

point for more intensive studies. This brings us to the work of the International Joint Commission.

The term Commission is misleading, as this body is in reality a tribunal formed under the treaty of January 11, 1909, between Great Britain and the United States to prevent disputes regarding the use of the boundary waters and to settle questions now pending or which may arise hereafter between the United States and Canada, involving the rights, obligations or interests of either in relation to the other or the inhabitants of the other along their common frontier. In addition to their judicial powers the Commission, under Article IX. of the treaty, is empowered to investigate and report upon such questions as may be referred to it by the two governments. It is provided that such reports under Article IX. shall not be regarded as decisions of the questions and shall in no way have the character of an arbitral award under this investigative function.

The question of pollution of boundary waters was referred to the Commission by the two governments. The reference was in two sections, the first dealing with the location, origin and extent of pollution and the second dealing with remedies. The text of the reference was as follows:—

1. To what extent and by what causes and in what localities have the boundary waters between the United States and Canada been polluted so as to be injurious to the public health and unfit for domestic or other uses?

2. In what way or manner, whether by the construction and operation of suitable drainage canals or plants at convenient points or otherwise, is it possible and advisable to remedy or prevent the pollution of these waters, and by what means or arrangement can the proper construction or operation of remedial or preventive works, or a system or method of rendering these waters sanitary and suitable for domestic and other uses, be best secured and maintained in order to insure the adequate protection and development of all interests involved on both sides of the boundary, and to fulfil the obligations undertaken in Article IV. of the waterways treaty of January 11, 1909, between the United States and Great Britain, in which it is agreed that the waters therein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other?

The Commission took up first the question of location, origin and extent of pollution. At the Detroit session February 20, 1913, Dr. McLaughlin was placed in charge of the investigation as chief sanitary expert and director of field work. Associated with him on the Canadian side were Dr. John W. S. McCullough, Chief Health Officer of Ontario, and Dr. John A. Amyot, Professor of Hygiene, University of Toronto. Canadian laboratories were established at Fort Frances, Port Arthur, Sault Ste. Marie, Sarnia, Windsor, Amherstburg, Port Stanley, Fort Erie, Niagara-on-the-Lake and Kingston, Ontario, and Montreal. American laboratories were established at Port Huron, Michigan, Detroit, Michigan; on U.S. Revenue Cutter "Morrill"; Buffalo, New York; Youngstown, New York; Clayton, New York; and Van Buren, Maine.

In the interest of economy and efficiency it was deemed wise to utilize such established governmental agencies as might be available for the field investigation. Accordingly the co-operation of the United States Public Health

Service, the Provincial Boards of Health of Ontario and Quebec, the State Board of Health of Michigan, and the Department of Health of the State of New York was secured and was of very great value to the Commission in carrying out the work.

The work extended from the Lake of the Woods through the entire chain of the Great Lakes and St. Lawrence River to the St. Johns River on the Maine—New Brunswick border. Field work began in April and terminated November 1. There were over 1,400 sampling points and over 19,000 samples taken and examined bacteriologically. The report presents as indices of pollution the average number of the colon bacillus per 100 cc. of water and the number of bacteria per cubic centimeter of water. The results of the investigation are shown by averages in concise form for each sampling point and cross-section by tables and colored maps. In addition, diagrammatic representation is employed to show the degree of intensity of the area of pollution in each section of the boundary waters. In certain localities on the Great Lakes and in all their connecting waters dangerous sewage pollution was shown to exist, but the bulk of the Great Lakes waters remains in its pristine purity. The investigation shows that the colon bacillus is practically never present in unpolluted waters, and that the normal bacterial content of Great Lakes water is less than 10 per cubic centimeter. Great Lakes water is classified tentatively into five classes in this report, from the relatively pure water through slight, moderate, serious to gross pollution. The sources of pollution in the order of their importance are sewage from cities, sewage from vessels navigating these boundary waters, and the inevitable pollution following rains and thaws. The distance pollution may travel in the Lakes was demonstrated also. At the mouth of the Detroit River and at the mouth of the Niagara River serious pollution extends normally more than 10 miles into the lakes and on occasion was found 16 to 18 miles from shore. The distances from the cities of pure water in the lakes, the enormous cost of long pipe lines, coupled with the engineering difficulties in placing intakes beyond a 70-foot depth, make it impracticable in most instances to secure pure water from the lakes without treatment. The present position of intakes is such that there is not a single municipality using lake water which can be said to possess a safe water supply without treatment.

As might be expected, the areas most grossly polluted are in the connecting rivers upon which large cities are situated. The pollution from vessels renders the St. Mary's River above the cities of Sault Ste. Marie unfit as a source of water supply without treatment, and vessel pollution combined with the sewage from the cities of Sault Ste. Marie cause gross pollution of the St. Mary's River from the Sault to Neebish Island.

Because of sewage pollution there is no point in the St. Clair River from which a safe water supply could be secured without treatment.

The Detroit River is polluted from Lake St. Clair to Sandwich sufficiently to make the water an unsafe source of water supply. From below Sandwich to its mouth the Detroit River is grossly polluted from shore to shore.

Gross pollution in the Niagara River extends along the American shore from Buffalo to Strawberry Island, throughout the entire Tonawanda Channel, and below the Falls gross pollution extends from shore to shore throughout the entire river and for miles out in Lake Ontario.

Investigation of the St. Lawrence River (Lake of the Thousand Islands) was made at two distinct seasons. The