

Chicago Drainage Canal.

APPENDIX A—*Continued.*

subject of a report to the Chief of Engineers, which appeared in his annual report of 1893 pages 4, 364 and following. But, as the subject was important, the *Engineering News* anticipated the appearance of the official report by publishing in its issue of March 2, 1893, this report, with the permission of the chief of engineers. This publication was the first ever made in which, as a result of careful measurements, a relation between the level of the lakes and their outflow, or discharge, had been established and given to the public. Prior determination of this discharge had not attempted to detect this relation, and nothing more than a general determination of a season's work had been published. In all plans for the Chicago Drainage Canal, the early measurements had been taken, and those studying the subject chose such isolated figures as suited them best.

The report of 1892, being so late in appearance, long after the drainage canal was put under construction, escaped the notice of many who are interested in navigation for two reasons. Some were too busy to see anything, unless specially brought to their notice. Others thought the whole matter already fully canvassed and settled. It is true there is nothing showing that the consent of Congress had been asked for this enterprise; certain that the subject had not been treated as an interstate affair, to say nothing of its being an international affair. The United States has always been slow to move; with its many sleeping rights, it has for many years been loth to exercise them. Not till 1888 did it begin to exercise positive legislation over its navigable waters in order to preserve them for all its citizens. Each river and harbour bill since then is found to have sections strengthening the hands of those who wish to keep the waterways open and in good order, for all classes of navigators. Not till 1890 had any prohibitive clauses been enacted into laws forbidding, for example, the destruction of channels by improper dumpings. Saw-mills went their own unchecked way every year, clogging up streams. Railways bridged all smaller streams, in the States, without interference from the United States. Many other features can be quoted. But it is sufficient to say that all that is now changed. The adopted policy is to defend, as well as improve, all water courses, now navigable, or probably navigable in the reasonably close future. Waterways are under the charge of the United States, and there is no likelihood of their being abandoned for some time to come.

With this an established fact it is impossible to think that United States supervision shall not be extended to the Chicago drainage canal in due time. Under whatever law built, and for whatever purpose constructed, just so soon as it is shown that that canal affects, or becomes a part of the system of navigable waterways of the United States, some supervision or control of it must follow. When boats use it for harbour purposes; when its waters add to the Illinois River, or take from the lakes, they alter natural conditions and the matter rises for consideration under national authority.

The water levels of the great lakes are very delicate. Storms, barometric changes, rainfall, even tidal changes, are felt. Records show at Buffalo no less than 13 feet as a total possible change between the lowest and the highest gauge readings. Each lake is a basin. The water is constantly pouring in from not only one, but several inlets. The overflow, however, is now always out of the one inlet provided for that purpose; the second one, formerly at Chicago, has been plugged up.

As in our basins, when the water rises enough to take two, three or more of the small holes to carry it off, it is always to be noted that those holes are always carrying that surplus off; they do not wait until the water has time to pass from one end to the other. In the same channel the head alone governs the rate of overflow, and that head is measured by the gauge-reading at the outlet. The supply of water in the lake, the net supply, allowing for evaporation, is the sole cause of the outflow. That supply depends solely upon rainfall; but the lake, when it receives more than it has been receiving, must discharge more; when it has less, there is less to run out. If the outlet be dug down, or new ones made, the water runs off faster than it ran off before.