fiber has no occasion for the introduction of silica or potash into it; and this is a radical distinction between the two. The cotton fibers radiate from the seed like those of the dandelion; and the consequence is that those on the same seed are all of equal length, giving it a uniformity of staple. Indeed all the cotton in the pod that ripens at the same time will be of equal length. From the peculiarity of the soil and climate of the United States, the seeds ripen almost simultaneously over a large extent of country; and all the cotton ripening upon the same day will be of equal length. During its growth, cotton requires an alternation of showers with hot weather; but when the pod begins to break, it requires a period of dry weather. Owing to the Appalachian system of mountains, these wants are supplied. The African continent, in its geographical and geological features, is more similar to the North American continent than any other upon the globe. In the interior of Africa, the cotton can be planted as successfully as in some portions of the United States; and probably there will yet be a cultivation of cotton in Africa second only to that of the United States. The uneducated labor of Africa is capable of raising about one bale of cotton to the individual. In the Southern States, the half-intelligent African is able to raise about three bales to the individual. But the intelligent German, upon the same soil and under the same circumstances, is able to raise about six bales to the individual; showing that it is intelligence after all which produces most cotton upon a given soil.

The PRESIDENT remarked that he should suppose from the appearance under the microscope, that the cotton fiber grew in the flattened form.

Mr. HASKELL stated that cotton is extensively cultivated in Brazil, where there are about 4,000,000 blacks who can be taught to cultivate it.

Mr. NASH said that the difficulty in the East Indies, is that the climate is divided by the monsoons. The plant is well started by the rain of the first monsoon. Then comes the sirocco, when it needs rain; and in the fall, when it needs dry weather, the monsoon comes, and the rain is so violent as to destroy everything. The Alleghany range of mountains stops the trade winds, as the coast stops the tides; and the currents of air are defiected northward like the Gulf Stream, producing a climate such as is found nowhere else. In Eastern Africa and in Brazil, there is an approach to it, and cotton can be cultivated there; but it will be an inferior article. The electrical influences of the earth which affect this question are very unevenly distributed. Gold brought from Australia or Africa has no crystals; while American gold is full of them. He did not believe that any white man could grow as much cotton as a black man with a white man over him.

Mr. SEELY remarked that the specimen of Peruvian cotton was probably from milkweed, and came from Peru, Ill.

Mr. BARTLETT said that he should wish, when the question should come up again, to make some statements and to correct some erroneous statments which had been made to-night.

ELECTRIC TELEGRAPH.

Mr. DIBBEN said that he had not yet reached any satisfactory solution of the question of the origin of the additional power in Mr. Holcomb's combination of the permanent and electro-magnets. With a battery force of two, and a positive force of four from the permanent magnet, upon combining the two the sum is not six, but about twelve, as shown by his latest experiments. So with other proportions. If the sum of the two forces, taken separately, is ten, taken together it will be about doubled, or twenty. He could only account for it upon the supposition—which, however, he was not prepared to accept—that the presence of the permanent magnet permits a quicker passage of a given battery force through the coil, and thus a greater force is generated in the battery by the consumption of a greater quantity of zinc.

Mr. SMITH said that any two magnets would react upon each other when brought near together, and thus there would be a greater combined force than the sum of the forces of the two acting separately. The telegraphing apparatus of Mr. Hughes adopts the principle of using a permanent and an electro-magnet in connection with each other; and many other experimenters have used the same feature.

Mr. CHURCHILL said that two permanent magnets, with a separate force of four each, would give a greater force than eight when combined. He suggested, as a reason, a molecular change produced in the steel. It has been found that soft iron, subjected to the influence of the Ruhmkorff coil, becomes so hard that it cannot be filed; whereas, upon removing it, it becomes soft again.

Mr. EDDY stated that Mr. Hughes merely neutralized the permanent magnet with the other, but did not make the two currents flow together, as Mr. Holcomb did.

Mr. DIBBEN said that he had alluded to Mr. Hughes in saying that something similar had been done, but not the same that Mr. Holcomb accomplishes.

Dr. VAN DER WEYDE explained more fully the action of magnets upon each other. Take four steel magnets, carrying two pounds each, and put them together, and, instead of eight pounds, they would only carry about three pounds, because the similar poles being placed together, counteract each other. It is not possible to have a power out of a combination of horseshoe magnets equal to the sum of them all. In an electro-magnetic machine with seven magnets, each carrying alone sixteen pounds, the seven could scarcely carry fifty pounds. But if the magnets are placed end to end, the force will be more than doubled, for they react upon one another.

The PRESIDENT—Does this submit to Carnot's law?

Dr. VAN DER WEYDE replied that he did not question that, but that there were some peculiar circumstances not to be overlooked in the influence of the magnets upon each other.

Mr. DIBBEN did not question the facts, but asked for the cause—whether it arose from an increase of battery action.

Mr. SMITH and Dr. VAN DER WEYDE stated that the battery action is increased.

The PRESIDENT—That brings it within Carnot's law.

Mr. SEELY gave a historical account of various steps in telegraphing, commencing with the discharge of a current of electricity through 4 miles of wire, by Dr. Wilson, in 1747, and described the various methods attempted to be used; the signals being made by a pith ball, by the flashing of gunpowder, by the electric spark, by the decomposition of water, by the defiection of the magnetic needle, and some using 24 wires. Upon one plan, two clocks were to be used, going equally and marked with letters, the signal indicating the letter to which the index should point at the moment. As to Mr. Holcomb's invention, he should be disposed to add his name to the list. It may be that there is no increased consumption in the battery, or that the result may be explained by the concentration of the power where we can use it, being moved outward from the central portions of the magnet. There may be really no more force, but, being shoved along to the end, we may be able to use more of it. In our ordinary operations we do not utilize all our power.

Mr. HOLCOMB believed that his combination of the electro and permanent magnets does not increase the consumption of the battery. The best proof of this is that a galvanometer placed in the circuit will not be affected by the action of the permanent magnet. The method of Ampère, deflecting a magnetic needle, was a combination of a permanent and an electro-magnet. Merely combining the two was not new. It was merely his peculiar combination which he supposed to be new. In former combinations, the power deduced is only the power of the electro-magnet without the permanent magnet.

Mr. BARTLETT said that it was owing to the support given to Professor Morse by the American Institute that he was enabled to bring his invention before the public, and thus to introduce a practical American telegraph.

NEW SUBJECTS.

The subject selected for the next meeting is "The Effects of Alcohol upon the System in Large or Small Quantities."

The subject selected for the following meeting is "The Relation of Climate to Invention, and the Applications of Inventions," proposed by Prof. Mason.

On motion, the Association adjourned until half-past seven o'clock on Thursday evening the 21st inst.

CRICKET BALLS.—A new kind of cricket ball has been patented by H. Nicholson, Rochdale, England. He makes the body of cotton filaments, and covers it with gutta-percha, molded for the purpose, with the cotton for a core. Common cricket balls are made of worsted wound hard round a small core.

ELECTRICITY IN STEAM ENGINES.—Faraday's investigations of this matter showed that dry steam escaping from a small opening produces no electricity, and led to the conclusion that the electricity results from the friction of the small drops of water against the sides of the orifice.

Annual of Scientific Discovery.

We have received from the editor, David A. Wells, A.M., his "Year Book of Facts in Science and Art for 1861," and heartily commend it to our readers. It is a complete summary of the discoveries in all departments of science and the useful arts which have been made in the world during the past year. The subjects are divided under the following heads:—Mechanics and Useful Arts, Natural Philosophy, Chemical Science, Geology, Zoology, Astronomy and Meteorology. We give the following specimens of the varied contents of this little work:—

THIN CAST IRON.

At a recent meeting of the Manchester Philosophical Society, Mr. Fairbairn, the President, exhibited two large pans of cast iron, procured from China, where they are used for boiling rice. The metal, which is at the strongest part only one-tenth of an inch in thickness, possessed considerable malleability. The President remarked that the art of making such large castings of thin metal was unknown in England.

NEW MODE OF JOINING PIPES.

Mr. Siemens has exhibited at the London Institution of Civil Engineers a machine of his invention, manufactured by Messrs. Guest and Chrimes, for joining lead and other pipes by pressure only. The machine consisted of a strap of wrought iron, in the shape of the letter V, and of three dies, two of which were free to slide upon the inclined planes, while the third was pressed down upon them by means of a screw passing through a movable crosshead, embracing the sides of the open strap. The pipes to be joined were placed end to end, and a collar of lead was slipped over them. The collar was then placed between the three dies, and the pressure was applied by means of a screw key until the annular beads or rings projecting from the internal surface of the dies were imbedded into the lead collar. The machine was then removed, and a joint was formed capable of resisting a hydraulic pressure of eleven hundred feet. The security of the joint was increased by coating the surfaces previously to their being joined with white or red lead. The advantages claimed for this method of joining lead or other pipes, over the ordinary plumber's joint, were the comparative facility and cheapness of execution, as the cost of a joint of this description was said to be only about one-third or one-fourth that of the plumber's joint. A machine of a similar description was also used for joining telegraphic line wires, a specimen of which was likewise exhibited by Mr. Siemens.

CHROMEIDOSCOPE.

Under this name a new form of kaleidoscope has recently been brought out in England. The objects viewed, instead of being bits of colored glass, &c., are patches of floss silk of various colors, arranged on a spindle, capable of being drawn in and out and rotated, so as to make endless changes. The effect is very pretty, and, as any figure can be reproduced and kept stationary, the instrument is likely to be of use to designers for manufactured goods, as well as forming a pleasing optical toy.

THE DEBUSSCOPE.

This name has been given to a recent French invention, which consists of two silvered plates, highly polished and of great reflective power, placed together in a framework of cardboard or wood, at an angle of seventy degrees. On being placed before a small picture, a design of any kind, no matter how rough, or whether good or bad, the debusscope will reflect the portion immediately under the eye, on all sides, forming the most beautiful designs; and, by being slowly moved over the picture, will form new designs to any extent. The instrument gives the design in such a manner that it can be made stationary at pleasure, until copied. It is, therefore, an inexhaustible treasure to draughtsmen and others. Setting aside the utility of the debusscope altogether, it can be made the means of gratification in the drawing room, and, doubtless, will soon assume its proper place along with the microscope and stereoscope, as a source of amusement.

ON THE REGISTRATION OF SOUND VIBRATIONS.

The Abbé Laborde has recently devised the following plan for registering the vibrations of sound. To the ceiling of a room are fixed two rings, some six feet apart, and to these are suspended two wooden rules, about eight feet long. Their lower ends are fastened into a block of wood, which is connected with a pendulum, so that the vibrations may be registered on a piece of glass, the face of which is covered with smoke black. From this photographic impressions may be multiplied, if desirable, to any extent. This apparatus is much less costly than any other hitherto made for registering sounds, and is interesting, since it is an aid toward the invention of machines which shall gradually advance from registering sounds to registering syllables and words. As soon as the wit of man has invented a machine as delicate as the human ear, we can have reporting machines. The idea is certainly far less astonishing than that of the daguerreotype before its invention. If the vibrations of light, so much finer than those of sound, are made to register themselves with such wonderful accuracy, why may not the vibrations of sound be made to do the same.

ALUMINUM LEAF.

A Parisian gold-beater, Degousse, has succeeded in obtaining leaves of aluminum as thin as those from gold and silver. The aluminum must be reheated repeatedly over a chafing-dish during the process of beating. This leaf is less brilliant than that of silver, but it is not so easily tarnished as the latter. It is easily combustible, taking fire when held in the flame of a candle, and burning with an exceedingly intense white flame.

According to Fabian, the chemical lecturer will find aluminum leaf to be well adapted for exhibiting the characteristic properties of the metal. It dissolves, for example, with surprising rapidity in a solution of caustic alkali.

MEANS OF REMOVING THE RANCIDITY OF BUTTER.

Wild recommends that the butter should be kneaded with fresh milk and then with pure water. He states that by this treatment the butter is rendered as fresh and pure in flavor as when recently made. He ascribes this result to the fact that butyric acid, to which the rancid odor and taste are owing, is readily soluble in fresh milk, and is thus removed.—*Pharm. Jour.*

ANTIDOTE FOR PHOSPHORUS.

Poisoning by phosphorus is becoming common from the facility of procuring friction matches. It is, therefore, important that the antidote which has of late been found the most efficacious should be extensively known.

Messrs. Antonicelli and Barsorelli have shown by numerous experiments on animals:—

1st, That fatty matters should not be employed in poisoning by phosphorus, as these matters, far from preventing its action on the viscera, on the contrary, increase its energy, and facilitate its diffusion through the economy. 2d, That calcined magnesia, suspended in boiled water, and administered largely, is the best antidote, and, at the same time, the most appropriate purgative to facilitate the elimination of the toxic agent. 3d, That the acetate of potash is extremely useful when there is dysuria in poisoning with phosphorus. 4th, That the mucilaginous drinks which are given to the patent should always be prepared with boiled water, so that those beverages may contain as little air as possible.

VENTILATION AND HEALTH.

In a recent lecture before the Royal Institution, on the relations of town architecture to public health, Dr. Drewitt stated that close bedroom air was an efficient cause of scrofula and consumption. Thirteen contagious diseases producible at will were enumerated; and the lecturer stated his belief that in time epidemic diseases will be made subject to human control; and that the surest mode of protecting the dwellings of the rich was to cleanse and ventilate the dwellings of the poor.

This work is published by Gould & Lincoln, Boston; Phinney, Blakeman & Mason, New York; George S. Blanchard, Cincinnati; and Trubner & Co., London.

Recent American Invention.

PRINTERS' GALLEY.

This invention relates to an improved means for securing the types in the galley, whereby the types may, by a very simple adjustment, be firmly secured in a proper position in the galley whatever the width of the columns or lines of types may be. The object of the invention is to dispense with the wedges, furniture, &c., hitherto employed for the purpose of securing the types in galleys, and to avoid the manipulation—frequently troublesome—of sorting cut wedges of different thickness to suit lines of types or columns of different width. This end is attained by the employment or use of sliding and stationary bars attached to galleys and forming a fixture thereof, provided with oblique lateral projections, and so arranged that by a longitudinal movement of one bar another is moved laterally, and made to clamp the type between it and a stationary ledge at one side of the galley. Stephen W. Brown, of Syracuse, N. Y., is the patentee of this invention.

The Next World's Fair of Industry.

We learn by our foreign exchanges it is now decided that another universal exhibition of industry will be held in London some time next year. A commission to hold it has been granted by Royal Charter, and about $1,500,000 have been subscribed by wealthy parties to construct a suitable building and carry on the enterprise. An architect has been chosen in the person of Captain Fowke, R.E. The buildings to be erected for the grand exhibition are divided by the designs adopted as follows:—

A, a building about 2,300 feet of picture gallery, varying from 55 to 35 feet wide, and from 70 to 60 feet high, to be built of brick. B, a hall about 550 feet long, 250 feet wide and 220 feet high, to be built chiefly of iron, wood, and glass. C includes the naves and transepts, about 2,200 feet long, 80 feet wide, and 100 feet high, and polygonal entrances, about 150 feet high, to be erected in iron, wood and glass. D consists of about 260,000 superficial feet of buildings, about 50 feet high, with galleries, built chiefly of iron, wood and glass. E consists of sheds of wood and glass, about 4,000 feet long, in widths of about 50 feet, and about 35 feet high.

The contracts have not yet been given out owing, it is stated, to the defective specifications of the architect; contractors refuse to make estimates upon them.

MONS. F. ATHLAND, division director of telegraph lines in France, has come to the United States, by order of Napoleon III., for the purpose of studying the various systems of telegraphing in this country, modes of insulating, the construction and working of the lines, as well as the method of keeping the accounts connected therewith. He has visited Phelps' manufactory of telegraph instruments in Williamsburgh, and was delighted with what he saw there.

THE UNITED STATES NAVY.—The statistics of the present state of our navy, which will be found on another page, have been very carefully prepared, expressly for the SCIENTIFIC AMERICAN, under the supervision of a gentlemen whose position has made him familiar with the subject, and the table may be relied upon for completeness and accuracy.

The New Commissioner of Patents.

It is announced that Hon. David P. Halloway has been appointed to the important office of Commissioner of Patents. This gentleman comes from the thrifty town of Richmond, Indiana, which numbers amongst its citizens many ingenious inventors and mechanics. We may therefore conclude that Mr. Halloway brings to this high office generous feelings toward those who will seek its protection, and who will look to him as the appointed conservator of their rights. Whenever the new Commissioner fairly gets the "hang" of his duties, he will be very likely to discover that the Patent Office needs some vigorous measures of reform to restore it to its former efficiency and popularity.

The *Washington Star*, in noticing this appointment, says: "It was settled in Cabinet council to appoint Mr. Halloway, of Indiana, late a member of the House of Representatives, to the position of Commissioner of Patents. Mr. Halloway is a man of clear head, excellent judgment, much energy of character, and unapproachable integrity. He is a mechanic rather than a lawyer, by profession, though through connection with general business and public trusts at home and here, he is sufficiently familiar with the principles of law (as shown in the manner in which he discharged the duties of his late position in Congress) to enable him to make a very successful administration of the important trust about to be confided to him."

It is generally known to our readers that an Appeal Board has existed in the Patent Office for a considerable time. It was constituted by Commissioner Holt with a view to facilitate the business of the Office, but until now it has had no *positive* legal standing. Under the new law this Board is legalized, and is to consist of three persons, who are to be appointed by the President, by and with the advice and consent of the Senate. They are designated as Examiners-in-Chief, and are to receive a yearly salary of $3,000 each. Next to the Commissioner, these offices are by far the most important in the Patent Office, and ought to be filled by true men, upon whose ability and integrity there rests not one film of doubt.

The Examiners who are now performing the duties of this Board are Messrs. D. C. Lawrence and A. B. Little, both of whom have given much satisfaction to all who have had business with this department of the Office.

Our readers will learn with much pleasure that the President has appointed Hon. Thomas C. Theaker, of Ohio, to the chairmanship of this new Board. We hope Mr. Theaker will accept the position, as he is admitted to be well qualified for it.

The two remaining appointments will settle the policy of the Patent Office for the next four years; they are therefore of much importance to the interests of inventors.

We would respectfully suggest to the President that the two vacancies ought to be filled by those who have had practical experience in connection with the duties of this Board. To appoint new and inexperienced Examiners would seriously retard the large amount of business that constantly presses upon this department, and thus injury would be done to the claims of many applicants.

MALLEABLE IRON.—Copper and brass unite together in various proportions, and form alloys possessing very diversified characteristics. Some of these are very brittle and unfit for common purposes when they are subjected to tensile strains; therefore it is of great importance to know the best proportions for obtaining the most serviceable alloy. This is believed to be what is commonly called "Muntz metal," which is composed of 60 per cent of copper and 40 of zinc. This alloy can be rolled either hot or cold, and also hammered and drawn. The copper is first melted in preparing it, and then the zinc added in small pieces. It is homogeneous in its fracture, whether it is cooled quickly or slowly; this is the test of the perfect combination of the two metals.

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