

contents burn, and it may be that in some cases the fact that the walls stand increases the distinction enabling the contents to burn as in a furnace. Buildings do not take fire, but *that which is in them*.

Mr. Ayres—A fire occurred in an iron building in San Francisco, which was full of combustible materials. The building stood firm although everything in it was fiercely consumed. The firemen tried in vain to pull down the building with ropes, and assisted by horses. But the building was finally removed in the proper way, and with no difficulty, by taking it to pieces as it was put up.

Mr. Whittemore—In Chicago we had a very different experience. In one case in particular, I distinctly recollect that the bolts were sprung by the heat and the whole structure came down in a mass.

Mr. Reid—In the *London Mechanics' Journal*, of 1824, there is a description of an iron lighthouse 16 or 18 feet square, with a column and lantern all of iron. The lighthouse was erected on the wharf at Glasgow.

Mr. Johnson—In 1839 Mr. Fairbairn constructed a corn mill entirely of iron; it was erected in Turkey. The walls were of sheet iron of proper thickness, consolidation and bound together by cast iron columns and girders. It had an arched roof of corrugated sheet iron. In Peru, S. A. a custom-house and warehouse, 2 stories high, 70 feet square, with a balcony, have been erected. They were made and set up in Manchester, England. In 1775 Smeaton first applied cast iron beams in the north of England, and up to 1801 little progress had been made. In that year Philips & See, of Manchester, built a fire-proof mill; Boulton & Watt executed the work. In connection with the ornamentation of iron the name of Quintin Matsys is remembered by all. In Antwerp there are still remaining many evidences of his skill. At the burning of the Crystal Palace, glass, iron, silver, gold and copper wire melted. If the Cooper Building should take fire it would fall. Cast iron becomes weak and brittle before it melts. A stick of wood will retain its form longer in a furnace than a bar of iron of the same bulk.

Mr. Godwin—About 30 years ago, a large quantity of cast iron columns were brought to New York from England. Long before any iron buildings were built here, Mr. Jordan L. Mott advocated the plan of a building wall composed of hollow cubical blocks, tied together by wrought iron rods.

Dr. Young—Buildings should be so constructed that in case of fire, the fire would be confined to one floor or one room. Cast iron contracts on cooling, and if the cooling is too sudden, it cracks. Pattern-makers generally provide for a contraction of $\frac{1}{8}$ inch to the foot in casting.

Mr. Reid—In England, now, they are proposing to erect an extensive fortification entirely of iron.

Mr. Seely—Without impeaching the statement of Mr. Ayres, that he has not observed that expansion is of any practical account in iron buildings, I am yet not content. The fact and the exact amount of expansion by heat are undisputed, it is also understood that the expansion of iron is irresistible. When the fact of expansion is made sensible and familiar to us in so many ways, it seems strange that it has not been observed in Mr. Bogardus' building. Professor Horsford, by means of a plummet suspended in the Bunker Hill monument, has shown that the monument daily sways back and forth by the heat of the sun. Let a careful test be applied to any iron building, and the expansion must be noticed. The brick walls against which Harpers' Building abuts, must move every day; and if one of them be so rigid as to be unyielding, the effect on the other may be of real practical consequence. In many familiar cases the expansion of iron in ordinary changes of temperature is of practical account and provision is made for it, as in tubular bridges, arches and girders for masonry, &c.

Mr. Ayres—I can only repeat that I know of no instance of iron buildings in which expansion is taken into account. We are erecting an iron building 700 feet long, and we do not think it at all necessary to provide for expansion.

Mr. Seely—Mr. Bogardus so puts together a building that it is a unit with no joints to spring apart or close up. The angles are generally right angles, and the directions are straight. He seems by his plans in the beginning to have anticipated and prevented the injury from expansion. But vary the construction a little, and the effect of expansion would be noticeable.

Mr. Garvey—The expansion of wood by hygrometric conditions is a far more serious evil in a building than the expansion of metals by heat. Wood also expands by heat.

Mr. Seely—Wood expands by moisture only across the grain; in that direction it would do little damage in beams. Wood expands less by heat than metal. Wood is also so yielding as to accommodate itself to the expansion with little injury.

Mr. Garvey—The force of wood swelling by moisture is used in quarrying, and I doubt the statement that wood expands less than iron by heat.

Mr. Garbanati—Wood should be protected by paint so that moisture shall not penetrate it.

Mr. Johnson—Wood is named in treatises on horology as the substance which expands less than any other, and as the best material for a pendulum when the expansion is not compensated by the ordinary means. At my house I have evidence, every day the sun shines, of the fact of expansion of iron. Under the heat the whole tin roofing is set in motion, and cracks and rumbles as if some one was walking on it.

Mr. Howe has seen in watch stores many regulators of wood. The value of wooden pendulums is well understood by clockmakers.

Dr. Van Der Weyde—The old clock of the City Hall had a wooden pendulum. The rods that are operated by the keys of an organ are always wood. Metal would not answer on account of the expansion.

Mr. Johnson—Nature understands wood-making better than we do iron-making. When a cast iron beam is deflected by a weight, the deflection increases by a continuance of the load, and may eventually break under it; or if the load is removed, the beam will not resume its original form.

The subject ordered for the next meeting is "Expansion."

FACTS IN PHOSPHORESCENCE.—At a recent meeting of the Academy of Sciences, Paris, a paper by Dr. Phipson, on some new cases of phosphorescence was read. The author shows that native sulphuret of antimony or stibine glows with a phosphoric light when it is heated in a crucible to a dark-red heat. When copper, silver, or gold are melted before the blowpipe in a piece of charcoal, they also become phosphorescent at this high temperature; copper, in this case, is seen to shine like the glow-worm, with a greenish yellow light; the effect is striking when the phosphorescence is viewed through a piece of blue glass. The mineral lepidolite, which was not known to possess such a property, is, according to our author, very phosphorescent before the blow-pipe, especially when viewed through the blue glass. Dr. Phipson has discovered, also, that sugar of milk or lactine becomes phosphorescent on being broken or ground down in a mortar—a fact not devoid of interest, as it brings sugar of milk still nearer to other sugars, such as cane sugar and mannite, which are also phosphorescent in the same circumstances. Finally, the author describes what he terms the finest case of mechanical phosphorescence he has ever witnessed. It happens when a certain quantity of large dry crystals of nitrate of uranium are shaken up violently in a glass bottle, through which magnificent flashes of light are seen to shoot. M. Phipson has experimented on a great variety of other salts, but none, except proto-chloride of mercury, gave any light that could be compared to that produced by the crystals above named.

NATURAL HISTORY SPECIMENS.—A pamphlet has been issued giving instructions to persons who may be willing to take the trouble to send specimens of natural history, such as minerals, skins of animals, of birds, snakes, &c., to the great national collection of these specimens which is being made by the Smithsonian Institution. It is requested that the most common species of each neighborhood should be forwarded. The pamphlet of instructions will doubtless be sent to any one who may write for it to Professor Joseph Henry, the secretary.

GRAIN CRADLE FINGERS.—An obliging correspondent, writing from South Groton, Mass., says:—"I would state to your correspondent, G. C., of Georgia, that there is a machine used by A. V. Blanchard & Co., of Palmer, Mass., for dressing grain cradle fingers, which I think is not patented."

A COLUMN OF VARIETIES.

A firm in Savannah has just received an order for 200,000 feet of pine lumber, for the Holy Land. Portions of the cargo are destined for Jerusalem and Damascus. A similar venture made last year was successful. As the *Savannah Republican* truly remarks, "there is something novel in the thought that the palaces of the Holy Land are to be rebuilt with materials taken from the forests of Georgia.".....A complete canvas of Cincinnati has lately been made, with a view to obtain information in reference to its manufacturing interest. It appears that there are engaged as operatives in manufacturing and mechanical pursuits, 23,161 men, 1,423 girls, and 949 boys. The value of the aggregate annual production is \$66,502,440.....It is estimated that no less than nine thousand men will leave Iowa, this season, for Pike's Peak.....A building, covering 36,000 square feet, has been erected at Toronto, C. W., for the manufacture of railroad rails.....There are now over 2,000 miles of railroad in operation in Canada. The Grand Trunk Railway is certainly a gigantic undertaking. The whole extent of this line is about 1,100 miles. To the construction of this great road, Canada has contributed \$16,000,000—the balance of the capital has been advanced by shareholders in England, and the line is now in working order, and at a total expense of \$60,000,000.....We see that the upright stem of vessels, which was first introduced in this country, and which—no longer than when the *Niagara* first visited London—was condemned by the English critics, has been adopted not only in the largest English ships, but also in the navy of France.....A hunter of pigeons has done a heavy business this Spring by following the pigeons from point to point—gaining his intelligence by telegraph. He commenced operations some weeks ago in Virginia, and has lately been in Michigan, and at nearly every place where he has stopped he has been very successful. A paper published at Grand Rapids, Mich., dated April 3d, states that in four days he shipped from that place 600 dozen—40 barrels.....The *London Journal of Gas-lighting* in speaking of the recent fatal explosions in the mines, and of the unprecedented series of shipwrecks, intimates that the legislation for the purpose of protecting persons from such accidents has defeated its own ends and tended rather to increase the evil.....The famous "purple" of the Romans was a deep crimson....The St. Paul (Minn.) *Times* reports that "recently about three dozen fine fat cattle went down on the *Grey Eagle*, for New York, the first which ever went to that great market from this neighborhood. They were raised in various parts of northern Minnesota, and collected by the shipper. He pays \$20 per head, through freight."....One-tenth of one per cent of the atmosphere contains oxygen enough for the supply of the whole present population of the world for 10,000 years.....There is a very handsome young fellow in the Indiana Lunatic Asylum, whose self-conceit is said to have become morbid, and is actually the cause of his insanity.....The clipper ship *Andrew Jackson* has recently made the shortest trip yet from New York to San Francisco—89 days and 7 hours—six hours shorter than the famous trip of the *Flying Cloud*.....The *Savannah News* describes the performance of the caloric yacht *Marie Louise*, at that port, and says she proved "the entire adaptation of the caloric engine to the propulsion of small vessels.".....The schooner *Matilda* recently arrived at Honolulu, from Fanning's Island, with 10,000 gallons cocoa-nut oil, which sold at a good profit. It is estimated that 20 or 25 nuts will make a gallon of oil, which is used for making soap, and for the hair. It is thought that a very large quantity will yet be gathered.....J. Mosheimer, of San Francisco, Cal., writes to us that the first silver ore from the Washoe mines was smelted at his laboratory, and that 40 tons have been smelted, yielding about \$3,000 to the tun. It is the general opinion in California that these will prove to be the richest silver mines in the world.....Chloroform has been administered to a child, during sleep, a painful surgical operation performed, and the child allowed to continue its sleep, awaking in the morning unconscious of anything unusual having occurred.....The late prize fight would afford the *London Times* a good text for one of its interesting articles on the physical decline of the Americans.....Corliss & Nightingale publish the statement that the "James Steam Mills," of Newburyport, Mass., paid them \$19,734.32, as the amount saved in fuel, by the use of one of their engines, during five years.