is probable that the gas collected from the fusion or high-temperature treatment would require no further purification for therapeutic use.

The liberation of small quantities of emanation by high temperatures has already been successfully applied in the quantitative measurement of radium by the emanation method. There is nothing novel in the idea, and its application has already been tested out under somewhat different conditions. The object of the present note is simply to call attemtion to the possibility of applying the same principle to the collection of large quantities of emanation for therapeutic use, and to leave the field open for experimentation by the different laboratories and companies interested.

The procedure might be varied in several ways. Fusion might be employed with or without a flux; possibly temperatures considerably below fusion will be found to liberate emanation from some salts with a satisfactory recovery. The salts come mainly in consideration are: The chloride, bromide, carbonate and sulfate. With the chloride or bromide the corresponding lithium salt might prove to be a good flux. Experiments with other salts of radium might disclose one that would yield its emanation at a still lower temperature.

It should also be investigated whether the state of fusion per se is favorable to the liberation of emanation. It is possible that a viscous fusion just above its melting-point would not liberate emanation so readily as the more porus salt before fusion. The effect of various proportions of barium should also be studied, as well as volatilization losses under various conditions with different salts.

The heating should preferably be electrical, but whether internally or externaly applied is a matter for determination.

The collection after liberation might be by means of mercury displacement or by liquid air condensation.

S. C. LIND

GOLDEN, COLORADO,
November, 1920

A QUANTITATIVE SURVEY OF THE FLORA OF LAKE MENDOTA

IN the summer of 1919, quantitative determinations were undertaken for the Wisconsin Geological and Natural History Survey, of the submerged vegetation of Lake Mendota, Madison, Wis. The object of the work was to form an estimate of the total amounts of the various species present in the lake, and to obtain such additional data as might be available on their comparative distribution.

The plants were gathered by hand from measured areas of the lake bottom. For this purpose the whole plant zone of the lake was divided into stations according to local differences in physical and floral characteristics. Samples were gathered at different depths in each station. The plant zone is continuous around the lake in water not deeper than 7 m. The samples thus gathered were separated into their component species, and their wet and dry weights determined.

For purposes of calculation the plant zone was divided into three depth-zones, namely, 0 to 1 m., 1 m. to 3 m., 3 m. to 7 m., this arbitrary classification being based on evident differences in the character of the vegetation at different depths. By averaging the weights of the various samples gathered within one depth-zone, and comparing this average with the total area of that zone, as measured on a map, the total weight of each species in each zone was computed, and by addition the total weights for the whole plant zone.

The total amount of plants collected in this way was some 93 kilograms wet, 11 kilograms dry, the average water content being about 88 per cent. This material was obtained in 221 samples taken from 35 stations. The yield of the entire lake, estimated on the basis of these collections, is in round numbers 18,500,000 kilograms wet, 2,100,000 kilograms dry. The total area of the plant zone is 10,040,000 square meters. The yield per unit area is therefore 18,426 kilograms per hectare wet, 2,091 kiligrams per hectare dry (or 16,215 pounds per acre wet, 1,840 pounds per acre dry).

Almost one half of the total yield is found in water from 1 m. to 3 m. in depth. More than one quarter is found in water shallower than this, and a quarter in deeper water (3 m. to 7 m.).

Almost one half of the wet weight of the total yield is made up of *Vallisneria spiralis.* The dry weight of this plant forms a somewhat smaller fraction of the whole, owing to its relatively high water content. The remainder of the vegetation is composed mainly of various species of *Potamogeton. P. amplifolius* composes about one quarter of the total, *P. pectinatus* and *P. Richardsonii* each about one tenth. None of the remaining species exceeds 4 per cent. of the total.

The above is an average for the whole plant zone. At different depths the situation varies. *Potamogeton pectinatus, P. Richardsonii,* and other species, including *Najas flexilis, Ranunculus aquatilis,* and *Chara crispa,* bulk large in water less than 1 m. in depth. Between the depths of 1 m. and 3 m., *Potamogeton amplifolius* replaces to a large extent the other species of this genus, and *Myriophyllum* and *Ceratophyllum* are abundant. In the deepest water (3 m. to 7 m.), *P. amplifolius* composes about one half of the entire vegetation. *Vallisneria* forms a large part of the growth at all depths.

The greater the depth, the smaller is the number of species. Many plants are restricted to the shallow water. Among these are *Ranunculus* and the rare species *Potamogeton lucens.* On the other hand, most of the *Potamogeton zosterifolius* is found in water deeper than 3 m., and about three quarters of the *Myriophyllum* and *Ceratophyllum* is found in water from 1 m. to 3 m.

Within each depth-zone, the abundance of the vegetation is different in different stations. The figures obtained represent, therefore, averages of widely varying conditions. Much of this difference is correlated with the character of the lake bottom. Especially in the shallowest water, there are large tracts of sandy bottom, on which *Potamogeton pectinatus, P. Richardsonii, Ranunculus, Najas,* and *Chara* thrive, while other species do better in muddy regions. *Vallisneria* flourishes equally on mud or on sand. Both the character of the bottom and the nature of the flora are more uniform in the deeper water.

In addition to the plant zone as a whole, there are a large number of shallow bays which have distinctive flora. Here grow a number of marsh and pond plants not found elsewhere in the lake, including *Scirpus lacustris, Castalia odorata, Nymphaea advena, Typha latifolia,* and other less common species Almost all the other species found in the lake are also present in the shallow bays. Here also the character of the vegetation varies considerably with the nature of the bottom. Quantitative determinations of this class of cases were very difficult to make, owing to the irregular, patchy nature of the growth, especially in the case of the larger marsh plants.

Around the margin of the lake extends a narrow strip of *Cladophora glomerata,* growing attached to rocks of various sizes. This plant varies greatly at different points in the density of its growth. Samples were collected from representative spots, field notes taken on the general distribution and abundance of the species, and an estimate of the total made on the basis of these data.

A detailed report of these investigations is to be published in the *Transactions* of the Wisconsin Academy of Sciences, Arts, and Letters.

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THE AMERICAN CHEMICAL SOCIETY

(*Continued*)

DIVISION OF DYE CHEMISTRY

A. B. Davis, *chairman.*

R. Norris Shreve, *secretary.*

Wednesday and Thursday

Physiology Lecture Room

New naphthalene dyes: A. S. Wheeler. The tones produced vary with the reaction of the bath and also may be modified considerably by the use of mordants. The sulfonation of napthalene with fuming sulphuric acid, is carried out at a low temperature and is so regulated that the