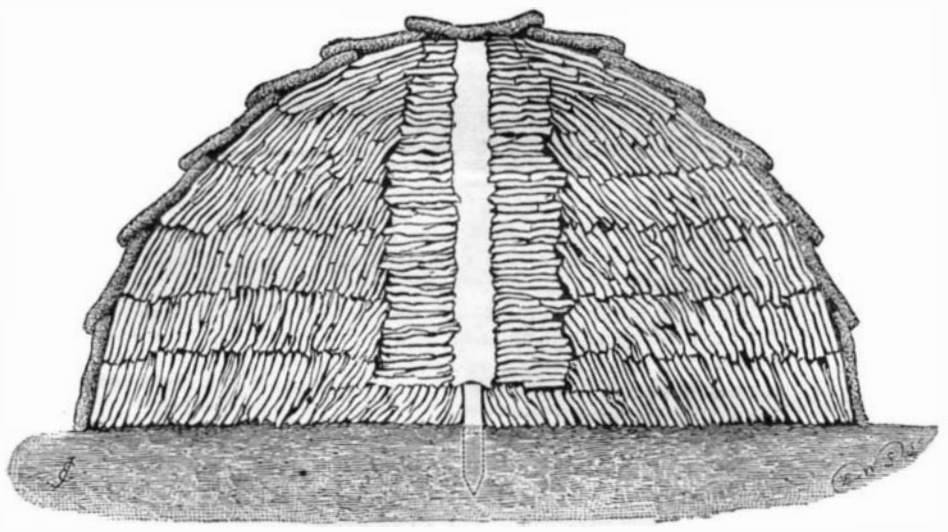
MANUFACTURE OF CHARCOAL.

Inquiries having been from time to time made regarding the production of charcoal for gardening and other purposes, the following simple method, which has been successfully carried out on a large estate, and by which the very finest charcoal is produced, may be interesting if not useful to some of our readers. As now conducted, charcoal is prepared by two different methods.

One is that of placing the wood in an iron cylinder, set in brickwork, and surrounding with fire; and the other, by piling the wood in a heap, covering with turf, and setting on fire; but as the latter method is that generally adopted, we purpose giving a description of the mode of operation. Select a piece of ground sheltered from the prevailing winds, and to which easy access with wood can be obtained. A hut or temporary shelter of some kind should also be provided for the men engaged at the work, as during the period of burning constant attention is required, both day and night.

The quality of wood used is not of special importance, although charcoal produced from ash, oak, or beech is of superior quality to that obtained from most other woods, and may consist of firewood, or any unsalable pieces of timber that may be come across in the general course of thinning. The wood is sawed into pieces two feet in length, and these again split if required to about three or four inches square, until a sufficient quantity has been cut up for the pit, after which the building of this is proceeded with in the following manner:



A CHARCOAL PIT.

The pit is made of a conical shape, 21 feet in diameter and 9 feet in height. A strong stake is driven into the ground, the top of which is left protruding about 12 inches; around this are placed small pieces of dry ash or pine of a similar length, and standing as close to the upright stake as possible. Another layer is formed in the same manner, and so on until a circle of about four feet in diameter is obtained. A circle of one foot in diameter, and having the top of the stake formerly driven into the ground as center, is next made by placing the wood horizontally side by side on the upright pieces, laying others on these in a similar manner until the pit is of the required height, thus forming a sort of chimney, by means of which the pit is fired; the wood used here being dry pieces of ash 24 inches in length, but split rather smaller than the ordinary pieces. Outside this the wood is placed on end and reclining inward, this being continued until the pit is of the required size.

The top half of the pit is now carefully examined, and any crevices between the wood are packed full of small pieces of turf and sawdust to exclude the air. The pit is then covered with newly cut turf, beginning at the base and working toward the top, each row of turf overlapping by a few inches the previous one, the circular hole or chimney being left open for firing. The best turf for this purpose is that grown on loamy soil, that from clay being too stiff, and leaving a residue after burning of clods instead of fine soil.

The turf may be cut of any convenient length, but not over a foot in width, the quantity required being about three loads. The pit is next fired by dropping a quantity of burning wood and some dry pieces of pine or ash into the opening left at the top. After having become thoroughly lighted the top turf is put on, which completely shuts up the chimney when the process of charring commences.

During the period of burning constant attention is required day and night, more especially should the weather be stormy, for the wind blowing for some time from one point generally causes that side to burn very rapidly and "flat" into a hole; should this occur the hole must at once be filled with knotty logs, which should be laid aside for this purpose when splitting the wood, and recovered with turf, any crevices being carefully filled with sawdust to exclude the air. During mild weather less attention is required; the pit burns uniformly all over, and produces the best charcoal.

The time required in burning varies from seven to nine days, much depending on the state of the weather, mild requiring the longest period. As the charring proceeds the turf gradually disappears, until only a slight covering of burnt earth remains, at which point the pit is reduced to about half its original size. When cool the pit is ready for being opened, the charcoal being extracted by means of a light rake resembling a drag, but with much finer teeth; and after becoming thoroughly cool, is stored in a dry shed until required for use. By the above method the very finest charcoal is produced, and of superior quality to what is generally sold. The accompanying illustration represents a section of charcoal pit ready for firing.

Properties and Uses of Charcoal.—The principal use of charcoal is for combustion, for which purpose it is found not only cleaner to use, but also productive of greater and more lasting heat than most other combustible matters, and therefore it is of inestimable value for cooking purposes.

Great care should be exercised in the using of charcoal, as during its combustion carbonic acid is formed by the union of the oxygen of the air with carbon, which acts upon the human system as a powerful sedative poison. It is of frequent use in the garden for potting purposes, vine borders, flower beds, etc., and in the transmission of bulbs nothing is better for packing than charcoal dust. The consumption of charcoal for gunpowder making is also very great, preference, however, being given to that produced from certain kinds of wood. Charcoal is a good disinfectant, tasteless, inodorous, and full of pores, nearly 100 inches of gaseous ammonia being absorbed by a cubic inch of fresh charcoal.—*A. D. Webster, in The Gardeners' Chronicle.*

PHYSICS WITHOUT APPARATUS.*

1. *Conductivity of Sound by Metals.*—If we hold a watch by means of a pair of tongs, and place the handle of the latter closely against our ear (Fig. 1), we shall hear the ticking of the timepiece as distinctly as if it were itself being held to the ear. If we remove the tongs, leaving the watch in the same place, we may ascertain, through the diminution in sound, how excellent is the conductivity of metals for the latter.

This experiment explains the role of those wooden rods that have been devised for the use of deaf persons, and at one extremity of which the speaking is done, while the other extremity is placed in the ear of the person afflicted with deafness.

Fig. 1.—CONDUCTIVITY OF SOUND BY METALS.

Fig. 2.—EXPERIMENT ON THE PRINCIPLE OF INERTIA.

2. *The Principle of Inertia.*—The experiments which serve to demonstrate this principle are innumerable, and we have already cited a large number. The one represented in Fig. 2 is an amusing one to try, and gives a means of uncorking a bottle without a corkscrew. If we take a well-corked bottle of wine, beer, or other gaseous liquid, and, after protecting the bottom with a cushion formed of a napkin, give it several strong raps against a wall, the liquid, by virtue of the principle of inertia, will drive out the cork; and sometimes even, especially if the experiment is tried with beer or carbonated water, the cork will come out with such force that a portion of the liquid will spurt out at the same time, and, to the amusement of the operator, fly over the curious spectators of "Physics without Apparatus."

It is asserted that it is not rare at St. Galmier to see the waiters in the hotels of that place uncork bottles of carbonated waters in this way, by striking them against the floor. But, just as M. Jourdain made prose without knowing it, so these waiters are assuredly not aware that they are performing an operation in physics, and giving a demonstration of the principle of inertia.

3. *An Experiment in Repulsion.*—Toward the end of the year 1875, says M. Le Goarant, in *La Nature*, I performed an experiment that I have never seen described in print.

If we pour some pure water into any vessel, a bowl for example, and allow the melted wax from a lighted candle to fall drop by drop on to the surface from a distance of six to eight inches, the wax cools suddenly in the form of light hemispheres.

If the end of a slightly moistened piece of soap be dipped into the water, in the midst of the waxen bodies, these latter will all be suddenly repelled, as if by an invisible puff of air, against the sides of the vessel, to which they will remain adherent. By blowing them they may again be driven to the center of the water, and the experiment may be repeated two or three times; but, after that, it no longer succeeds, because of the small proportion of soap that is dissolved in the water. In order to begin again, the water must be removed.

The experiment is very easy to perform. It is probable that the cause of this so marked repulsion is due to the rapid solution of the soap in the water. The soap at first stays on the surface, and after the water has dissolved some of it the solution operates through the mass and not only on the surface.

I have tried other bodies, such as essences, oil, etc., and found the effects to vary with the material employed.

* From *La Nature.*

The Phosphorescent Flame of Sulphur.

Heumann, having raised the question whether phosphorus among the metalloids was the only one which underwent slow combustion at a low temperature, becoming luminous, has answered it satisfactorily by experiment. He finds that sulphur shows this phenomenon very well, though of course at a temperature higher than is required for phosphorus. If a heated rod of glass be dipped in pulverized sulphur, it becomes covered with the fused material, which takes fire. If now the blue flame be blown out, the sulphur still continues to burn, but with a whitish flame visible distinctly only in the dark.

This white phosphorescent light is seen much better when the sulphur is heated rapidly to 180° on a plate in the interior of a metallic air bath. White flames ten to twenty centimeters long flicker through the entire box. By regulating the gas this slow combustion may be continued for an hour without the appearance of the blue flame. Various kinds of sulphur were tried with the same result. Moreover, many compounds of sulphur act in the same way; cinnabar, antimonious sulphide, arsenious sulphide, aurum musivum, sodium t iosulphate, potassium xanthate, sulphurea, all showing the white flame. The odor emitted when the sulphur thus burns is peculiar, recalling that of hydrogen persulphide, camphor, and ozone at once, and is the odor ordinarily ascribed to sulphur vapor. On examining it closely, however, nothing could be recognized in it but sulphurous oxide.—*Ber. Berl. Chem. Ges.*

Cure for Lumbago.

A correspondent in Smyrna, Turkey, sends the following, and states that it is reliable: Take a piece of oilskin cloth, such as we use to cover tables, but of a soft, pliant kind, sufficiently large to cover the loins; place it over the flannel shirt, and bandage yourself with a flannel bandage; profuse perspiration will ensue on the loins, and you are quickly rid of this wearisome complaint.