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## Book Reviews

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*"Great Lakes Basin,"* A symposium presented at the Chicago meeting of the American Association for the Advancement of Science, 29-30 December, 1959, Ed. by Howard J. Pincus, Pub. No. 71, AAAS, Washington, D.C., 1962.

The Great Lakes not only constitute a number of fascinating natural features of basic geological, limnological, and biological interest but also are of great practical concern as a source of power, water and food, as a transportation media, and as a recreation area. The need for controlling these important natural resources becomes greater as population and industry expand and competition for the use of the Lakes increases. This volume is dedicated to achieving closer communication and coordination between natural and social scientists and administrators and users in planning the future of the Great Lakes.

In December, 1959, a symposium entitled "Great Lakes Basin" was assembled under the joint auspices of the American Association for the Advancement of Science and the Geological Society of America to consider the natural setting, man's adaptation in the basin, and utilization of water. With three omissions and one addition the book represents the results of that symposium. The topics considered in the 16 published papers include: the geological background, climate and drainage, water balance and lake level fluctuations, lake circulation, physical and chemical conditions, shoreline recession, plankton productivity and energy relationships, changing human population patterns related to land use, history and prospects of the transportation network, hydroelectric power, recreation, water resources, and pollution. Summary remarks by one of the co-chairmen conclude the volume. While some topics such as navigation and fisheries are not included the work is probably the most comprehensive to date. Papers range in scope from reports of current research to summary articles, to historical treatments, but the theme running through nearly all of the presentations is an awareness of future prospects and problems. There is not space here to consider all the papers in the volume so what follows will be a summary of some of the problems discussed.

The paper by Bruce and Rodgers and that by Laidly take up water balance and level fluctuations of the Lakes. Evaluation of factors involved in maintaining and changing lake levels is of practical importance especially in navigation and hydroelectric power. One of the most difficult factors to evaluate accurately is precipitation on the surface of the Lakes which by several different types of measurements and estimates ranges from 60% to 94% of adjoining land precipitation. Bruce and Rodgers evaluate three different methods for determining lake precipitation; water budget, island gages, and weather radar. They feel that although preliminary experiments were not greatly encouraging weather radar seems to hold the most promise for future work.

Two papers deal with cultural and economic developments within the basin. In their article, Clark and Officer relate the differences in population density and growth

between the northern and southern portions of the basin to environmental differences and settlement history. Population and urbanization are expanding rapidly in the south while north of approximately 45 degrees population density is actually diminishing. In their paper on the "Development of the transportation network" Muhl-enbruch and Stuart point out the importance of transportation coupled with natural resources as critical factors in the growth and decline of commercial centers. They feel that centers which have declined will develop only if new natural resources are found and exploited or transportation systems in the area are integrated and improved. It is unfortunate that in this article some of the maps are not as enlightening as they could be. Also the dates given for the maps on pages 166 and 168 seem to be in error.

In the discussion of hydroelectric power resources within the Great Lakes and St. Lawrence basins Tower presents estimates showing that about half of the total power potential of 5,814,000 kilowatts is being used. Of the six Great Lakes states New York leads with the highest total power potential and also the highest undeveloped potential (3,078,000 kw or 85% of the total undeveloped potential for all the states). Michigan comes next with 328,000 kw of undeveloped potential and finally Minnesota, Wisconsin, Indiana, and Ohio with a combined total of 198,000. The large overall power potential will be an important asset in industrial and commercial growth in the region. In addition, New York with the highest potential seems to have the best prospects for continued growth.

In an article by Cain, recreation facilities of the Lakes are nicely surveyed with the aid of tables and a map. He feels that much needs to be done in the way of expanding park and boating facilities, particularly as population growth and urban crowding will increase the demands on the area. Considering both lake and groundwater resources (papers by Gamet, Bergstrom and Hanson, and Watt) supplies in the basin are abundant for present needs. However, with increasing pollution from domestic and industrial wastes we must find better methods of purification. Dahl and Postan in separate discussions of pollution point up this major problem and emphasize the need for research on waste treatment methods and for the expansion of present treating facilities.

Taken as a whole these papers constitute a highly readable introduction to Great Lakes problems and an excellent source book. Many illustrations, diagrams, maps and tables support and enhance the discussions and conclusions. Everyone interested in the Great Lakes area should read this volume.

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