For the Scientific American.

Receipts.

PLUMBER'S CEMENT —Black rosin 1 part, brick dust 2 parts, well incorporated.

IRON RUST CEMENT.—100 parts of iron filings pounded and sifted, with 1 part of sal ammoniac. When it is applied give it a sufficiency of water to make it of a paste consistency. This cement is for filling up seams of iron.

ANOTHER OF THE SAME KIND.—Mix 4 parts of fine filings with two of potter's clay and pounded earthenware, making them into a a paste with salt and water. If this is allowed to dry slowly, it is a very good cement for iron joints, but from experience, all cements for iron joints should be allowed to dry slowly, or else it will soon become useless.

Plane Measurement.

To find the area of a circle : Multiply half the circumference by half the diameter and the product will be the area.

To find the circumference of a circle from a diameter : Multiply the diameter by 22 and divide by 7 ; or, to be more exact, multiply the diameter by 366 and divide by 133.

To find the area of a triangle : Multiply the base by the perpendicular height, and take half the product for the area.

To find the area of an oval : Multiply the longest diameter by the shortest, then multiply the product by the decimal 7.854.

NOTE.—The first problem above is found by the theorum of the triangle, for suppose the circle to be a regular polygon of an indefinite number of sides, then the sum of the sides will be the perimeter or circumference of the circle, consequently the radius or semi-diameter of the circle, will be the altitude, and the perimeter or the base of the triangle, therefore the area of the circle will be one half the circumference multiplied by one half the diameter, or one half the circumference multiplied by the radius. Euclid was the discoverer of this rule.

Mineral Analyses.

For the guidance of the blast-furnace managers, a correct analysis should, at all iron-works, be made of the coke, and its ashes, in order to show the amount, number and proportions of the earthy matter therein contained: for, unless an operative manager be made fully acquainted with the earths and oxides upon which he has to work, all his efforts will at best, be built upon conjecture, and his results entirely the effect of chance."—"The earthy matters of the ore can only be ascertained by *analysis*: repeated analysis of the iron-making materials at each separate iron work should, therefore, be made whenever the slightest alteration appears in their mality.

A furnace-manager, who is generally restricted to the use of limestone for the fusion of his materials, will have to apportion that flux in his charges, to correspond with the amount and nature of the earthy matters of his mines and fuel, and which 'amount' and 'nature' can only be known by analysis.

For finding out an inadequate flux for bringing the earthy residums of the materials used in blast-furnaces into perfect fusion without the addition of protoxide of iron—there in no other possibly safe and certain road for him to pursue than to repeatedly refer to the components of the materials upon which the furnace manager may have to operate, and that by analysis only; all other modes of proceeding would be guess-work, uncertain and unsafe.

With regard to the analysis of materials for the use of the iron-smelter the contents of his mines, limestones, charcoal, ashes, and auxilliary fluxes—all in the state in which they are put into the furnace—should be correctly ascertained and duly tabulated for ready reference to at any time.

"By the smelter obtaining a proper analysis of his materials, and by attending to assort his ores and fluxes, so that the residuary earths shall readily fuse at the usual temperature of his blast-furnace into a clear and colorless glass, or cinder, without the aid of protoxide of iron—any furnace manager may regulate his processes, so as, at all times, to obtain whatever iron result he may desire.

Curious Facts in Natural History.

About the year 1748, some laborers in working a quarry in the neighborhood of Princeton, N. J. for the stone with which the college is built, discovered a cavern which contained the entire skeletons of an immense number of the Rattlesnake (Crotalus.) The bones were in such quantities as to require two or three carts for their removal. There can be no doubt that this cavern had once a small opening, which was afterwards closed by the accidental fall of a stone or some other impediment. This had probably been the winter abode of the rattlesnake for years, where many had died through age, and others in consequence of the circumstances just mentioned. M. Humboldt, in the third volume of his Personal Narrative, hints at an occurrence somewhat similar to the above. "I had visited the caverns of the Hartz, those of Franconia, and the beautiful grotto of Treshemienshiz, in the Carpathian mountains, which are the vast cemeteries of bones of tigers, hyenas, and bears, as large as our horses." Buckland in his Geology, has an account of a hyena skeleton, discovered in Derbyshire, in a cavernous rock. He supposes the cavern to have been open, and afterwards closed by stalactites; instances of which are common in Derbyshire. "Into this cavern, I conceive," says he, "the animal had retired to die, at a period long after the existence of the marine animals which are imbedded in the surrounding rock."

The Heart.

Every time that the heart beats a contraction of the fibral fibres takes place and the blood is sent through the arteries by the force of the stroke, as water gushes through a syringe ; and exactly at the same time an equal proportion is received from the veins. Thus at every pulse, about two spoonsfull of blood are sent out from the human heart, through the arteries, and the same quantity is received from the veins. It is said that each ventricle of the heart will contain an ounce of blood. The heart contracts 4000 times an hour, from which it appears that 4000 ounces, or 250 lbs. of blood pass through the heart every hour.—The whole mass of blood in the body of a grown person is about 25 lbs., so that a quantity equal to the whole mass, passes through the heart 10 times in an hour, which is about once every six minutes. Such is the operation of the heart in the human body ; but consider what it must be in the larger animals, such as the elephant or the whale. In the latter, the tube through which the blood is forced into arteries called the *aorta*, is a foot in diameter, and ten or fifteen gallons of blood are thrown out of the heart at every stroke, and it rushes with a velocity like that of water through the sluice of a mill.

Finding the Longitude.

The following is a simple mode of finding the longitude at sea : Obtain an altitude of the sun a short time before meridian, (say 20 or 30 minutes,) note the altitude and time by chronometer. Screw the index fast and watch the sun until it falls to the same height, and note the time as before. Add the two (times) together, take the mean and apply the corrections of the chronometer. If the equation is subtractive, add it, and if additive subtract it.

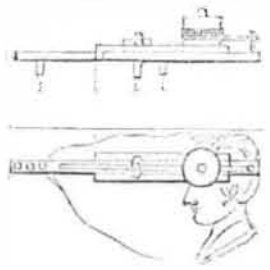
To Extract Iron Spots from Linen.

Purchase an ounce of oxalic acid at any apothecary's, put a few of the crystals on the iron spot and pour hot water on them and the iron spot will immediately disappear. Oxalic acid is a poison and looks very much like salts, therefore should be labelled and kept out of the reach of children. From experience we know that it is the best and most simple substance for extracting iron and ink spots from linen and furniture.

A wet silk handkerchief tied without folding over the face, it is said, is a good security against suffocation and smoke ; it permits free breathing, and at the same time excludes the smoke from the lungs.

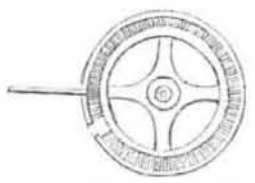
MECHANICAL MOVEMENTS.

Instrument for Drawing Curved Lines.



This engraving represents a plan and elevation of an instrument for drawing curved lines from a design. The upper figure represents an elevation of a rule having the first and third points below attached to it and held by a similar piece carrying the second point. This second point passes through a slot in the lower rule, which is allowed to slide freely in the clips, (the pieces which carry the points,) but drawn towards the right hand extremity by means of a spiral spring and band. Supposing the second point to be firmly fixed as a centre, and the third point to be passed over the outline of the face in the plan, a curved line will be produced, and if the centre be placed on the profile, a succession of similar curves may be produced by varying the position of the profile, all of which will be common to the centre.

Mangle Wheel.



This is a modification of what is generally called the Mangle Wheel, in which the uniform revolution of the pinion, which passes from one side of the large wheel to the other by means of the opening to the left, produces an alternate back and forth revolution of the larger wheel.

Scientific Memoranda.

There are many well know phenomena explicable on galvanic principles. Porter has a more lively taste from a pewter or silver cup, than from a glass one ; in the former case the moisture of the under lip, the metallic cup and the porter, form a simple galvanic circle, which gives rise to the peculiar taste.

Silver spoons are blackened in eating boiled eggs—here a galvanic circle is formed by the silver, the sulphur, the saline, or saltish matters contained in the egg ; in which case the sulphur combines with the silver, forming a blackish compound, called sulphuret of silver.

Iron railings are generally fastened into stone, by means of lead, and the iron always corrodes first, at the junction of the lead and iron with the stone ; in this case, the moisture together with the two metals, from a galvanic circle, in which the iron is the most oxidisable metal, and is the most rapidly corroded.

If a piece of gold or silver leaf be brought between the poles of a powerful galvanic battery, when in operation, they are instantly consumed ! the former giving out a splendid white light tinged with blue, and the latter a brilliant green of the emerald tint, and the light is still more intense than that from gold ; copper burns with a bluish white light, throwing off red sparks ; lead gives a vivid purple. The light given off when small pieces of charcoal are substituted for the metallic leaves, is equal in brilliancy to that of the sun, and the heat is greater, perhaps, than from any other artificial source.

If a person place his tongue between a piece of silver and a piece of zinc, and bring the outer edges of these in contact, he will perceive a peculiar taste, and in the dark will see a flash of light.

The transition of solid carbonic acid into gas deprives all around it of carbon so rapidly and to so great an extent that a degree of cold is produced immeasurably great, the greatest indeed known.

Paris Academy of Sciences.

M. Pelouse communicated a paper by M. Sobrero on which he calls mannite nitrique ; viz ; the substance called mannite obtained from manna, honey, &c., and treated by nitric acid. The mannite natrique or fulminating mannite, explodes under the blow of the hammer with the same violence as fulminating mercury, and produces in its decomposition sufficient heat to ignite gunpowder. M. Sobrero states that he has prepared capsules in which instead of fuminating mercury, he placed a little nitric mannite crystallized in alcohol, and discharged a fowling-piece with them several times with the same certainty as with the ordinary capsules.

A communication was received from Dr. Plouviez, of Lille, on the use of common salt as a powerful modifier of the blood.

A communication was received from M. Pallas to the effect that the greater number of nervous affections are occasioned by the excessive influence of atmospheric or terrestial electricity. He states, that by adapting to bedsteads glass feet, and isolating them about eighteen inches from the wall of the apartment, he has cured the patients sleeping upon them of a host of nervous affections.

Steam.

Steam heated separate from water has different properties from that heated over water. Thus, the steam in the pipe which conducts it from the boiler to the engine, may be heated till it becomes rare enough to pass through cast iron, and will readily escape at the joints and it sometimes does happen that boilers are defectively set, so as to produce a similar result.

French Royal Printing Office.

When Pope Pius the 7th visited the Royal Printing Office of Paris, he was presented with the Lord's Prayer in one hundred and fifty different languages. There are more than 150 hand presses in it and two power presses. In one room there are forty thousand forms packed away. The hands employed in it work ten hours and good compositors earn from five to six francs per day, and pressmen about the same. After thirty years service in the establishment, a workman gets a pension of four hundred francs per annum. Authors can have works of real utility printed in it free of expense.

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