POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, April 28th. From a great variety of miscellaneous business we select for mention only a sample of the work of—

BLANCHARD'S MACHINE FOR TURNING STATUES.

Dr. Rowell presented an unfinished marble bust in miniature, which had been copied from a full-sized bust of Daniel Webster by means of Blanchard's machine. This machine was invented by Thomas Blanchard, and is a simple modification of his lathe for turning irregular forms, described on page 258 of this volume. The cutting tool in this case is a sharp pointed steel drill, rotating with great velocity, and supported in a lever having its fulcrum at one end, while the opposite end, terminating in a pointed finger bent at right angles, rests upon the bust to be copied. The bust and the block to be sculptured are both secured to the same shaft, and are moved slowly along horizontally while they rotate—the bust beneath the supporting finger of the lever, and the block beneath the cutting drill.

The likeness to the great orator in this machine-made bust was perfect; the deep cavernous eyes and the calm thoughtful expression being reproduced with delicate fidelity.

Dr. Rowell remarked that he was reminded to bring the bust for exhibition to the society by observing an announcement of the inventor's death.

THE USE OF WATER WITH FUEL.

Mr. Stetson, being invited by the chair to open the discussion of the regular subject of the evening, gave a brief account of the chemistry of combustion, and remarked that if there was no absolute increase of heat from the decomposition of water and the burning of its elements—a problem akin to perpetual motion—there might a very large economy result from the mechanical action of water or steam on coal or other fuel.

Mr. Reed described a furnace which has been for some time in use at Newark, N. J. The air enters through hollow grate-bars, and issuing from holes in their lower sides passes up between them to the fire. This circulation of air prevents the bars from melting or burning. Wet tan bark, dripping with water, is shoveled into the furnace, and an intense heat is the result. Whenever the furnace doors are opened the interior of the furnace is filled with smoke, but as soon as the doors are closed the smoke disappears, and a passer-by would not know from looking at the chimney that there was any fire in the establishment.

Mr. Bassett:—At our gas works, near Providence, R. I., we are using superheated steam in the furnaces for heating our retorts, and the saving in fuel is 50 per cent. We have twice as much coke to sell when we use steam in the furnaces as we do when steam is not employed. The waste heat from the furnace passes through an upright boiler in the rear of the retorts, and the steam is brought forward through a pipe which is coiled around the fire-box, where the steam becomes superheated, when it is admitted in fine jets into the fire-box, 5 jets above the grate and 2 below on each side. The steam pipe around the fire-box becomes so highly heated that if a stick of wood is introduced among the coils it quickly takes fire. The heat in the furnace is so intense that we are obliged to use clay retorts for making the gas; iron retorts being destroyed in a short time.

The discussion was continued at considerable length by a number of speakers, but no other new facts were elicited. The same subject was continued, and the Association adjourned for two weeks.

The Cotton Culture in Italy.

We find in *Le Moniteur Illustré des Inventions* the following account of an exhibition at Turin of cotton cultivated in Italy:—

"The principal organizer of this exhibition was M. Devincenzi, a deputy, the same who represented the Italian Government, as commissary general, at the Universal Exhibition at London.

"The number of exhibitors was 207, belonging for the most part to the Tuscan marshes, Sardinia, Sicily, the Campagna of Rome, and the Neapolitan provinces.

"The number of samples of cotton was 685, 306 of which were of the species of Siamese white cotton, 48 of Siamese yellow cotton (red fiber), 82 of herbaceous cotton, 7 of bristly cotton, 80 of New Orleans, Louisiana and North Carolina, 110 of Sea Island, 25 of Mako and 27 belonging to species not classified.

"This enumeration shows that the cultivation of cotton has begun to occupy the serious attention of the Italian people. We announce in another place the formation of a society which is going to introduce this culture on a large scale in the island of Sardinia. A general satisfaction was expressed with the quality of the cotton exhibited. What the Italian producers require is a greater familiarity with the industrial processes. Some laudable efforts are being made to acquire this familiarity, and with perseverance the aim will be soon attained."

MORLEY'S NOISELESS COG-WHEEL.

It is always desirable to have machinery run noiselessly, but with the cog-wheels in factories—or of geared engines in screw propellers and for similar uses, this feature is absolutely necessary to comfort and economy. The wheel illustrated herewith is designed to obviate this difficulty; its principle consists in insulating the periphery, or part containing the cogs, by means of a layer of a non-conductor of sound, placed between the periphery and central part of the wheel.

Fig. 1.

Fig. 2.

Fig. 1, is a perspective view of a finished wheel, and Fig. 2, is a cross section. A, is the periphery, B, the center, and C, the india-rubber or insulating material. The center is formed in two parts, as shown in Fig. 2, and riveted or bolted together so as to gripe the india-rubber between the beveled circumferences and the internal beveled face of periphery, A. In operation, the noise of the cogs which would be transmitted by passing along a solid, is interrupted and absorbed by the insulator. The inventor has a standing offer of $300 for this invention, which will be accepted at the end of three months, if in the meantime a better one is not received. Its utility and value can be tested at a trifling cost by any mechanic. It is cheaper, stronger, and much more durable than a wooden-toothed wheel. This invention was patented on Feb. 10, 1863; for further information address the inventor, F. A. Morley, Station B, New York City.

Utilization of Brine.

Another has just been added to the many instances in which purely scientific research has led to the development of the arts and manufactures. Mr. Alex. Whitelaw, of Sidney Street, has invented and patented a process for the treatment of the hitherto waste brine of salted meat, so as to produce therefrom nutritive and wholesome extract of meat and portable soup. His process is the first practical application of Mr. Graham, the master of the Mint's recently-made, curious, and interesting discovery of "dialysis." Mr. Graham, after pursuing these elaborate investigations on liquid diffusion that have occupied him for many years, found that when animal membranes (as well as some other bodies of a similar nature) were interposed between solutions of various substances and water, that "crystalloid" bodies freely diffused themselves through the membranes into the water; but to "colloid" bodies, such as gum, albumen, &c., the merest film of such a membrane presented an almost impassable barrier. Mr. Whitelaw has availed himself of this principle in his process, which is of the simplest character. He can conduct the dialytic operation in vessels of various forms and materials, but the arrangement he prefers to employ as being in every respect practically the best is a series of bladders, fitted with gutta-percha necks and plugs. These bladders are filled with the previously filtered brine, and hung in rows from poles stretching across and suspended into vats of water. The water is renewed in these vats once or twice a day, and the action allowed to go on; when, at the end of the third or fourth day, it will be found that nearly all the salt and niter of the brine have been removed, and that the liquid contained in the bladders is pure juice of flesh in a fresh and wholesome condition. This juice, as obtained from the "dialysers," may now be employed in making rich soups without any further preparation; or it may be evaporated to a less or more concentrated state, and packed in hermetically sealed tins for sale. The extract of meat thus obtained is in the highest degree nutritive and wholesome, and well adapted for hospitals, for ships' use, and for an army in the field. Mr. Whitelaw has also adapted his process for the use of ships at sea, for the economization of their brine, and for the improvement of the food, and, consequently, the health of the men. The quantity of brine annually wasted is very great. In Glasgow alone not less than 60,000 to 100,000 gallons are thrown away yearly; and if we take each gallon as equal in soup-producing power to 7 lbs. of beef, some idea may be formed of the economic value of this process.—*Glasgow Herald.*

Tremendous Results from the Explosion of a Small Boiler.

Under the head of "Life in Greenock," an English journal describes a boiler explosion which took place in that town. One would think Greenock an undesirable town to settle in, if this be a sample of the life in it. The journal in question says:—

"The *Ruby*, a strong iron screw lighter, with a high pressure engine of 8-horse power, lately arrived at Greenock from Glasgow, deeply laden with coal. She had been in collision on the way down the river, and sprung a leak in the fore compartment or cabin. The *Ruby's* bow was therefore run upon the bank when her stern went down, and immediately thereafter her boiler burst with a tremendous report, which shook the houses for a great distance round to their foundation. Scarcely a house within a circuit of 200 yards but had its windows broken by the concussion. People along the quay-breast suffered severely by pieces of the boiler, coal, and wood entering their houses. What is most remarkable, considering the damage done to the surrounding property, is that only one man was killed, and that not one of the men on board the *Ruby* suffered any injury. A young lad had his leg broken; Mr. M'Kenzie, a pilot, had his leg bruised; Mr. Livinston had his head cut; and others got slight wounds. The scene along the coast was one of great devastation. The street was perfectly wet, and pieces of wreck spread all over the quay. The Lord Clyde Hotel had almost every pane of glass broken. The force of the concussion was so great that in one room the windows and frames were blown in; an infant was carried out of its cradle and lifted fully a yard away, while the cradle was upset; and a servant girl passing along the lobby was carried out to the stair-head. Warner's lodging house suffered most; several stones in the wall were knocked in, and the steam-pipe carried away the boiler and entwined itself in the blind. Pieces of the boiler were carried over the houses and fell in the adjoining streets; one piece, of three iron plates, was carried about 400 yards, over a three-story building."

French Patent for Refining Petroleum.

L. Martin's French patent for refining petroleum, and for a mixture of it with rape-seed oil to burn in common lamps, is thus described:—

"Supposing a tun of petroleum is to be operated upon, about eight per cent. weight of caustic soda dissolved in water is added to the petroleum in a large vat, after which about ten per cent. of tepid water is added, stirred, and the whole allowed to rest for four hours. A precipitate falls to the bottom of the vessel, and the clear is then drawn off with a siphon, and placed in a still. It is now distilled at a temperature of 248° Fah., steam heat being used for the purpose. A light eupion oil passes over at this heat, and 35 per cent. of rape-seed oil is added to it and makes a good burning oil for common lamps. The remainder of the petroleum in the retort is now subjected to heat of from 437° to 600° Fah., when heavier oils are distilled. They are mixed with ten

per cent. of rape-seed oil for the lightest variety, and five per cent. for the heaviest. This heavy oil also sometimes submits to another purification, by agitating it with very dilute sulphuric acid, then with a weak brine of common salt, and afterward washing with tepid water."

Correspondence

Submarine Telegraphy.

MESSRS. EDITORS:—Will you allow me a little space in your excellent journal to correct an error of fact, respecting the origin of submarine telegraphy, to which my attention has been specially directed in a marked number of the *Telegraphic Journal*, of London, sent me thence by an unknown friend.

In a notice in that journal of April 2d, of the late Mr. Brett's collection of pictures, there is in this incidental remark; "The late Mr. J. W. Brett who was designated by Prof. Morse as *the father of submarine telegraphy*, &c."

I have never designated Mr. Brett, nor any one else as "the father of submarine telegraphy," having always claimed to have first proposed, and personally laid and operated the first submarine telegraph myself.

Mr. Brett I knew well; he was a personal and highly esteemed friend, but I knew that he supposed himself to be the first who had proposed a submarine line in 1845. In conversations with him I always insisted that not only the first proposal, but the first actual execution and operation of such a line belonged to me. I told him I had unanswerable evidence of the fact. This announcement to him I saw gave him uneasiness, and after I left Paris in 1858 for Porto Rico, he wrote me a letter under date of Nov. 15, 1858, in which he asked me to give him the history of my connection with submarine telegraphy. To this letter I replied from Arroyo, Porto Rico, Dec. 27, 1858, quite at length, giving him minutely its history. In that letter (a press copy of which I have by me), I showed him that at least as early as 1838 I had made the proposition of an Atlantic telegraph to Robert Walsh, Esq., the American Consul in Paris, for Mr. Walsh testifies to that fact of his own move, without my knowledge at the time in one of the American journals, of which he was the foreign correspondent. But I refer him also to my letter of Sept. 27, 1837, to the Secretary of the Treasury, published in the Congressional documents, in which letter I suggest the submarine method of constructing a telegraph line. I referred him also to my letter to another Secretary in August, 1843, in which I make the distinct prediction of a future Atlantic telegraph, as a deduction from experiments I had made. For in the autumn of 1842, I had carried into effect the proposition of a submarine line in the harbor of New York, laying out the line personally from Castle Garden to Governor's Island. This was an acknowledged success by the journals of the day, and for this success I received the gold medal of the American Institute. This medal fixes a date (1842) unmistakeably. Mr. Brett rests his claim on the fact that in 1845 he addressed a letter to the British Government proposing oceanic and subterranean telegraphs. The year 1845 is the earliest date to which he appeals, and at that date he had only suggested a plan of submarine telegraphs to the British Government, while three years before I had actually constructed and operated in New York harbor a submarine telegraph line.

It is obvious, therefore, that I could not have designated Mr. Brett as the "father of submarine telegraphy." The *Telegraphic Journal* marks these words professedly as a quotation from a written or printed document of mine. I have never written nor printed any such admission. The nearest to such an admission is the following extract from the historical letter alluded to, which I wrote to Mr. Brett. After giving him a detailed account of the steps I had taken in submarine telegraphy, I say, "I have read your account of the origin and progress of the ocean telegraph with deep interest, and if chronology by its rigid dates gives the origin of submarine telegraphy to me, it cannot detract from you the undoubted merit of having independently originated the project of submarine intercommunication, and successfully carried it out, too, in Europe to a useful result. I esteem and honor you as the *Father of European Submarine Telegraphy*, and I rejoice that both the honor and the profits have been so justly awarded to you."

In thus awarding to Mr. Brett in that letter, the honor of being an independent originator of "European Submarine Telegraphy," I ought to say that if there are other claimants to that position in Europe, I do not pretend to decide between them. I based my remark to Mr. Brett solely on his representations to me, believing him to be as he was, an honorable and high-minded, as he certainly was a generous and worthy man. If the supposed admission on my part that Mr. Brett was the "father of submarine telegraphy," is founded on this letter of mine to him, it is seen at once that it is a misquotation in the *Telegraphic Journal*, and (as I am willing to believe) through mistake, that the important qualifying word "European" was left out, but which is necessary to be inserted to make the quotation conform both to my letter and to the truth of history.

SAMUEL F. B. MORSE.

New York, April 26, 1864.

Strength of Steam Boilers.

MESSRS. EDITORS:—Mr. T. W. B. has been laboring in a number of articles on the "Strength of Steam Boilers," to disprove the truth of the principles of the tables of Mr. Toshach, given on page 71, current volume of the SCIENTIFIC AMERICAN. He claims that the strain to which a boiler shell is subjected varies as the semi-circumference, and yet denies the theory of Mr. Toshach, which supposes the strain to vary with the diameter—not knowing that the two propositions are identical—thus unwittingly admitting what he denies. The trigonometrical lines of the circle, all being functions of one another, vary by the same ratio; thus, if any lineal element, as the diameter, is doubled, all the other lineal elements, as the circumference, sine of any arc, cosine, tangent, secant, &c., or any aliquot part of the same, will be doubled. Hence, if any quantity varies with one of these elements in a given ratio, it varies with each and all of them in the same ratio. Therefore, if the strain on the shell varies as the semi-circumference, it also varies as the whole circumference or as the diameter, or as the radius—which latter term is generally used. This proposition is known and recognized by all well-informed engineers, and enters into the theorem of Mr. Toshach, for the table above referred to.

H. C. PEARSONS.

Ogdensburgh, N. Y., April 28, 1864.

MESSRS. EDITORS:—On page 278, current volume of the SCIENTIFIC AMERICAN, your correspondent "T. W. B." after all that has been written on the subject, sticks to his theory that, "the force to rupture boilers is as the semi-circumference, and 52 per cent. greater than the usual estimate, calculated from the diameter." To be as brief as possible in reply, may I ask him to refer to the figures in his letter (page 278), and also note the following extract from it:—"showing that as E is approached, the required resisting force becomes theoretically infinite;" that is to lift or force asunder the upper semicircle, D F E, from the lower one. Now if the semi-circular theory is correct, the force cannot be "infinite" or decreased in any part, and must be as great at D or E as at F, and at each and every inch above and between those letters; and each of these distinct inches (on the semi-circumference) must exert an equal force in an upward direction. If "T. W. B." will look at this carefully he will be convinced of the correctness of it, before writing on this subject again. "T. W. B." further says:—"From the above I deduce the rule that the force at any one point to rupture at E is inversely as the cosine to the radius; and is mathematically conclusive in favor of the semi-circumference, which will be more plainly evident by inspection of the quadrant F H." Now, Messrs. Editors, I cannot see the slightest difference between the quadrant F H, and any other in the circle below it; nor can I see how he can come to the mathematical conclusion he does from the cosine. I should like to see a formula of "T. W. B's," expressing the relation between the cosine and the semi-circumference, to illustrate its application to the present case. The relation of the semicircle to the diameter is as 1.57 to 1—not as 1.52 to 1, or 52 per cent. as "T. W. B." has it.

WM. TOSHACH.

54 William street, New York.

Employment for Women.

MESSRS. EDITORS:—Recent inquiry into the condition of the working women of Philadelphia has brought to light facts which, in my humble judgment, are neither creditable to our christian feeling or social economy. These facts have been submitted to such parties as were deemed fit, from their acknowledged wisdom and religious culture, to propose some remedy for the dreadful suffering and degradation which working-women are under. But all seemed alike ignorant and hopeless that any measures could be devised that would successfully reach the fact that mothers with one, two, three, four, and five children, have no other means of supporting their offspring than by their own labor, the compensation for which runs from two dollars to four dollars per week (most generally nearer the former sum); and that scores, if not hundreds, of women, born and raised in hope and prayer, are compelled to debase themselves for the necessities of life. Believing that there exists a remedy for this state of things, I cheerfully offer the Treasury Bond, No. 8,712, of fifty dollars, as a premium for the best paper on "Improving the Condition of Working Women."

This is but a small sum for so great a purpose; but it is all, as a poor man, I have to spare. Yet I feel assured that the good results from such an effort, if successful, with the gratitude of the toiling ill-paid women, will make the purse invaluable, and perhaps not unworthy the efforts of the best statesmen in the land.

Communications must not be longer than a tract of ten or fifteen pages; each must have the name of the writer on a separate slip, which will be kept from the examining committee until the decision is given, so that no member of the committee may be influenced by any personal consideration for any writer whom they may know.

Communications must be postpaid, and sent to Mr. Thomas W. Braidwood, School of Design for Women, 1,334 Chestnut street, Philadelphia, who will retain the names of the writers, but hand the communications to the committee for examination.

T. W. BRAIDWOOD.

Philadelphia, April 25th, 1864.

Distributing Petroleum in Pipes.

Le Cosmos, of Paris, announces in glowing terms an invention of M. Forcault, for lighting houses by means of petroleum, in a novel manner. The oil is driven, by mechanism which is not described, through pipes precisely similar to gas pipes, and issues through burners of a peculiar construction, arranged in the same positions as ordinary gas burners. The force that drives the liquid through the pipes would eject it in a stream from the burners if the flow was not controlled by a regulator, which seems to be one of the principal features of the invention.

Le Cosmos says that this system is in operation in several places, and that one of the most frequented saloons in Paris has been lighted by it for more than six months.

Le Gaz suggests that the authorities will prohibit this distribution of liquid petroleum in pipes on account of the great danger of fire.

Report of the Commissioner of Patents.

We commence in this week's issue the publication of the Annual Report of the Commissioner of Patents, and shall continue it in succeeding numbers until it is completed. We hope all our readers will carefully peruse this document, as it is one of the most interesting and valuable that has ever issued from the Patent Office. We shall refer to the subjects so ably discussed by Mr. Holloway, in a future number.

THE new two-cent piece which has been recommended for the sanction of Congress, is said to resemble as much as anything can, a gold coin. On one side there is a wreath of wheat, in the center of which is stamped "2 cents," and around which are the words "United States of America." On the other side there is the shield of liberty, bearing the words, "God our Trust."