PUDDLED STEEL.

On page 317, Vol. XIV, SCIENTIFIC AMERICAN, we described the method of making puddled steel, as pursued in England, and stated that we had been informed of its manufacture having been commenced at the iron works of Corning & Winslow, of Troy, N. Y. Since that period we have not been able to learn whether its manufacture has been successful there or not; but we conclude that it has not, from the fact that it has not found its way into common use. In the New York *Times* of Tuesday, Nov. 29, there is a short article on this subject, apparently by "Tubal Cain," who formerly corresponded with that paper from abroad. He states that puddled steel is now being extensively tried in England for steam boilers, and that its best qualities are as easily worked as copper, and that boilers made of it may be one-third thinner and lighter than those of iron. Thus far the experiment with puddled steel plates in boilers has been very successful, excepting in one important particular, namely, some of the plates split and peel under the intense actionof the fire. This is certainly an insuperable objection to its use for boilers, but we are informed that this defect is being gradually overcome. It is stated to be one-fourth stronger than iron, and that it can be made about as easily and cheaply as cast-iron. Its successful manufacture requires an intimate knowledge of steel-working because it is made by partially decarbonizing pig-iron in a puddling furnace, and the work of reduction must be arrested at the exact point or the desired result will not be produced. It takes a practiced puddler of steel to know when this is effected by the appearance of the metal in the furnace, but if this is done in England, it surely can be performed in America, and we should not be lagging behind in such an important matter.

FERRUM OR TRUE IRON.

Ferrum is the Latin as well as the chemical name for iron. In its chemical sense it means pure iron, in distinction to the common word, iron; because all the iron of commerce is not pure iron, but a compound of iron and charcoal. Iron and steel vary only according to the quantity of charcoal combined with the iron. Pure iron, *i. e.*, ferrum, is never seen but in a laboratory or chemical museum; there is, however, no substance perhaps so widely and universally diffused as ferrum, in combination with this and that, throughout the world's surface. Iron exists in almost every soil; it can can be traced in almost every plant and fruit. It not only exists in animals. but its quantity is so regular in the human blood, that ferrum is now considered one of its natural constituents; in fact, physicians distinguish healthy blood by the amount of iron it contains. The manifold uses of this truly precious metal render it more valuable to man than any other metal, and from the numerous and important applications to which it is put, it appears almost indispensable to the condition of civilization. Its frequent mention in Scripture indicates the early period at which man became acquainted with its qualities. All kinds of tools and implements, such as the ax and the harrow, are mentioned in the Bible; and also even some things which are almost considered to be modern inventions. Thus, King Og, of Bashan, is described as having a "bedstead of iron." The "iron pen," is also twice spoken of, but that refers to an instrument used for 'graving, not writing, in one case, and is used figuratively in the other. Iron gates, iron chariots, and iron pillars are also mentioned, sufficient to show that nearly all the applications of iron of our day date from ages ago. The mechanical uses of iron are innumerable, from the ponderous engine to the lady's needle; from the pit saw to the surgeon's lancet. The chemical properties of iron are equally numerous. Its presence gives color to many precious stones; the garnet, the ruby, the lapis-lazuli, the topaz, all owe their tint to ferrum. Many artificial colors and pigments owe their brilliancy to iron, such as Prussian blue, which is a compound of iron. Even the ink with which we now write is a compound of iron; and so we may go on enumerating its value to the currier, dyer, and druggist—a long chain of many curious links. Independently of the precious mechanical qualities and chemical properties of iron, there appears something so mystical in its nature, that man's study of it reveals only the more to his astonishment. Of these mystical qualities, none is more mysterious than that of its magnetical properties, and its power, when poised, to set itself at right angles to the motion of the earth's rotation which we call "polarity." What a mass of mystery is there in that little balanced needle by which the mariner directs his course over the foaming wave to a port unseen and unknown:

> "Hail, adamantine steel, magnetic lord,
> King of the prow, the plowshare, and the sword!"

Ferrum yields up its strength and its might to water made sour with sulphuric acid. In this liquor iron dissolves and becomes invisible. When the solution is saturated with iron and then evaporated, a beautiful salt (sulphate of iron) is produced, which crystallizes like bits of broken frozen sea.

S. PIESSE.

ACTION OF HEAT-DIFFUSERS

We condense the following very useful remarks from the London *Mechanics' Magazine*; they were written by A. A. Taylor, of Marseilles:—

"Mr. Wye Williams and others have found that an increased effect was produced by the fuel burned in steam-boilers when what have been called heat-diffusers were placed in the tubes or flues. The apparatus in question consists generally of metallic bands or ribands twisted into spirals or bent in the direction of their length into zigzag forms, and placed in the tubes or flues; the professed object of this addition being to break up or disturb the current of heated gases passing through the tubes, and to cause every portion of the gases to impinge on the heating-surfaces; the cause given for the increased effect produced being, that when a current of heated gases passes through a tube under ordinary circumstances, only the exterior portions of the columns come in contact with the sides of the tube, and that in thus disturbing the current by obstacles to its direct course, a more perfect contact of the gases with the surface is produced. But gases do not radiate the heat which they contain, so that the only mode in which a gas can communicate its heat to a surface is by contact or connection. This is, in the present practice, the only mode in which those heating-surfaces of a boiler which are not exposed to the radiation of the fire or flame can abstract heat from the products of combustion; but if, in a flue or tube, a solid body be introduced, it will become heated by contact with the gases, and will radiate the heat thus received to the sides of the flue. Now these diffusers, &c., exactly fulfill these conditions, and their effect is mainly, if not entirely, owing to the function which they must fulfill in absorbing heat from the gases by contact, and then radiating this heat to the sides of the tubes or flues; and the amount of heat thus conveyed to the water may be very important, when it is considered that the temperature of the gases in the tubes of a boiler at five or six inches from the fire-box tube plates is about 800° Fah., and that these radiators will consequently have a temperature of several hundred degrees above that of the surfaces in contact with the water in the boiler, and that a very active radiation must consequently take place from one to the other. This principle once established. the modes of application in practice are, of course, endless; and we do not see any advantage in making these radiating surfaces of such a form as to impede the draught, especially in the case of marine boilers, but would rather choose the form which would give the greatest amount of radiating surface, and offered the least impediment to the free passage of the products of combustion through the tubes. Perhaps as effective a form as any for placing in the tubes of boilers would be a simple straight band of metal, or a wider band bent in the direction of its breadth, at an angle of 60°. In the case of marine boilers, they should be made so as to draw out easily, to enable the tubes to be swept."

MODEL OF SOLOMON'S TEMPLE.—We stepped into Temple Hall (formerly Doctor Van Zant's church) in Ninth-street, to take a glance at this exhibition, with a strong feeling that we should see a sort of paste-board puppet show, but we were quite agreeably disappointed. There is hardly any one who would not give 25 cents for a clear, full, and distinct idea of the size and appearance of Solomon's Temple, and ten minutes inspection of the model now being exhibited as above, will go farther to give him this idea than hours or weeks of reading.

A COLUMN OF FACTS IN RELATION TO METEORS.

Several persons have been struck dead by stones falling from the heavens: for instance, a monk at Crema, on the 4th of September, 1511; another monk at Milan, in 1650; and two Swedish sailors, on board ship, in 1674.....Meteors, shooting stars, and aerolites, are now generally regarded as the same thing.....On clear nights, the number of shooting stars which may be seen from one point of observation averages about eight per hour. .....When we consider that a fall of stones would not be noticed if it occurred in half of North America, three-fourths of South America, one-fourth of Europe, three-fourths of Asia, seven-eighths of Africa, and nine-tenths of the ocean, and connect this consideration with the list below of those which have been observed, we may understand that the earth is being almost constantly pelted with these flying rocks.....Shooting stars are apt to appear in great numbers in August and about the middle of November.....Humboldt thought that the observations of the sun's disk which have been noticed may have been caused by masses of these little planets coming between us and the sun.....Professor Pierce says that the meteor of 1783 was half a mile in diameter, and moved at the rate of 20 miles in a second; this is 60 times greater than the velocity of a cannon ball.....The word "meteor" is derived from the Greek word *meteoros*, meaning high, sublime.....Pliny gives an account of the fall of three large stones in Thrace, 452 years before Christ.....A stone weighing 260 pounds fell at Ensisheim, Upper Rhine, Nov. 7, 1492.....Carden Varat mentions the fall of 1,200 stones near Padua, in Italy, in the year 1510; one of them weighed 120 lbs., and another 60 lbs.....A stone weighing 59 lbs. fell on Mount Vaise, France, Nov. 27, 1627.....In January, 1706, a stone of 72 lbs. weight fell near Larissa, Macedonia.....A stony mass fell at Niort, in Normandy, in 1750.....Two large stones, weighing 20 lbs., fell at Liponas, in Bresse, September, 1753.....A shower of stones fell at Plunn, in Bohemia, July 3, 1753.....Two stones, weighing 200 and 300 lbs., fell near Verona, in Italy, in 1762.....A stone, weighing 7½ lbs., fell at Luce, France, Sept. 13, 1768.....There was an extensive shower of stones in the environs of Agen, France, July 24, 1790.....There was a shower of stones near Boquefat, France, in July, 1789.....A stone, weighing 10 lbs., fell in Portugal on Feb. 19, 1796.....There was a shower of stones at Benares, East Indies, Dec. 19, 1798. .....A stone, of 56 lbs. weight, fell at Wold Cottage, Yorkshire, England, Dec. 13, 1795.....A stone, weighing about 20 lbs., fell at Sale, in France, March 17, 1798.....On April 26, 1803, several stones, weighing from 10 to 17 lbs. each, fell near L'Aigle, in France. A large stone fell near Glasgow, Scotland, April 5, 1804.....Dec. 14, 1807, a number of stones fell at Weston, in Connecticut.....April 19, 1808, a stone fell at Bengo San Domino, Italy.....1808, May 22d, a stone, welghing four or five lbs., fell at Stanen, Moravia.....1808, April 3d, a stone fell at Lissa, Bohemia. .....1809, June 17, a stone, weighing 6 ounces, fell on board of an American vessel in lat. 30° 58′ N., lon. 70° 25′ W.....1810, Jan. 30th, a number of stones, some of which weighed about 2 lbs. each, fell in Caswell county, North Carolina.....In July, 1810, a great stone fell at Shahabad, India, which burned five villages and killed several men and women.....August 10, 1810, a stone, weighiug 7¾ lbs., fell in county Tipperary, Ireland.....Nov. 23, 1810, stones fell at Mortelli, Villerai and Moulinbrule, France; one of these weighed 40 lbs., and another 20.....March 12, 1811, a stone, weighing 15 lbs., fell in the province of Pultowa, Russia.....July 8, 1811, a number of small stones, one weighing 3¼ ounces, fell near Berlanguillas, Spain..... April 10, 1812, a shower of stones fell near Toulouse, France.....April 15, 1812, a stone of the size of a child's head felt at Erxleben.....August 5, 1812, stones fell at Chantonay.....March 14, 1813, stones fell at Cutro, in Calabria.....Sept. 10, 1813, several stones, one of which weighed 17½ lbs., fell at Limerick, in Ireland.....1814, Feb. 3d, a stone fell at Bucharest, in Russia.....Sept. 5, 1814, stones, some of which weighed 8 lbs., fell near Agen, France.....Nov. 5, 1814, a number of stones, of which 19 were found, fell in the Doab, in India.....Feb. 18, 1815, a stone fell in Dharalla, in India.....The list could be continued to the present time if we had space.