

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, June 28th, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Professor Mason presiding.

MISCELLANEOUS BUSINESS.

The Cork Tree.—Mr. S. V. Smith, of this city, exhibited the trunk of a cork sapling, and made some interesting remarks upon the peculiarities of the cork wood tree. The cork tree is a species of oak, grows to a large size, and lives to an age of one or two hundred years. What is known in commerce as cork is only the bark of the tree; the bark is stripped from the tree without any difficulty, and in about 10 years is replaced. The cork tree is abundant in the southern part of Europe. An ounce of good cork has buoyant power on water of one pound. The wood of the cork tree is hard and fibrous and resembles ordinary oak.

The Great Eastern.—Mr. James Montgomery, of considerable length, addressed the meeting in eulogy of the *Great Eastern*. He considered the *Great Eastern* the staunchest and safest vessel afloat, and that although, at present, some may look upon her as a commercial failure, she can be a failure in no other respect. When commerce can make use of large ships there will be no difficulty in their construction, and all the advantages predicted by science will be realized.

Strength of Tubes.—Mr. Fisher exhibited a sample of iron tubing used for boilers, which he considered quite too thin for that purpose. He invited mathematicians to elucidate the methods of determining the strength of materials in the form of tubes.

The President here introduced the regular subject—"Cut-offs."

DISCUSSION.

Mr. Rowell gave some further details of experiments late performed at the Metropolitan Mills, this city, tending to show that cut-offs are useless. He gave satisfactory answers to various questions as to circumstances of the experiments which he had omitted. For example, he stated that unusual precautions had been taken to prevent the error by loss of heat through radiation from the boiler, pipes and engine. He concluded his remarks with strictures on a pamphlet issued by the Corliss Manufacturing Company, to the purport that the Corliss Company claim for the cut-off only a regulating power.

Mr. Seely—So far in the discussion we have had only facts, and to some minds such facts as are stubborn and ultimate. But I submit that we should deal here with something beyond and above such crude things. There is nothing more uncertain than what are called facts, and no weaker foundation for reasoning than simple facts. Every absurd scheme is built up on facts, and facts endorsed by what we consider the highest testimony. No composition of matter given to sick people as medicine can be so inert or harmful that we may not have the unimpeached testimony of the most respectable clergymen, lawyers and statesmen, that they were cured by it of consumption, or rheumatism, or something else.

The President—How about chemists?

Mr. Seely—They sometimes tell one side of a story when they are handsomely paid for it. I have little respect for facts in a scientific argument. But we have something certain and sure in the laws of nature, and the principles of science which have endured the scrutiny of ages; these are immutable, and the facts which are irreconcilable with them are rubbish and chaff. Now, as to the cut-off: its utility, in my mind, cannot be brought in question, and the only feeling I have concerning the facts which are brought here is one of curiosity to find out where lurks their fallacy—to discover that omitted element which, when seen, will entirely change their nature. Steam does our work by virtue of its expansibility. Inclosed in the boiler, its power is in abeyance; when the port is opened to the cylinder, the piston gives way to this power. It is the expansion of the steam, and nothing else, which moves the piston. This power must be used against the piston, and exhausted against it, or it is lost. If the steam has any expanding power when it leaves the piston, so much is lost; it is power wasted on the air. The steam issuing at a 100 lbs. from a cylinder without a cut-off wastes nearly one-third of its available force. If you cut off at one half, the half cylinder full of steam has an average

pressure of 75 lbs. for the remainder of the stroke. If you cut off sooner, the gain is greater.

The President—Would you recommend a cut-off where it was required to get the greatest amount of work from an engine in a given time?

Mr. Seely—Certainly not. But if an engine could not do a given work with a cut-off it should be replaced by a larger. As to economy of fuel, the condensing engine, when so built as to overcome the practical difficulties of friction and loss of heat by large surfaces, is the cheapest; and in engines of high pressure, there is no difference in economy, except such as is brought in by the differences in friction and cooling surfaces. The cut-off does not in any sense make or increase the power of steam; it only saves what would otherwise be lost.

Mr. Montgomery—There is much improvement needed in the construction and management of engines. There is no part of the whole apparatus that may not be a source of waste, or produce an error in a test experiment. The boiler at high pressure may leak and run into the fire, while heat may be lost by radiation from the boiler pipes and engine. The whole should be protected against such loss.

Mr. Rowell—In the experiments I have detailed, the boiler was blanketed and the pipes protected with felt. The whole was sheltered from currents of air.

Mr. Montgomery—Cut-offs are often used with steam at too low temperature, or cut off too soon. Cylinders should be protected by a jacket of superheated steam.

The President—Waste is often chargeable to the engine operatives. A railroad company once reduced the wages of engine-drivers, but promised them a share of any saving they might make for the company. The system worked well, for the workmen received more and the expense to the company was less than before.

Mr. Dibben—The experiments of Mr. Rowell do not at all weaken my confidence in the utility of the cut-off, but yet are of value. There are many things about the steam engine which are to be determined by just such experiments. The use of the cut-off requires a larger cylinder, and thus friction and loss of heat are a larger element. Mr. Isherwood does not disapprove the working of steam expansively under all circumstances, but only in certain cases.

At the close of the discussion, Lieutenant Bartlett moved an adjournment till the 1st of September. After remarks on the propriety of a vacation during the warm weather, it was agreed to further consider the subject in two weeks, to which time the meeting adjourned.

The subject of "Cut-offs" was ordered to be continued at the next meeting.

A PROFITABLE PATENT.—An ingenious and successful patentee (O. Coe, of Port Washington, Wis.) concludes a recent communication as follows:—"Allow me further to say that the patent I obtained through your branch office at Washington, for a rotary harrow, is proving to be a very good thing and is much liked by all who have used it. The times are very hard for selling patents or anything else; but I have succeeded in selling six of the western States, within the last nine months, for \$9,000. I offer it low by States. Some purchasers of State rights are now selling counties at from \$100 to \$250 each. It is a capital thing for fitting ground for a crop and also for covering in large seed, such as barley, peas, &c., and also winter wheat. I have sent several applications from Wisconsin to your branch office at Washington, for others, this year."

REFORM IN WEIGHTS AND MEASURES.—On another page of the present number will be found the first of a series of able articles on this important subject. We cordially endorse the author's views, which are the same as those we have often urged in former years through the columns of this journal, and which we very fully discussed on page 52 of our last volume. If the press throughout the country, would occasionally devote a little space to the ardent advocacy of this great reform, it would soon be adopted. The *SCIENTIFIC AMERICAN* has "set the ball rolling;" who will next strike it?

TUBES made of paper charged with bitumen have been used for water pipes in France, and they have been subjected to a pressure of 250 pounds on the square inch, without bursting. Small pipes, made of this same material, about half an inch in thickness, have also been successfully employed in Paris for conveying gas.

A COLUMN OF VARIETIES.

The Winans steamer has been undergoing further alterations, which are said to be decided improvements. She made a successful trial trip on the 23d ult.

Mr. John Dudley, for many years one of the head workmen at the Washington Arsenal, has been appointed by the government to go to Japan with the returning embassy, and superintend putting-up the various articles of machinery presented by the United States and her citizens.

An immense bed of white marble, said to be equal to the finest Italian, has been discovered in Presqu'Isle county, Michigan.

It is stated by some of our foreign cotemporaries that M. Toussaint, of Paris, has made the discovery of taking and fixing the natural colors on photographic pictures. The principal substances which are said to be used by him are oil of pink and chloride of gold. We receive this information from abroad, with many doubts of its correctness, but hope it may be true.

Rodriguez Masta, a young man of Toledo, Spain, has recently finished copying upon a single sheet of paper of about the ordinary letter size, in legible characters and without abbreviations, the whole of Don Quixote. He employed two years, and nearly lost his eye-sight, in the useless task.

The *Springfield Republican* states "A mechanic has lately made an improvement in arranging railroad car wheels and axles, to insure greater safety and prevent the wheels running off the track in turning curves. The arrangement is stated to consist in having the wheels loose instead of fixed on the axles, as they now are." There is nothing new in such an arrangement of car wheels and axles. It was proposed and tried several years ago, but without any good results attending it.

Gabignani's Messenger, of Paris, recently gave an account of a discovery made by a French lady, for curing chronic deafness, by simply introducing a few drops of ether into the ear, three or four times in succession. A great number of persons are stated to have been cured by this application. Great caution is necessary in making applications of this character to such a delicate organ as the human ear.

Many of the heavy freight trains carrying coals on the Great Northern Railway (England), run at the rate of 40 miles per hour—a higher speed than that of our express trains. Larger engines are now being built, it is stated, in England, so as to run at the rate of 50 miles per hour.

The *London Engineer* states that experience has demonstrated the narrow to be preferable to the broad gage for railways. The power required to work it is much less; broad gage roads requiring engines and carriages of excessive weight. The broad gage necessitates longer axles, which increase the liability of one wheel to run ahead of the other in turning curves.

A mechanic in Islington (England) has recently made a burning-glass, three feet in diameter, by which steel, flint, and even platina, it is said, have been melted by concentrating the rays of the sun upon them. Owing to its great size, it has attracted the notice of several societies devoted to science and art.

No art, excepting that of photography, has progressed and improved so rapidly as that of dentistry. Forty years ago it was not a distinct profession, for all doctors then officiated as regular tooth-pullers, with turnkey levers of the most rude description; and as for supplying the place of old teeth with new ones, it was never done at all. In 1820 there were only 30 practicing dentists in the United States; in 1850 there were 2,923; at present there are about 5,000. The invention of artificial teeth has given a wonderful impetus to this most useful and beneficial art.

In a letter of Dr. Hassal to the *London Lancet*, he states that poisoning with lead is more common than most persons suspect. He says: "The whole subject of lead poisoning is one of the greatest importance, and it behooves the public to be thoroughly on its guard against this source of danger to health. For the employment of leaden vessels and pipes, in nine cases out of ten, no absolute necessity whatever exists, and in certain cases they ought, for the better protection of the public health, to be entirely prohibited. From the number of samples of water which I have received, containing lead, I am induced to believe that the metal is more frequently introduced into the system in this way than is expected."