Albuminoid Ammonia—Oxygen Absorbed in 15 minutes and 4 hours at 80° F.—By both of these determinations we are enabled to infer the relative quantity of organic matter present in the sample of water under examination. To estimate the exact amount of organic matter in a water or to ascertain with certainty what part of such is of animal or vegetable origin, is not only difficult, but impossible.* Organic matter of an animal origin is generally conceeded to be more dangerous in a water than that derived from vegetable growth; yet that decomposing vegetable matter has a toxic effect has repeatedly been shown. It is as yet an undecided question if decomposing organic matter, whether animal or vegetable, is of itself poisonous apart from those low forms of life which cause such decomposition, and which are held by many to be the direct cause of disease. Bacteria require organic matter for their growth and development, therefore we may argue that water containing a large quantity of such matter is likely to contain a greater number of these micro-organisms, than water possessing but traces of organic matter.

This so-called albuminoid ammonia is evolved when a water containing organic matter is boiled with an alkaline solution of potassium permanganate, and hence the quantity found is a measure of the organic matter present. Much albuminoid ammonia from a water giving but little free ammonia points strongly to the excess of vegetable organic matter. Many waters contain less than ·05 parts per million, and ·1 part per million causes a water to be looked upon with grave suspicion, while ·15 p. p. m. would, according to Wanklyn (the deviser of the process), condemn a water for drinking purposes. In applying this standard of purity to a water we must, however take into consideration its source, and therefore we should not be justified in condemning the Ottawa water without additional data, because it yields ·13 parts of albuminoid ammonia per million, though we must judge it impure in this respect.

The amount of oxygen absorbed during a stated interval at a stated temperature from a given amount of an acid solution of pot. permanganate again gives us a measure of the organic matter present. The more oxygen absorbed the greater the quantity of the decomposing organic matter. The excessive amount of oxygen so absorbed by this water emphasizes in a most unmistakable manner the conclusion arrived at in the preceding paragraph.

Drs. Tidy and Frankland have suggested the following scale for classifying upland surface waters from results obtained by this method:

Section 1—Upland surface water:

Class 1—Water of great organic purity, absorbing from permanganate of potash not more than 1 part of oxygen per million parts of water.

Class 2—Water of medium purity, absorbing from 1 to 3 parts of oxygen per million parts of water.

Class 3—Water of doubtful purity, absorbing from 3 to 4 parts of oxygen per million parts of water.

Class 4—Impure water, absorbing more than 4 parts of oxygen per million parts of water.

Section 2 is a classification for waters other than upland surface. The limit of the amount of oxygen absorbed is exactly one-half of that in the corresponding class in Section 1.

Judged by this standard it is obvious that the Ottawa water in its present condition is unfit for drinking purposes owing to the large excess of dissolved vegetable organic matter.

That the organic matter is vegetable in its origin is borne out by the fact that the ratio of the amount of oxygen absorbed in fifteen minutes to that absorbed in four hours is nearly as 1 : 2, whereas if the matter were of animal origin the ratio would approach 1 : 15.

Although vegetable organic matter, as before stated, cannot be considered as injurious as that of animal origin, yet the excessive quantity here found is quite

*Nichols' "Water Supply," page 36.