AN ORNAMENTAL GOURD.

The exceedingly graceful plant which is shown in our illustration is a miniature gourd, the seeds of which were brought from Africa to Europe by Sir Samuel Baker, who states that the plant, when in a wild condition, covers dwarf trees and shrubs with its slender climbing shoots, which are loaded at every joint with pretty little fruits, which, in a young state, are bright green, striped and spotted with white; but which, when ripe, change to scarlet, a color which sets off the white spots and pencilings to increased advantage. The fruits, as will be seen, are borne in clusters of about three or four together. The foliage, being of a distinct shade of green, renders the plant effective, even when not in fruit. It has been grown in a melonhouse, in which it quickly covered a large trellis, and became loaded with fruits which, were it not for their white marblings, might easily be mistaken for those of *solanum capsicastrum*. Some of the African tribes use the long slender shoots of this gourd for garlands and head dresses, purposes for which its habitof growth eminently fits it. Long festoons of it, laden with fruit, might be usefully employed for garnishing stands on the dinner table, or the sprays of crimson fruit might be allowed to hang naturally and gracefully from the margins of ornamental vases. Gourds of this description, says a correspondent of the English *Garden*, well deserve more attention than they have hitherto had.

Fog.

Angus Smith gives an account of a remarkable fog observed at Reikjavik, in Iceland. It appears that, on a bright afternoon in July, "as soon as we left the house, a cloud came down a street from southwards, and some one said: 'Let us cross out of the way of the dust.' I looked more carefully, and, finding the cloud moving very slowly on the ground, concluded that it was smoke from a chimney, but smoke mixed with larger particles than we generally see. Gradually it came to us; there was no smell, but a distinct chill."

Perceiving that it was a fog, Dr. Smith ascended a rising ground, and saw the fog rising out of the small lake behind the town, and rolling into the streets very slowly. A similar fog rose from the sea, and rolled also into the town. Hence it appeared that the wind had nothing to do with the matter, but that both fogs rolled because they were too heavy to remain suspended. The peculiarity of the fog was in the size of its particles, larger than any the author had ever before seen, and which he estimates at from $\frac{1}{400}$ to $\frac{1}{500}$ of an inch in diameter, in the flatness with which it fell on the ground, and in its lumbering mode of rolling, whence all observers at first took it for dust. The author found that the particles were perfectly spherical, and not hollow, but concrete throughout. "They all tended downwards, they were falling, evidently; it was a falling dew, or a slight incipient rain, rapidly disappearing into the earth." Dr. Smith adds: "It seemed evident to me that, to make a distinction absolute between fog, rain, and dew, was a waste of words. There is a broad observable distinction, but no narrow line, and we cannot tell the end or beginning of either."

Examining the common opinion of the vesicular nature of clouds and mists, he declares that it "rests on a foundation too weak to be worth much attention." A vague notion that the globules of fog are analogous to soap bubbles seems to lie at the foundation. Dr. Smith has repeated the experiments of Saussure, but without meeting with any signs of vesicularity. "Indeed," he remarks, in summing up, "I see no reason for going far for a mode of keeping clouds up. Times without number I have observed, on calm summer evenings, a cloud of smoke from a steamboat funnel lying for miles in length at a hight very little different from that of the funnel out of which it issued. . . . At other times I have found the smell of a cigar, used by a person fully a quarter of a mile off, over the road, at about the same hight as his mouth, nothing being visible. In these cases, have we anything to look to but the size of the particles? They are so small that their resistance to the atmosphere is diminished to its utmost, as the resistance of the air is increased so much, in proportion to the weight, that they cannot fall rapidly."

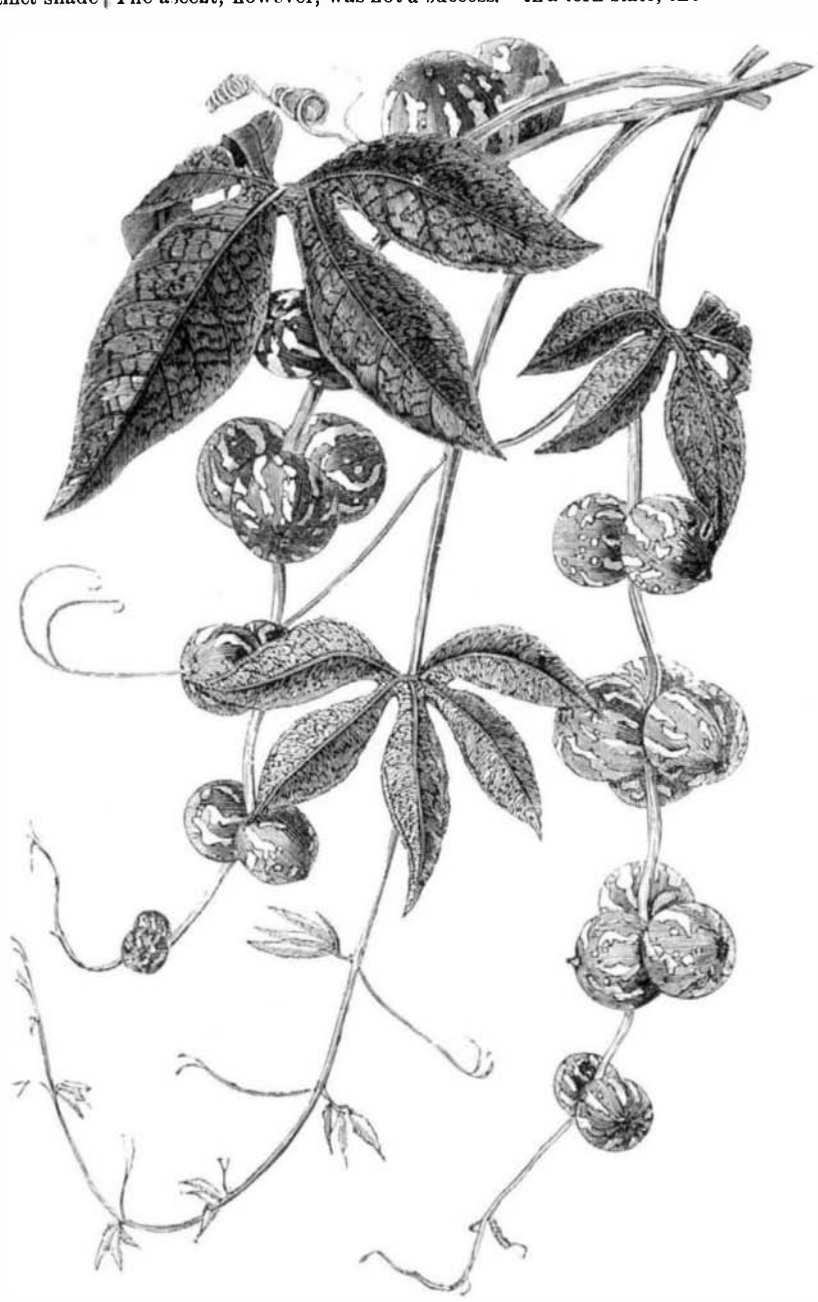
Curiosities of Ebullition.

Dr. T. L. Phipson, in the *Chemical News*, says that water, strongly acidified with hydrochloric acid, and containing a small quantity of benzole, was found to enter into violent ebullition every sixty seconds; after a while the boiling ceased completely, and then recommenced suddenly every thirty seconds for some time. The flask still being kept over the spirit lamp, the periods between quiescence and violent ebullition dropped to twenty, ten, and finally to eight seconds, at which interval the phenomenon continued for some considerable time. The temperature of the vapor in the flask was 214° Fah., in the liquid 218°, during the whole time of the experiment.

When methyl alcohol was added to the above mixture of water, hydrochloric acid, and benzole, and the flask placed over a spirit lamp, no ebullition at all occurred for a very long space of time, and then it took place very suddenly and continued.

Ballooning Experiments.

Captain H. B. Dight recently ascended in his balloon Fairy from Wolverhampton, to illustrate the action of his steering apparatus prior to his experimental trip across the English Channel, for which he announces he has arranged with the British government. The ascent occasioned much interest, and drew together many thousands of spectators. The ascent, however, was not a success. In a torn state, the balloon and steering machinery fell in a neighboring meadow, after Captain Dight had been in great jeopardy.



BRYANOPSIS LACINIOSA.

A SPRING BUTTON HOLE BOUQUET.

The tasteful arrangement of a small bouquet of choice flowers, shown in the annexed engraving, is made up of a leaf of lily of the valley at the back, upon which lies one spray of that flower mixed with four or five very small pieces of maidenhair fern. These portions of a frond are so arranged that they break the hard outline of the leaf behind them,

and also tone down its bright green by their glaucous shade of color. In front of these is placed a fine thickly petalled bud of climbing *Devoniensis* rose. This, of course, has been properly wired, and slightly blown open. The base of the bud is concealed by two well chosen leaves from a fairy rose, by which means another shade of green is introduced into the bouquet, which not only serves to set off the rosebud to the best advantage, but also contrasts well with the foliage previously used. If it were a necessity that hardy plants be employed in making up such bouquets, some well selected leaves from *thalictrum minus* would prove such an efficient substitute for the maidenhair that ninety-nine people out of a hundred would regard it as a fern, and not as a leaf from a flowering plant. Those who do not possess means for growing *adiantum cuneatum* are strongly recommended to cultivate the hardy *thalictrum*, which does best in a calcareous or magnesian soil.

COTTAGE HORTICULTURE.

THE SELECTION OF OUTDOOR PLANTS.

The choice of flowering plants, suitable for culture in the limited space usually available for the above purpose, is comparatively limited, because of the many qualifications requisite to each plant: for instance, its hight, the length of its blooming period, and the color of its bloom. For if the flowers in a bed are of irregular hight, part of the bloom must be hid. If the arrangement of the color of the bloom is inharmonious, the effect will be anything but pleasing to the eye; and the more of the plants which are in bloom at the same time, the worse the bed will look. To those possessing a hothouse, greenhouse, or forcing beds, in which a succession of plants may be reared to supply each bed with plants so soon as the old ones have ceased to flower, hyacinths, crocuses, tulips, snowdrops, and lent lilies may be followed by verbenas, stocks, asters, etc., and thus a continuous blooming bed may be secured; but with a proper selection of plants and ordinary care in their culture, three plants (scarlet geraniums, yellow calceolarias, and the deep blue lobelias) will give us the best attainable arrangement of color and of hight, and will at the same time produce a flower garden from spring time till the frosts of winter cut them off, which qualifications are not combined in any other plants.

In selecting the plants, choose those whose leaves are of a deep green, and in all cases those which are short and bushy and have no bloom upon them. If, however, they are in bloom, cut off the flowers before planting, which will only delay the blooming a few days, and will greatly strengthen the plant. If the plants have been reared in a greenhouse or under frames, keep them a few days before setting them in the beds, placing them out of doors in the daytime, and taking them in at night, in order to make them hardy and prevent them from suffering from the cool night air. If the plants are placed in a cold frame, either before or after being planted in the beds, be careful to lift the frame during a great part of the daytime, otherwise the sweat which gathers on the inside of the glass will fall upon the plants and infallibly kill them by what is called damping off.

PLANTING.

The bright scarlet horseshoe or fish geranium, and not the pink, should be selected, and planted ten inches apart in the center of the bed. Next come the calceolarias, about ten inches from the geraniums and about ten inches apart, and then the lobelias, about six inches apart, surrounding the calceolarias. All these plants will bloom together and continuously, the geraniums growing tallest and the lobelias shortest; hence we shall not only have a true arrangement of the prismatic colors, but all the flowers will be visible from almost any point of view. The effect may be considerably hightened by planting a standard perpetual rosebush in the center of the beds; but in such case, let the standards be of various hights and the colors to a pattern if the beds are arranged to a pattern, as should be the case. For a red rose, John Hopper is one of the very best. For a yellow one, *Gloire de Dijon* is very superior. In the absence of roses, a white lily may be planted in each bed. If there are border beds, white lilies, or any of the broad-leaved, red, or variegated plants, will form a pleasing contrast.

PROPAGATING.

To propagate geraniums and calceolarias, do not let the plants flower too soon; but pinch off the first appearing bloom and pinch out the eyes of all straggling branches, which will immediately throw out side shoots, thus forming bushy and shapeable plants, besides very healthy and strong ones. Give preference to those plants which have their branches close to the surface of the soil. A strict attention to these rules is indispensable to obtaining a fine and freely blossoming plant.

TO DISCOVER INSECTS.

If the leaves of the plant turn reddish or yellow, or if they curl up, a close inspection will generally disclose that the plants are infested with a very small green insect, or else with the redspider, either of which must be destroyed. For this purpose, scald some common tobacco with water until the latter is colored to a yellow, and when cold sprinkle the leaves of the plants with it; but a better plan is to pass the stems and leaves of the plants between the fingers, and to then shake the plant and well water the bed immediately afterward. The latter operation destroys a large proportion of the insects shaken from the plant. This latter method is the only infallible one.

It sometimes happens that the fertilizer used to enrich the soil will germinate insects which destroy or impair the roots of the plants; the indications of such being the case are that the leaves will turn red or yellow, and will flag or droop during the warmer portions of the day. If this occurs while the plants are in pots, an effectual remedy is to let the mold in the pots get so dry that the leaves of the plant commence to droop; then place the hand over the surface of the mold, letting the stem of the plant pass between the fingers; then turn the flower pot upside down, and slap the bottom of the pot with the other hand. After one or two such blows, the pot may be lifted off without disturbing the mold from the roots of the plant, and the insects will be found on either the outside of the mold or on the sides of the flower pot. After removing them, the pot may be replaced, and the plant watered. If, however, the flower beds are infested with insects, the soil should be allowed to get comparatively dry, and a piece of carrot, parsnip, or turnip placed upon the surface as a bait and covered over with two or three cabbage leaves. An inspection early in the morning will discover the insects around the bait.

PEGGING DOWN CREEPING PLANTS.

To propagate lobelias and verbenas, the first bloom should be picked off, and the branches, as they extend, should be pegged down closely to the surface of the mold. The branches will then take root as they lengthen; and by thus drawing a large amount of sustenance from the soil, they will bloom very freely and cover a large space. A verbena may thus be made to cover a square yard, and a lobelia a square foot, of ground. When a plant is permitted to bloom, the growth of its branches is very seriously retarded. For example, a balsam, or lady's slipper, as it is commonly termed, kept free from bloom and continuously repotted (as the roots extend) into a larger pot, may, under favorable circumstances, be grown as large as a good-sized gooseberry or currant bush. Asters and stocks require transplanting from the seed bed so soon as the plant has six leaves, to another bed, placing them about six inches apart: then when they are large enough to set into the beds, they should be well watered both before and after removal.

TRANSPLANTING.

The object of transplanting is to check the growth of the top, and to extend the growth of the roots of the plant, thus enabling it to draw increased proportionate sustenance from the soil.

As soon as the plants in the seed bed have four leaves, the weakly ones should be removed to give room to the healthy ones, otherwise the abundance of leaves will draw the plants up, causing them to grow tall, slender, and weakly. Before removing them, however, it is well to water the bed, so that those removed can be drawn from the earth without disturbing the soil around those remaining.

Flowers require a light soil, to obtain which sand may be mixed with heavy soil. Sufficient ammonia to just taint the water will be found an excellent means of promoting the growth of the plants; soapsuds will also have the same effect. Watering should take place in the morning during the spring, and at night during the summer months; for the reason that, in the spring, the nights are apt to be cold, and the watering would make the soil still colder; and in the summer the water evaporates very quickly from the soil if applied during the day. Water which has been exposed to the open air should be used, and not that drawn from a hydrant or a well; and if after watering, the surface of the soil becomes caked, it should be disturbed with a rake, or the growth of the plants will be seriously impeded. The water should be applied in as fine spray as possible, and in no case poured upon the plants. All plants should be planted deeply into the soil, which should be pressed moderately firmly to and around the roots.

POTTING PLANTS.

The mold for potting should be light and loamy, the fertilizing material used being well decayed. If the soil is rich of itself, it is better to be either very sparing with the fertilizer or to dispense with it altogether. In the bottom of the pot, place several small broken pieces of crockery or similar material to assist the drainage; and in setting the plant, be careful to keep it well down in the pot and to press the mold moderately around the roots. The surface of the mold should be about half an inch below the level of the top of the flower pot. Slips should be planted close to the sides of the pot, and in small pots.

When a plant becomes pot-bound, that is, when the roots have become matted around the sides and bottom of the pot, the plant, so soon as it has ceased blooming, should be repotted in a larger pot. It is not necessary to remove any of the mold from the roots, but simply to fill in the space in the larger pot with new and rich mold.

Plants kept in the windows should be turned every morning, or the light, striking on one side only, will draw the plant to that side so that all its branches and leaves will turn towards the window. The water in the saucers should never be applied to the plants. In cutting slips of any plant, always choose the youngest branches; and cut off the slip at the junction of a joint or leaf, since the roots shoot more readily from such joints. If you follow these directions and put sufficient sulphate of ammonia to just taint the water applied to your plants, you may cultivate with success almost any plant, even though you are an entire novice.

Ashes and Iron for Flowers.

The observation of practical and experimental gardeners seems to confirm the fact that, to procure brilliant colors in flowers, it is necessary to supply the soil with an abundance of ferruginous constituents and silica. The latter supplies a material (says S. E. Todd, in one of our foreign exchanges) which is of vast inportance in the production of that brilliancy of the petals and the dark green luster of the leaves. Then, if potash be added, or the ground be dressed round about the growing flowers with unleached wood ashes, an increased brilliancy will appear in every petal and leaf.

Any person who cultivates only a few flowers in pots, or between grassy lawns, or on spacious parterres, may readily satisfy himself of the exceedingly useful part the foregoing materials play in the production of beautiful flowers. Even white flowers, or roses that have petals nearly white, will be greatly improved in brilliancy by providing iron sand, and unleached ashes for the roots of growing plants. Ferruginous material may be applied to the soil where flowers are growing, or where they are to grow, by procuring a supply of oxide of iron, in the form of the dark colored scales that fall from the heated bars of iron when the metal is hammered by the blacksmiths.

Iron turnings and iron filings, which may be obtained for a trifle at most machine shops, should be worked into the soil near flowers; and in a few years it will be perceived that all the minute fragments will have been dissolved, thus furnishing the choicest material for painting the gayest colors of the flower garden. When there is an excess of vegetable mold in a flower bed, and a deficiency of silica or sand, the flowers will never be so rich in color, nor so brilliant, as they would be were a liberal dressing of sand, or sandy loam, worked down into the bed, where the growing roots could reach it. If wood ashes can be obtained readily, let a dressing be spread over the surface of the ground, about half an inch deep, and be raked in.

A dressing of quicklime will be found excellent for flowers of every description. It is also of eminent importance to improve the fertility of the soil where flowers are growing, in order to have mature, plump, ripe seed. Let the foregoing materials be spread around the flowers, and raked in at any convenient period of the year. When soil is prepared for flowers in pots, let some sand, some oxide of iron, and ashes be mingled thoroughly with the leaf mold.

SCIENTIFIC AND PRACTICAL INFORMATION.

TESTING TINNED PLATES FOR LEAD.

M. Fordas recently communicated to the French Academy of Sciences the following simple method of determining the presence of lead in tin vessels employed for packing articles of food. The metal to be tested is first touched with nitric acid, and then heated, when the acid evaporates. If lead be contained, stannic acid and nitrate of lead remain. Iodide of potassium is then applied, forming yellow iodide of lead; while the stannic acid is white. The yellow stain, therefore, indicates lead, the white, tin.

NEW TESTS OF STEEL.

MM. Trève and Duvassier have lately conducted extended investigations into the nature of steels, and their coercitive force. Fifteen bars of steel, divided into five series of three each and differently carbonized, each received a peculiar temper. They were then magnetized to saturation, and their magnetic force determined by the method of deviations. A bar containing 0·950 per cent of carbon and tempered in cold water gave a maximum deviation, represented by 47. Another bar, with a similar percentage of carbon, but tempered in boiling water, gave 44. A third bar, with a like percentage, but tempered in oil, at 50° Fah., gave 43. The influence of the tempering liquid is here evident.

The effect of the proportion of carbon contained in different bars was also very marked. Thus a bar containing 0·950 per cent gave a maximum of 47; another, with 0·250 per cent, gave but 13. By describing the curves of variations for the different series of bars, the influence of the carbon and of the tempering liquid becomes clearly apparent. It is a remarkable fact that the curves of elasticity and the magnetic curves of the bars are closely similar, the carbon appearing to give elasticity to the steel, and at the same time to increase its magnetic capacity.

ALLOYS OF PLATINUM AND IRON.

M. H. Sainte-Claire Deville says: On analyzing platin-iridium, iron and platinum are united in the state of oxides intimately mixed. If this matter is treated with a current of hydrogen, oxide of iridium is reduced at common temperatures from 392° to 1,112° Fah. The metals are then alloyed; for if digested with hydrochloric acid, a few bubbles only of hydrogen escape, and very little iron is dissolved, even when it exists in the alloy to the extent of 10 per cent. Iron and iridium are thus capable of combining at low temperatures, and the same is probably the case with iron and platinum. Under these conditions, the alloy is evidently not homogeneous. Breithaupt admits the existence of platinum ores containing 14 to 19 per cent of iron. Berzelius, only once however, found a specimen containing as much as 12·98 per cent; and M. Debray and the author have never found more than 13. Platinum may be freed from iron by cupellation in chlorine gas. If heated from 2,192° to 2,732° Fah. in this gas, it is volatilized in the form of brilliant crystals, and deposited in all the hot parts of the apparatus

THE utilization of the sewage of Paris on the plains of Gennevilliers, containing an area of 800 acres of light sandy soil, is now being practically carried out. A large sewer is now being constructed to carry away the sewage from the main sewer at Clichy-sur-Seine. The new sewer will be of 5 feet 6 inches internal diameter, and about 4,150 yards in length; and when completed, half the sewage of Paris will be utilized.

Paper Barrels and Boxes.

The manufacture of paper barrels, boxes, and similar vessels, for use in place of those generally made of wood, is rapidly increasing, seven patents and an equal number of factories for producing the articles being now in operation, all in the Western States.

In the first of these patents, the paper used in the fabrication is prepared principally from straw, and is pressed, several sheets at a time, into a firm, compact sheet, which when dry becomes tougher than wood. The sheet is then bent into cylindrical form, and its opposing edges, which are previously cut into dovetails, fitted together. Double pointed nails are drawn through the dovetailed ends from the outside of the barrel, and are clinched upon the inner surface of a strip of wood placed vertically along the inside of the joint. The heads are of wood, fitted into the ends with a flange resting against the edge, and are secured by nails driven through the sides of the barrel. Hoops of wood or iron are added to protect the latter from abrasion or wear, and the paper is thoroughly waterproofed.

Another mode of making the barrels is to form them directly from the paper pulp, the latter being taken from the cylinder of the wet paper machine and carried around an expanded cylinder until it becomes of the requisite thickness. The cylinder is then contracted and removed, leaving the barrel all formed and ready for passage between two rollers. These are so arranged that one presses on the inside and the other on the outside of the barrel, moving the latter between them, and at the same time compressing and hardening the paper. The vessel is then a jointless cylinder, and nothing remains but to insert the heads and secure the hoops in place.

Securing the heads in paper barrels appears to be a difficult portion of the manufacture, and there are two patents on this especial point. In one the invention consists in fastening manilla or other strong paper around the head so as to form a flexible edge. This, after the head is inserted, is crimped so as to line the rim of the barrel, over which it is bent and secured by hoops.

The second inventor proposes either to press one head into shape from paper pulp, at the time when the barrel is formed about the cylinder, or else to make the heads separate and turn up their edges around the peripheries. This turned-up portion serves the same purpose as the flexible paper in the case just described, but differs in construction, being riveted to the cask through iron hoops.

Another plan for making barrels differs essentially from those already described, in that each barrel is formed of two cylinders instead of but one. One cylinder is placed inside the other, so as to serve as a lining, and, being shorter, to form shoulders on which the heads are rested. Thick paper is interposed between the cylinders, and all are pasted firmly together. The interposing paper is carried up above the rim and folded over the edges. Paper packages for lard, butter, and similar materials are composed of sheets glued together and pressed into shape in dies. This is done while the paper and glue are still moist, and a sheet of muslin, placed under the substance in the concave die, prevents cracking or tearing at the joints.

A Large Mass of Native Copper.

A few days since, a mass of native copper, said to be the largest ever discovered, was brought from Lake Superior to St. Louis, Mo. The mass is heart-shaped, and weighs 6,000lbs., exceeding nearly double the weight of the famous copper boulder which was transported many years ago from the same region to the Smithsonian Institute. The new specimen exhibits the pure copper to the eye, and contains 98 per cent of the metal. It was taken out from an ancient digging, sixteen and a half feet below the surface, by a Mr. Davis, who had spent 25 years in copper mining. The mass, when found, had evidently been detached from its bed by the ancient miners. A number of pieces of copper were found besides the mass, weighing from 1 oz. to 17 lbs., which were evidently clippings by the old miners. Stone hammers weighing from ten to thirty pounds have been found in cart loads, several specimens of which were brought away with the copper.

These were the primitive tools with which these ancient miners had to do their work, and are found either perfect or broken from use, and the fragments are found scattered through the *débris*. It has been computed that two hundred of these old miners with their rude methods could barely be equivalent to two of the skilled miners of the present day. Who, and to what race they belonged, and at what time these people flourished, is not satisfactorily known, and can only be the subject of conjecture. The only plausible assumption is that they belonged to the ancient mound builders, and worked in metals, anterior to the Indian races, as evidences of their occupancy were seen by the early Jesuit explorers, and specimens which they clipped from the copper rocks are found scattered over the whole continent.

CEMENT FOR MARBLE AND ALABASTER.—Mix 12 parts of Portland cement, 6 parts of slaked lime, 6 parts of fine sand, and 1 part of infusorial earth, and make up into a thick paste with silicate of soda. The object to be cemented does not require to be heated. It sets in twenty-four hours, and the fracture cannot be readily found.

THE results of the experiments for testing the proportion of carbonic acid in the air, made during the first ascension of the Zenith, show that, at the altitude of 2,260 feet, the volumes of carbonic acid contained in 10,000 volumes of air are 2·40; at 3,200 feet, 3·00.