For the Scientific American.

The Mineralogist.—The description and locality of every important Mineral in the United States.

(*Continued.*)

ANTIMONY, SULPHURET OF.

Occurs in compact delicate threads. Color, lead gray. Lustre, shining. Yields to the knife; brittle. Melts in a candle. 4 times as heavy as water. Found at Harwinton, Ct.; on Saco river, Me.; near Richmond, Va.; Zanesville, Ohio; South Hadley, Mass. This is the ore from which the metal is extracted

APATILE.

Colors, white, greenish, blue, bluish green, reddish, and yellowish white. Lustre, glassy; nearly transparent; yields to the knife. Does not melt; dissolves in acids. Occurs at Hamilton and Germantown, Pa; Milford hills, Ct.; Topsham, Me.; in the vicinities of Wilmington, Del.; Crown Point, New York, West Farms, Green Pond (Morris Co.,) Anthony's Nose, in the Highlands, N. Y.; Baltimore, Md.; Philadelphia and New Haven.

ARGENTINE.

Occurs in thin plates. Color, milk white, reddish or grayish white. Lustre, pearly. Nearly transparent. Yields to the knife; easily broken. Does not melt. Dissolves in acids with bubbling and heat. Found at the Southhampton lead mine, and Williamsburg, Mass.; Franconia, N. H.

ARGILLACEOUS OXIDE OF IRON, [COLUMNAR.]

Occurs massive, composed of columns, like starch. Colors, red, brownish, yellowish, or blackish red. Fine grained; earthy; brittle; adheres to the tongue; 3 to 4 times heavier than water. Found at Martha's Vineyard, Mass.; Navesink hills, N. J.; Long Island, N. Y.

ARGILLACEOUS OXIDE OF IRON [LENTICULAR.]

Occurs in flat, lens-like masses. Color, brown or red. Easily broken; 3 times heavier than water. Becomes magnetic when heated, but does not easily melt. Found at Ontario, N. Y., in sand, gravel, clay, &c.

ARGILLACEOUS OXIDE OF IRON, [NODULAR.]

Occurs in balls of a yellow or yellowish brown color. Scarcely yields to the knife; 3 times heavier than water. Found extensively at Bomb-shell hill, Md. When heated strongly it explodes. Also near Baltimore, Md.; Plymouth, Mass.; and Northington, Ct.

ARGILLACEOUS OXIDE OF IRON, [PISIFORM.]

Occurs in masses resembling peas Color, brown. Lustre, at the surface resinous; in the centre, dull. Brittle. Found in Salisbury, Windsor, and Hartford, Ct.; Pompton plain, N. J.; Staten Island, N. Y.

ARRAGONITE.

Color, white, yellowish white, greenish gray, pearl gray. Lustre, glassy; scratches marble. On a red hot iron, it shines in the dark. Dissolves in acids. Appears to consist of bundles of small crystals. Found at Weir's cave, Va.; and Suckasunny mine, N. J.

ARSENIATE OF COBALT.

Occurs in masses resembling a bunch of grapes, also kidney-form, and in crusts, with needle-like crystals. Crystals, transparent. Soft; readily bends. Nearly 3 times heavier than water When heated, emits the odor of garlic, and tinges borax smalt blue. Color, peach blossom red. Occurs in Chatham, Ct.

ARSENIC.

Occurs in plates, small masses, kidney-shaped, and resembling a cluster of grapes. Color, tin white, inclining to lead gray. Yields to the knife; brittle; lustre metallic; 5½ times heavier than water. Burns when heated, with a garlic odor, and soon goes off in vapor. It is found in Martha's Vineyard.

ARSENICAL NICKEL

Occurs massive, resembling a net or bunch of grapes. Color, red; tarnishes. Lustre, shining. Yields with difficulty to the knife. From 6 to 7 times heavier than water. When heated, gives out garlic odor. Forms a green solution in warm aqua fortis. Found in Chatham, Ct.; Frederick Co., Md.

(*To be continued.*)

Temper is Everything.

A friend of Mr Pitt introduced him at a very early age to Lord Mansfield, who, after conversing with him for some short time, on his departure asked his introducer—"What is the temper of your young friend?" "Under complete control." "Then," said Lord Mansfield, "he may rule the kingdom."

For the Scientific American.

Expansion of Steam.

The subject of the expansion of steam is so little understood by Practical Engineers that it is proposed in order to give a more clear understanding of the matter to investigate some of its principal features.

To him therefore who has not had time and money to go through a course of studies to qualify him for eminency in his profession is this writing particularly directed, and as the lives of those who travel by steam are for the time being in the hands of the engineer, and as anything tending to elevate him in his profession or character, would be a Public benefit, it is hoped the subject will not be uninteresting.

The meaning of the term "Expansion," is the act of expanding, being made larger, dilitation. A few examples will render the term more intelligible.

Suppose we take a bladder, fill it half full of air, and tie the mouth up tightly. Now on holding it to the fire, it will quickly commence distending, or get larger, and will go on increasing in size until it appears quite full, and such will in fact be the case, for the air, although not filling the bladder when cold, will on being heated expand and occupy the whole interior; we should then say, that this was owing to the expansion of air.

Second.—Take a tube, say of 8 inches in length and half an inch in diameter, let it be open at both ends and fitted with a piston so that the piston will move up or down without allowing air to pass its sides; the piston being pushed down to within one inch of the bottom. Place the finger over the bottom, now it will be evident that one inch by half of air will be confined in the tube. Still keeping the finger on the bottom, draw the piston up to the top, the effect will be that the one inch by half of air will expand and occupy 8 times the space it did before, and consequently will be 8 times as large. It will not be supposed for a moment, that the air will lie quietly at the bottom of the tube, such could not be the case, for common sense teaches us that where there is a vacuum the air will be constantly trying to gain admission and we certainly should by removing the piston from the enclosed air, create a vacuum if the air would be confined to the bottom of the tube; the moment the piston begins to move from the air, the air will follow it, and by the time the piston has arrived at the top of the tube the air will be there also; this is an accordance with natural laws, that when the air is strongest or most pressed, it will rush to where it is weakest or least pressed.

Third.—Take any vessel of a cubic foot capacity in the interior, put a cubic inch of water into it and place the whole over a fire. Now we can boil the water until it has all evaporated; after the water has all been converted to steam the steam would fill the whole interior of the vessel, we should then express ourselves by saying, that by applying heat we had expanded a cubic inch of water into a cubic foot of steam.

The examples cited will convey a proper meaning of the term Expansion.

The term Expansion Valve is not generally understood. Cut-off, would be a more appropriate phrase. Strictly speaking it is not an expansion valve, the valve has nothing to do with the expansion of the steam; the arrangements for cutting off are of various kinds, the principles however of all, no matter how simple or how complicated are the same, that is, the steam must enter through them at a certain time and may be cut off at any desired point. In the late improved cut off of F. E. Sickles the main steam valves are made to perform the operation of cut-off, and tracing out their principles and effects, we shall find that the valves are strictly and truly a cut off in every sense of the word, the arrangement is such that when the valve has opened the desired height it is tripped and falls again to its seat, thus cutting off a farther supply of steam and leaving what has passed through it, to undergo expansion in the cylinder.

Now to illustrate more fully the expansion of Steam in the steam engine, suppose we have a cylinder of 8 feet stroke and a constant pressure of steam of 16 lbs. to the square inch of area, it is immaterial at present what the diameter shall be. Suppose again the cylinder divided in the direction of its length into 8 equal parts, and that the steam is cut off where the piston has travelled one of these divisions, the steam being admitted at a pressure of 16 lbs will exert that force from the commencement of the stroke until it is cut off at the first division. Now if the piston was stopped at this point we should have 1-8 of a cylinder of steam of the pressure of 16 lbs. to the inch area, but the piston still continuing on to the second division, must make twice the room in the cylinder there was before, and the steam instead of being confined to the one division, would expand or increase in volume on dilate until it occupied the whole space made for it by the moving piston, and as the piston has by moving made double the room for it there was in the first instance it will of course be double the size it was while confined to one division, but in thus increasing to double volume the pressure will be decreased in like proportion, that is if the initial pressure be 16 lbs. on the piston's arrival at the second division the pressure would be 8 lbs., and could we suddenly arrest the piston at the latter division and make a hole in the cylinder for the steam to escape we should find that it would issue with the above force. The piston continuing on to the third division has made another equal space for the steam to occupy which it will again do by expanding, still filling up the three divisions but as before in expanding thus to fill the third space it will lose another portion of its pressure, and as the one division of steam now occupies three times the space it did at first it will only retain a third of its initial pressure which would be 5 1-3 lbs. the other 10 1-3 lbs. having expanded into the increased space in the cylinder. The piston on arriving at the fourth division will have added another space for the expansion of the steam, and as before in expanding into the space it will lose another equal portion of its pressure, for it has now increased to four times its first size, has lost twelve pounds of its pressure leaving 4 lbs. in the cylinder, that is, the steam that entered the cylinder at 16 lbs. pressure at the commencement of the stroke has now only one fourth of that pressure, when the piston has travelled to the fifth division the pressure will be 3 1-5 lbs. the other 12 and 4-5 lbs. having expanded, at the sixth division, pressure 2 2-3 lbs., 13 1-3 lbs. expansion, at the seventh division, pressure 2 7-25 lbs., 13 18-25 expanded, and at the last division or end of the stroke, pressure 2 lbs., 14lbs. expanded.

To be continued.

Working in Brass.

Brass moulding is carried on by means of two distinct kinds of moulds, namely, earthen or sand, and metal moulds; we shall now enterupon the investigation of the former of the two. The formation of earthen moulds requires long practical experience to overcome the disadvantages attendant upon the material used. The moulds must be sufficiently strong to withstand the action of the fluid metal perfectly, and at the same time must be so far pervious to air as to permit of the egress of the gases formed by the action of the metal on the sand If the material were perfectly air-tight, then damage would often ensue from the pressure arising from the rapidity of the generation of the gases, which would spoil the effect of the casting, and probably do serious injury to the operator. If the gases are locked up within the mould, the surface becomes filled with bubbles of air, rendering its texture porous and weak, besides injuring its appearance.

Sand mixed with clay or loam, is used for brass and other alloys. In the formation of brass moulds, old damp sand is principally used, in preference to the fresh material, being much less adhesive, and allowing the patterns to leave the moulds easier and cleaner.

Meal dust, or flour, is used for facing the moulds of small articles, but for large works, powdered chalk, wood ashes, &c., are used, as being more economical. If particularly fine work is required, a facing of charcoal or rottenstone, is applied Another plan for giving a fine surface, is to dry the moulds over a slow fire of cork shavings, or other carbonaceous substance, which deposits a fine thin coating of carbon. As regards the proportions of sand and loam used in the formation of the moulds, it is to be remarked that the greater the quantity of the former material, the more easily will the gases escape, and the less likelihood is there of a failure of the casting; on the other hand, if the latter substance predominates, the impression of the pattern will be better; but a far greater liability of injury to the casting will be incurred from the impermeable nature of the moulding material.

For some works, where easily fusible metal is used, metallic moulds are adopted. Thus, where great quantities of one particular species of casting is required, the metallic mould is cheaper, easier of management, and possesses the advantage of producing any number of exactly similar copies, such as casting bullets; printing types, and various other articles composed of the easily fusible metals, or their compounds, are moulded on the same principle. The pewterer generally uses brass moulds; they are heated previous to pouring in the metal. In order to cause the casting to leave the mould easier, as well as to give a finer face to the article, the mould is brushed thinly over with red ochre and white of egg. The founder finds that the proper time for pouring the metal, is indicated by the wasting of the zinc, which gives off a lambent flame from the surface of the melted metal. The moment this is observed, the crucible is to be removed from the fire, in order to avoid incurring a great waste of this volatile substance. Previous to raising the crucible, the molten brass is skimmed and then immediately poured. The best temperature for pouring, is that at which it will take the sharpest impression, and yet cool quickly. If the metal is very hot, and remains long in contact with the mould, what is called sand-burning takes place, and the face of the casting is injured. The founder then must rely on his own judgment, as to what is the lowest heat at which good sharp impressions will be produced; as a rule, the smallest and thinnest castings must be cast the first.

Complex objects, when inflamable, are occasionally moulded in brass, and some other of the fusible metals, by an extremely ingenious process. The mould is to be composed of some inflamable material, is to be placed in the sand flask, and the moulding sand is thrown in gradually until the box is filled up—when dry, the whole is placed in an oven, sufficiently hot to reduce the mould to ashes, which are easily removed from their hollow, when the metal may be poured in. In this way, small animals, birds, or vegetables, may be cast with the greatest facility. The animal is to be fixed in an empty moulding box, being held in the exact position required, by suitable wires or strings, which may be burnt or removed previous to pouring in the metal. Another mode, answers perfectly, when the original model is moulded in wax. This model is placed in the moulding-box in the manner detailed in the last process, having an additional piece of wax attached to represent the runner for the metal. The composition here used for moulding is 2 parts brickdust, to one of Plaster of Paris; this is mixed with water and poured in, so as to surround the model well. The whole is then slowly dried, and when the mould is sufficiently hardened to withstand the effects of the molten wax, it is warmed, in order to liquify and pour it out. When clear of the wax, the mould is dried, and buried in sand, in order to sustain it against the action of the fluid metal.

Apples for Food.

There is probably no one species of fruit, that is on the whole so valuable as the apple of our own native soil. Not a few persons entertain the idea that fruit for the invalid is unwholesome. This is an error arising probably from its injuring the health at times when mixed with other ingredients which are to the system of a rebellious nature. Most of those who can bear food upon the stomach at all, can bear apples in a proper quantity.

A boot-maker of Ognacoke, Illinois, exhibits *eight* pairs of large size boots, made by a man named Grinnell, in one day.

There is a great reduction contemplated in the expenses of the British Government—time for it.