Stated Meeting, held Thursday, January 19, 1905.

Tobacco and Sumac. Microscopically vs. Chemically.

BY CHESTER AHLUM.

[The author describes the results of the microscopical method applied to the identification of tobacco and sumac in vegetable materials used extensively by manufacturers of boiler-cleansing compounds.—THE EDITOR.]

In the compounding of boiler chemicals some manufacturers have been making extensive use of vegetable matter, high in tannin, such as sumac and tobacco. The presence of vegetable matter is easily determined in a chemical analysis, but to determine chemically whether tobacco or sumac is one of the ingredients, is difficult and too extended, therefore impracticable in a commercial laboratory where time is a factor.

I secured excellent results, by the microscopic method, in the determination of these substances and this method is now being used exclusively in the analytical department of Geo. W. Lord Company. It is much simpler than a chemical analysis and more dependence can be placed upon it.

The process is as follows: If the compound contains soda, or its compounds dissolve in water and bring to a boil, filter off and wash the vegetable matter thoroughly with water, puncture the filter and wash with the least quantity of water possible, into a strong bleaching-powder solution. After the fibre has become bleached wash thoroughly with water and place in a 35 per cent. solution of alcohol. After remaining in this solution about five minutes transfer to 35 per cent. alcoholic Grenacher's Borax Carmine stain, letting it remain until sufficiently stained (about fifteen minutes). Remove, wash with 35 per cent. alcohol and transfer to a weak solution of Iodin Green. In a few minutes remove, wash with absolute alcohol and place in oil of cedar.

The fiber can be examined in the ordinary way under low power, and if desired may be mounted.

If the fiber is found too small to be handled and in a powdery condition, it may be fixed to the slide by means of colodion fixative. After being bleached, filter, wash thoroughly and fix to the slide by means mentioned above.

Characteristics: Tobacco (*Nicotiana Tobacum*) is not used in its entirety in the manufacture of compounds, but the rib or stem, presumably because of their small commercial value. Owing to the fact that the stems are almost entirely fibro-vas-

cular and the cells are elongated, the distinction is marked. As in all cases of fibro-vascular bundles the iodine green is taken with great avidity.

The leaf fiber is rarely found in cases of this kind, it being almost entirely removed, but when found it is distinguished by the irregular cells and the abundance of stomata. Hairs are met with occasionally, are multicellular and are of three kinds, single, branched, and those having a cluster of cells at the extremity.

Sumac (*Rhus*) is used in the form of leaves, and is distinguished by the polyhedral cells and the uni-cellular hairs. The fibro-vascular bundles resemble those of tobacco, but the cells are much smaller. Another marked characteristic is that while

tobacco will take borax carmine very readily, sumac does not, but will take the iodine green.

SUMMARY.

Sumac:

Bleaches slowly.
Takes the iodine green readily.
Takes borax-carmine with difficulty, or not at all.
Fibro-vascular bundles composed of elongated cells, smaller than the tobacco.
Leaf fiber, polyhedral.
Hairs, unicellular.

Tobacco:

Bleaches quickly.
Takes the iodine green readily.
Takes borax-carmine readily.
Fibro-vascular bundles composed of large elongated cells.
Leaf fiber, irregular.
Hairs, multicellular, single, branched and lobular.

CONTROLLING INDIVIDUAL WATER SUPPLIES ON IRRIGATED LANDS.

In the irrigated sections of this country the land-owners living along one stream are more or less dependent on each other for their respective supplies of water. One person disposed to appropriate more than his share can readily do so by diverting and holding the water, to the detriment of the farms situated farther down the stream. This is the cause of unending disputes, and all the States in the West have laws designed to overcome it. A new and novel gate arrangement has been recently patented to meet this emergency by L. H. Rhead, a resident of Utah, stationed at the Rio Grande reclamation project, where he represents the United States Government. This gate regulates the flow of water at the heads of distributing canals and laterals, and is especially designed where the scarcity and unsatisfactory distribution of water causes trouble among those concerned. The device consists of an iron gate stem, threaded, and two wheels, also threaded to fit the stem. One of the wheels is for the purpose of raising and lowering the gate, and to the other wheel is attached a chain and padlock, by means of which the second and smaller wheel is locked in any position on the stem, and this constitutes the locking device. This is fixed at a point which will give a land-owner all the water he is entitled to, and will permit him to cut the flow off entirely or partially if desirable, but he is unable to increase it to the point of depriving his neighbors of their share.

—*Scientific American.*