Meetings

Great Lakes Research

The Great Lakes make up one of the most important inland waterways in North America and play a significant role in the economic and personal lives of both Canadians and Americans. In order to discuss recent research on the lakes the 7th conference on Great Lakes Research was held at the University of Toronto, 6–7 April 1964.

Interest in the effects of interaction of lakes and air is increasing; meteorological investigations include over-water micrometeorology (F. C. Elder, E. Ryznar, and D. J. Portman), effects of the lake breezes (R. E. Munn and T. L. Richards), and other lake weather phenomena (R. B. Sykes).

Some of the meteorological work has direct bearing on the water supply problem which is acute at the present time in some of the Great Lakes. In discussing the problem of precipitation over the lakes, G. C. Williams reassessed the frequently quoted Chicago crib precipitation records. Attempts to determine the year-to-year variation in evaporation by water budget (J. A. Derecki) and mass transfer techniques (T. L. Richards and G. K. Rodgers) have also been made. E. Megerian described the latest techniques developed by the U.S. Lake Survey for forecasting the levels of the Great Lakes.

Experiments with diffusing dye under steady and steadily changing conditions have contributed to the knowledge of circulation of lake water (G. T. Csanady). J. L. Verber submitted strong evidence for the existence of rotary currents of inertial period and internal waves in the waters of Lake Michigan.

Of the papers dealing with the chemistry of the lakes, that of J. R. Kramer was of major interest. His estimates of the chemical composition of various Great Lakes are based on the solubilities of common minerals of the basin and account for the concentrations of most constituents except chloride and sulfate. Human activity is probably responsible for the high concentration of chloride and sulfate. Further evidence that the concentration of dissolved solids is increasing in Lake Michigan was presented by C. F. Powers; sulfates, chlorides and total solids have increased. Trace elements in the sediments of Lake Superior were dealt with by D. G. Nussman.

In discussing biological aspects of the lakes, C. C. Davis reported plankton counts made by the staff of the Cleveland waterworks. This study from 1919 to 1962 shows a definite increase in the amount of phytoplankton in Lake Erie during that period. C. M. Herman reported on the extensive mortalities of gulls and loons which took place on Lake Michigan in late 1963. While toxin of type E botulism has been identified in a number of the dead birds, there is no indication that this contributed to the losses. Gulls are remarkably resistant to culture-produced type E botulism.

Two important physiological studies were noted. Mrs. C. Sparling reported that about 20 species of algae native to Lake Ontario gave off a portion of the carbon resulting from photosynthesis, but when carbon was not limiting, the excreted amount was less than 1 percent of that resulting from photosynthesis; thus these findings do not invalidate the carbon-14 method of determining primary productivity. W. Chavin described the extreme sensitivity of fish when they are handled during experiments. Adrenal cortical tissue and epinephrine-secreting cells are depleted of ascorbic acid and cholesterol within minutes. The thyroid is extremely sensitive to radioiodine; its function may be greatly impaired by retained doses of 0.001 curie. Pituitary cytology is altered by extremely small doses of radioiodide.

During the sessions emphasis was placed on the international aspects of work on the lakes. G. E. McCallum and L. B. Dworsky pointed up the need for cooperation in executing an effective development program. The historical development of international and interstate agreements pertaining to Great Lakes resources was outlined by N. V. Olds. The need for this coordination in the research field has already been recognized and acted upon in the formation of the informal international Great Lakes Study Group (G. B. Langford). Another important step has been the establishment by the U.S. Lake Survey in Detroit of a regional data center (L. W. Curry).

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Circulatory Responses to Exercise

Muscular activity is one of the most common stimuli which, under normal conditions, is invariably associated with increased cardiac activity. Such activity is usually proportionate to the increased metabolic requirement produced by the exercise. Mechanisms of this change in cardiac output and the control mechanisms in the body that are responsible for regulation of cardiac output in relation to metabolic requirements were discussed during a symposium of the American Physiological Society at the annual meeting of the Federation of American Societies for Experimental Biology, Chicago, Illinois, 13 April 1964.

Earl Wood pointed out that the gross physiology of the multiple factors and mechanisms which produce variations in cardiac output are rather well known and understood. However, there are practically no data available concerning the actual controlling mechanisms which regulate cardiac activity in relation to the metabolic needs of the body.

Modern investigative activities in contemporary physiology are tending more and more to use one of two approaches: the molecular approach or the so-called systems approach.

The molecular approach in physiology is becoming progressively more