

But, aside from the interest attached to this new genus of the *Volvocinae* from the botanical point of view, it may be found to have important relations to odors and tastes in water supplies, when it will become the enemy of engineers and water commissioners, as other members of this group have done before. For example, *Volvox globator* has caused much trouble in Rochester, N. Y., by imparting a disagreeable fishy odor to the city water supply, and in Massachusetts *Pandorina* and *Eudorina* have caused similar troubles on a smaller scale. *Pleodorina*, coming as it does between *Volvox* and *Eudorina* in the classification, may be looked upon with suspicion in this respect, if it ever infects a water supply in a sufficient quantity. On account of the filthy condition of the canal water in which it was found in Lafayette, and the number of other forms growing with it, no idea could be formed as to the nature of the odor, if any, of *Pleodorina*.

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FORMS OF XANTHIUM CANADENSE AND X. STRUMARIUM. BY J. C. ARTHUR.

In the absence of the author the outline of the paper was presented by Mr. Wm. Stuart and photographs of the two species were shown. The species in their most typical forms differ widely in the outline of the leaf and character and size of the burs. *X. Canadense* has a flowing sub-entire outline to the leaf, and large, strongly hispid fruit covered thickly with prickles, while *X. strumarium* has dentate leaves and smaller glabrous fruit with fewer prickles. All gradations exist between the two types, due possibly to hybridization.

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NOTES ON WOOD SHRINKAGE. BY M. J. GOLDEN.

The increase or diminution in size of a piece of wood, due to its possession of a greater or less amount of moisture, is well known, as is also the fact that this change in size may be accompanied by the expenditure of a great deal of force. If an unseasoned piece of wood has two sides fastened rigidly so that it can not shrink across the grain, and then be exposed to a current of comparatively dry air, it will very soon break, the break being in the direction of the length of the cells of which the wood fibers are composed; or if a piece of dry wood be confined rigidly to prevent any *increase* in size and then be saturated with moisture, it will tend to swell and the force will be sufficient to crush the fibers where they are in contact with whatever confines them.

This change in size occurs across the grain of the wood, or across the cells of which it is composed, and only to a slight degree in the direction of their length.

Some pieces of unseasoned poplar had iron bars ten inches long placed between the projecting ends to prevent the ends coming any nearer together, and were then allowed to remain in the conditions of ordinary workshop atmosphere until they broke, which they did in the average time of four hours after adjustment.

A number of tests made in a testing machine showed that a force of about 370 pounds to the square inch was required to break them.

Trials made with other wood gave corresponding results; in a few hours each piece broke, the force required to break it depending on the kind of wood. In some cases the force was over 600 pounds to the square inch.

A microscopic examination of sections made from some of the pieces after they had been allowed to dry, showed, first, a loss of the contained moisture, and, as the drying continued, in some cases what seemed a shriveling of the tissues of the side walls.

An examination, previously made, of the cell walls of some wood that had been in a dry place during some years showed a disintegration of the tissue, the cell walls having a rough and fibrous appearance.

In order to record any microscopic change taking place in the cell walls, two sections, one a transverse and the other a longitudinal radial one, were made from a freshly cut branch of *Pinus sylvestris* and mounted dry under cover glasses. They were photographed at intervals and records made of changes occurring in them. The moisture first dried out, the cells in transverse section becoming slightly less in size. After a few days when the moisture had dried from between the walls, the greater change seemed to take place in the longitudinal section, the walls of which began to shrivel slightly. This change continued for some weeks in a constantly lessening degree, however.