Wood Studies May Reduce Losses

Chemistry

No pampered child of the idle rich can claim to receive the tender care given to living wood-rot organisms at the Forest Products Laboratory. Ira Hatfield studies these little plants under the microscope in an attempt to discover some weakness in their life habits which might enable mankind to exterminate them effectively in trees, timber, or wooden structures.

Like children, decay organisms can not exist without water, food, warmth and air. Wood is the food element and water is the life element easiest to control. That is why Mr. Hatfield is singling out pure strains of the wood-decaying organisms and rearing them under conditions which are as superior to those surrounding the rich man's baby as the baby's environment is superior to that of an alley cat.

"If my observations can determine the least amount of water wood rot can thrive on or the most water it will tolerate," Mr. Hatfield said, "we will then be able to stop decay and rot in wood either by drying the wood until the wood-rot organisms die of thirst or by soaking the wood until the organisms drown."

The organisms at the laboratory must have just as much air as they would have in any lumber yard and there must be absolute assurance that undesirable alien spores of other organisms are not gaining access to the wood on which the pure wood-rot organisms are growing.

In Mr. Hatfield's series of tests the temperature of the growing decay organisms is maintained by incubator. An elaborate ventilation system, which employs both chemical and mechanical means, relieves the air supply of carbon dioxide and excess moisture. A chemical solution detains all the undesirable decay spores which are universally present in the laboratory air as they are everywhere. By means of one chemical solution through which it passes the humidity of the air—and correspondingly the moisture in the wood—is controlled to a fraction of a per cent. The growth of the wood-rot organisms under the artificialy controlled moisture conditions is measured, not by crude physical methods, but by measuring the amount of carbon dioxide given off, just as the work done by an athlete on a physician's treadmill is measured by the amount of carbon dioxide he exhales.

Science News-Letter, June 22, 1929

Smithson the Chemist—*Continued*

that copper does. Tincture of galls gives with this acid solution a green precipitate; but with an alkaline solution of molybdic acid galls produce a fine orange precipitate. If an alkali is put to the green precipitate, it becomes orange; and if an acid to the orange precipitate, it becomes green.

8. *Tungstic Acid.*—If tungstate of soda is heated with sulphuric acid, the granules of precipitated tungstic acid become blue, but not the solution; and the phenomena cannot be confounded with those presented by molybdate of soda. Martial prussiate of potash has no effect on this acid liquor.

Tincture of galls put to the solution of tungstate of soda in water does not affect it. On the addition of an acid to this mixture, a brown precipitate forms.

If tungstate of soda is heated to dryness with a drop of muriatic acid, a yellow mass is left. On extracting the saline matter by water, yellow acid of tungsten remains. It is readily soluble in carbonate of soda. If taken wet on the blade of a knife, it soon becomes blue. This is made very evident by wiping the blade of the knife with a bit of white paper. Possibly a small remainder of muriatic or sulphuric acid among it is required for this effect.

9. *Nitric Acid.*—Nitrate of ammonia produces no deflagration when filtering paper, wetted with a solution of it and dried, is burned; the salt volatilizing before ignition, most, or all, the other nitrates deflagrate.

If metallic copper is put into the solution of a nitrate, sulphuric acid added, and heat applied, the copper dissolves with effervescence.

10. *Carbonic Acid.*—It is to be discovered in the mineral itself. The application of heat is, in some cases, required to render the effervescence sensible. It has been sometimes overlooked in bodies from want of attention to this circumstance.

11. *Silica.*—A simple and sufficient test of it is the formation of a jelly, when its combination with soda is put into an acid.

It has evidently not been intended to enumerate all the means by which the presence of each acid in the soda bead could be perceived or established. Little has been said beyond what appeared required and sufficient.

Mention has been made above of small plates of clay.

They are formed by extending a white refractory clay by blows with the hammer, between the fold of a piece of paper, like gold between skins. The clay and paper, are then cut together with scissars into pieces about 4-10ths of an inch long, and 2½-10ths of an inch wide, and hardened in the fire in a tobacco-pipe.

They are very useful additions to the blowpipe apparatus. They admit the use of a new test, oxide of lead. They show to great advantage the colours of matters melted with borax, &c. Quantities of matter too minute to be tried on the coal, or on the platina foil, or wire, may be examined on them alone, or with fluxes. Copper may be instantly found in gold or silver by fusing the slightest scrapings of them with a little lead, etc.

Cut into very small, very acute triangles, clay affords a substitute for Saussure's sappare.

James Smithson (1765-1829) was well known as an analytical chemist during his lifetime. He was an intimate friend of Cavendish and much admired by Berzelius, but his chief fame today comes from his will, which started a new fashion in philanthropy. After providing for his servants and leaving his fortune to his nephew, Smithson added, apparently as an afterthought, that if his nephew died without issue the money should go to the United States to found in Washington an institution called the "Smithsonian" for the "increase and diffusion of knowledge among men." The nephew died in 1836, and Congress passed an act accepting Smithson's bequest. Richard Rush went to England, saw the case through the courts, and brought the money, amounting to about half a million dollars, to the United States in the form of gold sovereigns. The sovereigns were taken to the United States mint and recoined into American eagles. Part of the fund was later loaned to some of the new states of the union, and lost, but Congress accepted responsibility for the full amount of the bequest, the interest furnishing the income of the Institution. After much discussion it was decided that a library, a museum, an art gallery, lectures, printed publications and reports, and rewards for important scientific advances all come within the scope of Smithson's phrase. Much of the scientific work of the United States government owes its origin to the work of the Smithsonian Institution.

Science News-Letter, June 22, 1929