POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Tuesday evening, the 28th ult., the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; the chairman being Dr. R. Stevens, and John Johnson, Esq., acting as secretary *pro tem.*

MISCELLANEOUS BUSINESS.

Deterioration of Cast Iron in Cylinders.—Mr. Babcock described a peculiar deterioration of cast iron he had observed about the cylinders of an engine in Mystic, Conn. The water used was pretty pure spring or well water; steam worked at 60 lbs; india-rubber packing nsed in the cylinders; various kinds of oil used, but lately the best sperm. The steam pipes leading to the cylinder were not affected, and the interior of the cylinder, on which the friction of the packing took effect, was clean and bright as usual. But the parts of the cylinder beyond the reach of the friction were strangely changed. The surface of the iron was softened so that it might be whittled with a knife; bolts or screws lost their hold in it. The change sometimes reached the depth of one-half an inch.

Mr. Dibben—The effect was evidently not due to acids or other impurities in the water. The change seems to have begun at the point at which oil was used. The oil must have been quite impure, and the iron wsa converted into a kind of plumbago, which is a carburet of iron.

A stranger said he had observed similar changes of iron where there was no doubt that oil was the occasion of them.

Mr. Howe—There is not carbon enough in cast iron to produce its volume of plumbago; but the oil, which contains carbon, might furnish it.

The Chairman—Oils are often purified by acids, and the acids are not completely removed; also, the rubber of the packing contains sulphur. Both acids and sulphur destroy the tenacity of iron. It is quite common for boys to find pieces of iron about machine shops or foundries, which they carve with their jack-knives into images.

Mr. Seely—The facts which we are trying to explain are not clearly presented; we need a sample of the deteriorated iron. An analysis of it would show precisely the nature of the change. Cast iron completely dissolves or disappears in nitric acid; the iron is dissolved and the carbon is burned up. In hydro-chloric acid, the iron dissolves, and the carbon does not, but settles as a powder. But if the cast iron be left in salt water a long time, the iron is dissolved out, and the carbon is left in the coherent form of plumbago. The carbon being the electro-negative, possibly accumulates other negative matter with it; but we have no facts to warrant us in concluding that carbon itself is ever deposited by any electrical action. I do not believe, in the case in question, that the iron absorbs any carbon from the oil.

Mr. Stetson exhibited a sample of iron from the boiler which lately burst at a hat factory in Brooklyn. The plate was of reasonable thickness, but was composed of irregular laminæ—thickest and toughest on the outside—which might easily be separated from each other.

Mr. Selleck—Boiler plate is rolled down from "billets" about one foot in thickness. The billets are partly composed of old scraps, which should always be mixed in the same proportion to secure a uniform plate. But manufacturers are not careful enough, and often get an excess of scrap. Sometimes too large "blooms" are attempted to be worked with a light hammer; the strength is then on the outside, while, in the interior, the iron is rotten. Bits of soapstone (which lines the furnaces) often get into the mass of iron, and make bubbles and weak places. Iron may be good and its manufacture bad. The sample shown is good iron, but very poor plate.

The hour for miscellaneous business having passed, the chairman called up the regular subject—"Superheated Steam."

DISCUSSION.

Mr. Stetson—The trials of superheating have generally failed from overheating, and thus burning the superheating surface. The well-known trials on the *Arctic* and *John Farran* were unsuccessful from this cause and the complication of methods. At Mystic, Conn., they have had in operation, three years, a superheating system which realizes an economy of 25 per cent. It was the Wethered process of mixing superheated with normal steam, which failed on the *Arctic*. Mr. S. then illustrated, by an indicator card of the engine of the *Pacific*, made in 1853, the exact theoretical gain by superheating.

Mr. Babcock—The superheating contrivances at Mystic are automatic, and operate with great regularity; so that the temperature of steam does not vary 10° in 24 hours.

Mr. Dibben—Facts confirm the theory.

Mr. Goodwin—Was not a steam engineer, but saw many years ago an invention to remedy the difficulty from foaming in the boiler. The steam, before it issued away from the boiler, was made to pass through a considerable length of coiled pipe.

Mr. Fisher gave an account of several trials of superheating on steamers. There was as much failure as success; but we shall learn how to guard against the causes of failure. Superheating will some day be generally adopted.

Mr. Seely—Superheating steam, so-called, is much used in the chemical arts. Mechanics mean by "superheated" steam, "dry" steam; in addition to this, chemists sometimes mean only steam above 212°. Where steam is used for dessicating purposes, it must be dry; if hot-air has no injurious chemical effect, it is better and cheaper than steam. Steam is also used to effect decompositions by heat, as in charring wood, making stearine, &c.; and for this purpose it is not essential that it be dry. Superheated steam is also spoken of as a solvent, of quartz, for example. For this use, the steam must not be dry; and it is doubtful if water, at the same temperature, would not be more effective. I consider that a great deal of humbug is made about the use of steam for chemical arts.

Mr. Rowell—The subject of superheated steam for engines was first agitated here by Mr. Frost. He showed that steam at 212° was increased one volume by an addition of 4°; another by 12°; but that a third volume required about 500°. [This discrepancy, with the common notion of expansion by heat, is explainable by supposing that the steam at 212° maintains in suspension particles of water ready to burst into steam by a slight increase in heat.—REP.]

The subject for the next meeting—the "Adulteration of Food"—was then selected, after which the association adjourned.

AMERICAN NAVAL ARCHITECTURE.

In fulfillment of an intention expressed in the first paragraph of an article bearing the above caption, and published on page 131 of the present volume of the SCIENTIFIC AMERICAN, we now give the following details (reported expressly for this journal) of some recently-built steamers, embodying most of the modern improvements.

THE STEAMER "NEW LONDON."

This is a new vessel, built by the New London Propeller Company, and has recently taken her appropriate position on the route of her intended service, between New York and New London. Her dimensions, with minute particulars of engine and boiler, will be found annexed:—Length on deck (over all), 130 feet; breadth of beam (molded), 26 feet 8 inches; depth of hold, 8 feet; draft forward, 8 feet; draft aft, 10 feet; tunnage, 260 tuns. Her frame is of white oak and chestnut (molded), 12 by 8 inches and 9 inches, and is 24 inches apart at centers.

The *New London* is fitted with a vertical direct-action engine; diameter of cylinder, 34 inches; length of stroke of piston, 2 feet 6 inches; diameter of propeller, 9 feet; length of same, 1 foot 6 inches; pitch, 17 feet; and possesses 4 blades. She has one return tubular boiler; length, 18 feet; hight (exclusive of steam drum), 8 feet 8 inches. It contains two furnaces, the breadth of which is 3 feet 3 inches; length of grate bars, 7 feet 3 inches; number of flues, 26, internal diameter above, 16 of 8 inches: below, 8 of 3½ inches, and 2 of 16 inches; length of flues above, 16 feet 10 inches; below, 9 feet 8 inches; diameter of smoke pipe, 3 feet. The boiler is located on deck, and uses a blower to her furnaces.

She is fitted with one independent steam fire and bilge pump, and has, in addition to this, bottom valves or cocks to all openings in her bottom. She is schooner-rigged, has poop cabin and freight house forward to foremast.

Her hull was built by George Greeman & Co., of Mystic, Conn.; her engines, by C. H. Delamater of this city.

THE STEAMER "ALABAMA."

This steamer is a fine specimen of modern naval architecture, and does honor to her builders, Samuel Sneden & Co. She has been plying between the ports of New Orleans and Mobile since December last, and has, upon all occasions, more than exceeded the sanguine expectations of those who were interested in her erection. Annexed will be found full particulars of her dimensions, with minute details of engine and boiler:—Length on deck (from fore part of stem to after part of stern post, above the spar deck), 235 feet; length between perpendiculars, 225 feet; breadth of beam (molded) at midship sections, above the main wales, 32 feet 3 inches; depth of hold to spar deck, 9 feet; draft of water at load line, fore and aft, 4 feet; tunnage, 656 tuns; area of immersed section at above draft, 115 square feet. Her frame is of wrought iron plates, 5-16ths to ½ inch in thickness, and fastened with rivets ⅝ of an inch in diameter; the frames are molded, 3½ inches, sided, 5-16th inch, and 17 inches apart at centers; shape of same, *7 Z*; width of flanches, 3½ inches. The cross floors are 15 inches high, and 5-16ths inch in thickness; shape, Z, and fastened with ⅝ inch rivets every 2¼ inches.

The *Alabama* is fitted with a vertical beam engine; diameter of cylinder, 50 inches; length of stroke of piston, 10 feet; maximum pressure of steam, 25 lbs.; cut off at one-half stroke.

She has one return flue boiler, the length of which is 30 feet 6 inches; breadth of same at furnace, 12 feet; diameter at shell, 10 feet 9 inches; hight (exclusive of steam drum), 10 feet 9 inches. The boiler has 3 furnaces; breadth, 3 feet 7 inches; length of grate bars, 7 feet 2 inches. Number of flues above, 6 of 18 inches, and 6 of 9 inches; number below, 2 of 10 inches, and 8 of 15 inches; length of same, above, 26 feet 2 inches; length below, 17 feet 5 inches; diameter of smoke pipe, 4 feet 2 inches; hight above grates, 30 feet.

The diameter of her paddle wheels (over boards) is 29 feet 8 inches; length of blades of same, 8 feet; depth, 24 inches, and 26 in number. The boiler is located in the hold, and does not use blowers.

She has one independent (extra size) steam fire and bilge pump, one bilge injection, and bottom valves or cocks to all openings in her bottom; also, water wheel guards fore and aft, bunkers of wood, and four watertight bulkheads. There is a commodious saloon on the main deck, and a saloon cabin above.

The machinery was built by the Morgan Iron-works, this city; the owners are J. L. Day and others.

THE STEAM TUG "YANKEE."

This tug is a very powerful one for her size, and a short time since began her duties as a tow-boat in the harbor of New York. She was built in this city by Thomas Collyer, and is owned by Russel Sturgis. Her frame is of white oak and chestnut, and very securely square fastened with copper and treenails. The dimensions of her hull are as follows:—Length on deck, 146 feet; breadth of beam (molded), 25 feet 6 inches; depth of hold, 10 feet; area of immersed section at load draft of 5 feet, 170 square feet.

The *Yankee* is fitted with a cross-head engine; diameter of cylinder, 38 inches; length of stroke of piston, 8 feet 8 inches.

The diameter of her water wheels (over boards) is 21 feet 6 inches; length of boards, 9 feet; depth, 3 feet; number of same, 20.

She has one return flue boiler, built in this city in 1858; length, 20 feet 3 inches. It is located in the hold, and uses a blower. Her bunkers are made of wood. She is not rigged, and not coppered; possesses one smoke pipe; has no independent steam fire and bilge pump, and no opening in her bottom, has, however, one bilge injection; is not supplied with water wheel guards; tunnage, 376 tuns.

The builder of the engines of the above vessel is J. P. Allaire, of this city.

SAVING LIFE IN SHIPWRECK.

MESSRS. EDITORS:—The recent marine disasters (stranding of ocean steamers, and loss of life) has prompted me to make, through the columns of your much valued paper, the following suggestion to the minds of those interested. When a ship is stranded with a strong wind on shore, why would not a common kite,

built of strong and light materials and of a proper size, be an excellent thing to open up a communication with the shore, when no other or more preferable means were available? I am a seafaring man myself, and really believe that such a mode, had it been thought of, would have been found practicable in saving lives in many cases of shipwreck. It would be but a trifling expense for a passenger vessel to add to their stock of life-saving apparatus a silk kite, so constructed as to fold up snug when not in use, with a liberal supply of light, strong line. The chances are that in such cases as those of the *Indian*, *Northerner* and *Hungarian*, it might become of vital importance. Let some enterprising Yankee get up a folding kite, so as to be snugly stowed in a tin case.

Albany, N. Y., March 5, 1860. F. A. M.

DEFECTS OF CALF-SKIN LEATHER.

MESSRS. EDITORS:—On page 67 of the present volume of the SCIENTIFIC AMERICAN, I noticed an article on the "Defects of Calf-skin Leather," giving some account of what was termed "dry rot," which article greatly impressed me at the time; yet it did not fully meet the case. On page 137, the same subject is again referred to, with some comments, by two correspondents. One (C. L. Robinson) has some good ideas, yet does not give a full solution. I have had some 30 years' experience in the manufacture of boots and shoes; during that time, I have particularly endeavored to ascertain the cause of defects in calf-skins, those being more sensitive to any chemical action than perhaps any other kind of leather, for want of maturity in the texture of the skin. I am led to conclude that the principal difficulty is in the process of tanning, in the use of lime, and especially in what is called *baiting;* the tissues of the skin being so very delicate that any carelessness or ignorance in these processes proves injurious. This is an old complaint, and one that has been prolific of thought and experiments for several hundred years, with but very little practical benefit. The field is still open for research, and would yield a fortune for any one who solved this great chemical problem. The wax-like substance which exudes near the seams and soles of boots and shoes is not what has been called "dry rot," or any particular kind of decay in the skin, but is produced by the oxyd of iron in the blacking used for coloring the edges of the soles and seams, which blacking has a strong affinity for the oil in the leather, especially for resinous oils, which in its amalgamation decomposes the fibers of the skin; this, even where this substance does not appear, is the more immediate cause of the cracking of the upper-leather near the soles. I am satisfied that the more active agents are the oxyds and oil, as this peculiar effect is confined exclusively to that finished with oil, such as harness, "top," and other kinds of *grain* leather, when this kind of coloring is used, except (as before stated) when the oxyd in the blacking is brought into contact with the oil in the leather. The better the quality of the oil, the less its injurious effects. Pure, sweet neats-foot oil is probably the best. For several years I never allowed the blacking used for coloring edges to touch the upper-leather; and this carefulness, in a great measure, prevented the cracking from the soles. I have known a calf-skin to be kept for more than *twenty years*, and to be then made into boots which did excellent service; still, I do not think they improve by keeping. A pair of calf-skin boots which I had made for me in 1835, have been worn frequently ever since, and are now in a very good state of preservation. One defect in the manner of dressing calf-skins is the too free use of the *curry knife*. Skins wear much longer when finished as near their natural thickness as can be, and yet obtain a smooth surface; the fibers near the flesh being very much stronger than those near the grain. A too free use of oil, even the best, tends to injure rather than improve calf-skins; when oil is used the leather should be clean, and moistened with water before applying the oil. M.

Wakefield, R. I., March 6, 1860.

GREENWOOD CEMETERY IN WINTER.

[Communicated.]

The majority of people ignore Greenwood in this dreary season. One knows during the summer the pleasant avenues are thronged with strangers of all climes, curious to see a novelty; well-known citizens, anxious to breathe the rose-scented air and watch the gorgeous flowers that bloom silently above so much hallowed dust; and tearful mourners, wending their steps towards the tombs of beloved lost ones. Thus, as the south wind plays merrily over it, it seems a city of the living; but all now wears a deserted appearance. We could fancy ourselves in some forsaken city of the past ages. We have recently been through the grounds, and found them sublimely beautiful in their winter covering. The few leaves that are left flutter solemnly in the cold blasts from the north. The tufts and tops of snow-flowers were in close embrace here and there to the dull earth, peeping modestly from their fair dress and nestling lovingly in strange communion with the dark evergreens. The gigantic trees rear their lofty heads, standing out in strong contrast from the backgrounds of gray, murky sky—staunch emblems of a Creator—fit monuments of the fitful sleep of nature.

If it were our mind to seriously ponder this subject, we could add, as we now stand in this place, amid its majestic silence and the pungent realities of this season, we are taught some of our noblest lessons in life. It is at such times those sweet and hallowed memories often visit men, as they struggle through rugged scenes, giving them heroic souls, filling them with encouragement and making them better by their ministrations. Happy thoughts, of days long since gone, mingle with grief, as we cast still another glance at the graves of departed worth; but enough of this.

Freeborn's monument rises proudly on Battle-hill, towering far above the minor incidents of leaves and flowers, beautifully harmonizing with the majestic grandeur of the surrounding landscape.

The delicate framework of Charlotte Canda's tomb appeared to miss its covering of roses and foliage, and looked cold and lonely. We never see this monumental pile without having a sad thought; we see a beautiful girl—reveling in the pleasantest realities of life, and living, as it were, in the illuminated land of hope, whose whole life was a river of pure water—cut down in a second of time by "the fell destroyer" (who is no respecter of persons) and consigned to the earth.

Capt. F. Cobraja's striking monument deserves attention. It was erected by himself after his own design, and represents a statue of life size, in sailor costume, standing on a capstan, with a sextant to his eye, taking an observation by the sun. The aged seaman, we believe, is still living, taking great pride in his tomb; and although he is eighty odd years of age, he has, until recently, taken the sole charge of it himself. He, too, must soon be launched on a sea that he has never yet explored, speeding his way to that "bourne from which no traveler returns."

In this place there are many beautiful specimens of American marble; and it is really gratifying to see that the unjust prejudice long existing against the marble of this country is dying out, and that, in this respect, a new era has commenced. Certainly our country is rich in marble quarries, and it is a matter of much surprise and great regret that they have so long lain dormant, and that their abundant resources have not been far more fully developed; much of it will compare very favorably with some of the Italian.

Our *cicerone* on this occasion (a man apparently 40 years of age) was shy and modest—a rare virtue in a hack-driver; but a few questions awakened his recollection, and he detailed to us many pleasing reminiscences of his boyhood life. He had lived there all his days; childhood had been spent in climbing "Battle-hill," and roaming amongst the unshorn grass of the "Tour" and the other avenues, whilst they were the home of the living instead of the dead. "Sylvan Lake" had been a swimming pond to him when country farm-houses surrounded the place. The whole grave-yard was silent and all seemed inanimate; yet as we were departing, a snow-bird flew over our heads, making a doleful noise that might have easily been construed into a question, asking by what right or authority we had presumed to breathe in the "City of the Dead." It was the only thing of life on the premises.

An immense outlay is yearly required in grading and keeping the cemetery in repair, and this has been of late a heavy drain on the treasury; yet the company seem not to care for this, but to be determined to continue ornamenting until it shall surpass in beauty and design anything of its kind in the world. B.

THE tunnage dues annually paid in Liverpool amounts to $1,750,000. It is the largest seaport in the world.

A COLUMN OF VARIETIES.

The equinoxes, by the movement which is called precession, have slid thirty degrees to the westward of the constellations with which they were originally associated. This fact, combined with the known rate of precession, shows that the constellations were named about 307 years before the Christian era, that is to say, soon after the establishment of the Alexandrian school of astronomy.....It is stated that when the twelve hundred clerks employed in the Bank of England leave the building in the evening, a detachment of troops marches in to guard it in the night, although burglars could not penetrate the solid vaults in six weeks..... Sir Isaac Newton never believed in the wave theory of light, and recent discoveries have strengthened very much the doubts of its truth which have always been manifested by some of the greatest writers on the subject.....The calcium or lime light was discovered by Dr. Hare, of Philadelphia, soon after his great discovery of the compound blow-pipe.....The yellow ray of light is not merely inoperative when falling upon photographic paper, but it actually protects the paper from the influence of the actinic rays .....A sheet of black mica, which cannot be seen through at all, transmits those rays of heat which come from a stove not red-hot, more readily than they are transmitted by a plate of the most transparent glass.....The light of the tropics is not so powerful for photographic purposes as that of the temperate zones; a longer time being required to take a picture..... Photographs are more readily obtained in April and March than in June or July.....One of the large anacondas in Barnum's American Museum has recently been delivered of a litter of young. Snakes are ova-viviperous, that is to say, eggs are formed and hatched within the body of the animal. This, probably, has given rise to the popular notion that these reptiles swallow their offspring.....The *Nondescript* in Barnum's Museum is certainly a curiosity —though a disagreeable one. It looks like a deformed idiotic little negro.....Steam shipping has increased to such an extent that a large weekly newspaper is published in London, devoted exclusively to the subject. It is called *Mitchell's Steam Shipping Journal*.....The great eclipse of the sun which takes place on the 18th of next July, will be total in Spain, and it is said that at least forty astronomers, from various parts of Europe, intend visiting that country on the occasion, in order to observe the phenomenon.....The forenoon is the best time to have a photograph taken, as the morning sun produces better effects than can be obtained after 12 o'clock..... Sulphuric acid combined with iron forms sulphate of iron, but simple sulphur and iron, in combination, receive the name of sulphuret of iron. The same rule is applied to other substances—thus, carbonic acid and soda form the carbonate of soda, while a combination of carbon and hydrogen is called carbureted hydrogen.....Land has been sold in Fleet-street, London, at the rate of £900,000 equal to about $4,500,000 per acre; this is at the rate of $100 to the square foot, and would amount to about $200,000 for one of one of our up-town lots of 20 feet front.....The Maryland code has been so revised as to put an end to lotteries. The penalty is a fine of $1,000 or imprisonment..... When Elias Howe, Jr., the inventor of the first practical sewing machine, returned from England, his funds were so exhausted that he worked his passage as cook.....As Spain has a dry season in the summer, similar to that of California, there is no doubt that there will be a fine opportunity for viewing the great eclipse from that country, next July.....Although steel is believed to be harder and stronger in some proportion to the amount of contained carbon, cast iron, when it is very rich in carbon, is soft like plumbago, will break by its own weight, and may be cut with a knife.....A correspondent of the *Times* (London) states that in the Commune d'Ecully, in France, two men were buried alive in a well by a fall of loose earth, and that after twenty days one of them was taken out still alive; having survived the want of air, light and food, throughout that long period, in addition to the impossibility of moving and the presence by his side of the dead body of his unfortunate companion, for a considerble portion of the time.....In the comprehensive experiments made by Robert Stephenson upon different varieties of cast iron proposed to be employed in the High Level Bridge. Hot-blast iron was found to have nearly the same strength as cold-blast.