phates and chlorides (apparently connate) are both abundant. Thus water from a city well at Wheaton, Minnesota, shows Ca and Mg 1 per cent., Na 33 per cent., K 4 per cent., CO_3 4 per cent., SO_4 28 per cent. and Cl 30 per cent.; total salinity, 2,794 p.p.m. This is a typical soft salty water of the region. Similar waters occur in the basal sand of the Cretaceous rock system northward to the Canadian boundary, but with a salinity as high as 10,000 p.p.m. or more. Toward the east these waters are diluted and become sodium or calcium bicarbonate waters. The waters from the glacial drift above the Cretaceous beds are bicarbonate solutions of Ca or Na, but many show high sulphates also. Waters from wells ending in the clays of glacial Lake Agassiz are notoriously high in sulphates, so that they have a bitter taste and drastic purgative effect on the drinker. In one case a 12-inch bored well 45 feet deep furnishes water containing 2,104 p.p.m. SO_4 in a total salinity of 3,600 p.p.m. As an extreme, another 80-foot well furnishes water with 3,590 p.p.m. SO_4 in a total salinity of 5,756 p.p.m.

The drastic cathartic action and the weakening effect of these natural solutions of Epsom and Glaubers salts on man and on live stock are well known in the region. Some persons believe that disorders of kidneys and bladder also result, but that effect is not established. It seems true though that no matter how well they are fed, cattle and hogs can not be fattened for market while they drink such water. Indeed, the case is even worse. The cattle develop a run-down, ragged appearance and many eventually weaken and die prematurely. The principal difficulty in such cases seems to be that a degeneration of the bones sets in, so that most of the lime is abstracted from them. These bones are reduced to gristle that can be tied in knots and easily punctured with a knife. Calves are stunted in growth and many never mature at all. The cows develop strange appetites for bones, leather, wood, etc. The condition is alleviated but perhaps not cured by feeding bone-meal or ground limestone.

Altogether about one fourth of the State of Minnesota is affected in some degree by this problem. Furthermore, the observation of cattle from Dakota and Montana, where similar waters are known, suggests that the difficulty is really wide-spread but has not been properly diagnosed. With the present trend toward "diversified farming" involving cattle-raising and dairying, a considerable territory faces a critical problem. It seems probable that people using such waters are affected in the same way as cattle, but perhaps in different degree, so that questions of human physiology and diet also are involved.

It is to be hoped that the experimental work of Heller and Larwood will be continued, and that the effect on the equilibrium of body calcium may be studied in particular, because the problem has a large economic bearing.

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A SURVEY OF THE PHYTOPLANKTON AT ERIE, PENNSYLVANIA

IN a recent number of SCIENCE[1] Mr. Paul R. Burkholder outlined briefly the scope of the biological survey of Lake Erie which was carried out during the summers of 1928 and 1929 through the cooperation of the U. S. Bureau of Fisheries, Buffalo Society of Natural Sciences, N. Y. State Conservation Department, Buffalo Health Department and the fish and game departments of Ohio, Ontario and Pennsylvania. Attention should be called, also, to similar investigations being carried on at Erie, Pennsylvania, by graduate assistants in the University of Pittsburgh appointed for that purpose. The present note refers only to the work carried on by the assistant in the botanical department of the university.

Early in the spring of 1929, Mr. Herbert Graham began quantitative and qualitative studies of the raw Lake Erie water taken in at the large city waterworks intake crib situated out in the lake about two miles from the shore of Presque Isle and about three miles out from the main shore at Erie. The water is taken into this main at a level of about six feet above the lake-bottom and twenty-four feet below the surface of the water. Generally, two samples of this water were studied each week, the organisms identified and their abundance estimated. In the late spring Mr. Graham left to become a member of the staff of the ill-fated *Carnegie*, being succeeded by Mr. Russell Y. Gottschall, who has continued the investigation.

The notable results of this study consist mainly in that there is now a continuous record of the phytoplankton organisms throughout the whole year, based on studies of about 250 samples and including about 65 organisms determined as to species and various others as to genera. It is believed that this study will thus supplement in a very important way the more general biological survey carried on only from May to September. The Erie samples are also much more productive, as a larger number of the organisms are caught by the lake-sand filter method used than by the tow-net and bottle method.

Being an expert bacteriologist, Mr. Gottschall has extended the studies to cover the bacterial flora of Erie Bay, as well as its general phytoplankton, and

[1] SCIENCE, 75: 288, March 14, 1930.

has carried on a number of oxygen determinations, particularly during the colder months.

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THE VITALITY OF BURIED SEEDS

Two long-term seed tests have been started in the United States, and are still in progress. The first was started by Dr. W. J. Beal at the Michigan Agricultural College. In this test, one half of the kinds germinated after forty years. The other was begun by the Seed Laboratory, Bureau of Plant Industry, U. S. Department of Agriculture, in 1902 at Arlington Farm, Virginia. At the end of twenty years, fifty-one of the 107 kinds planted were viable. Other sets of seeds in both tests remain buried and will be taken up and germinated at intervals. These two tests have been particularly suggestive with respect to revegetation and crop rotation in relation to weed control.

It now seems desirable to put down a more comprehensive long-time series of tests to determine the effect of typical soil and climatic conditions on the length of time seeds will remain alive when embedded in the soil. Such a test is now being planned by the Seed Laboratory, Bureau of Plant Industry, U. S. Department of Agriculture. The success of the project will require the cooperation of many interested organizations and individuals. Suggestions as to characteristic areas with reference to both soil and climate will be welcomed as well as suggestions as to the kinds of seeds of particular interest in these typical localities. It is expected that the seeds used will be of the crop of 1931, and that they will be placed in the ground during the fall of that year.

E. BROWN

SPECIAL CORRESPONDENCE

RESEARCH AT THE MELLON INSTITUTE DURING 1929–30

SINCE Mellon Institute was established in Pittsburgh nineteen years ago, about thirty-five hundred companies have benefited directly, either as individuals or as members of industrial associations, by the work carried out under the institution's industrial fellowship system. Robert Kennedy Duncan, the originator of this procedure, envisioned as its goal ideal industry, which would "give to all broader opportunities for purposeful lives." The double function of the institute as a technical experiment station and as a training school for industrial scientists is manifested by the successful products and processes worked out under its auspices and by the regiment of earnest researchers who have here gained knowledge and experience that they are now applying in wider fields.

In his seventeenth annual report to the institute's board of trustees, just issued, Director Weidlein has summarized the progress during the fiscal year ended February 28, 1930. A quantitative measure of the activities is afforded by the funds contributed by the industries in this period for the support of research, which reached the sum of $929,109.02, showing an increase of 16 per cent. over the preceding year. At the close of the year, sixty-one problems were under investigation, twenty-one by multiple industrial fellowships and forty by individual industrial fellowships. Eight studies are being supported by industrial associations. Five additional fellowships will begin work during the spring. One hundred and forty-three industrial fellows and fellowship assistants are carrying on the experimental work. During the calendar year 1929, publications by members of the institute included seven bulletins, fifty research reports and fifty-nine other papers. Sixteen United States patents were issued to industrial fellows.

The institute expends its income not only in conducting research for the industries and in the extension of its library and experimental facilities, but also in sustaining its department of research in pure chemistry and in supporting certain investigations of general importance to public welfare, such as, for example, the comprehensive study of air pollution now in progress.[1] The fellowship on pure research, maintained since 1915, was perpetuated in 1927 as a separate department. In this way the institute is giving constantly increasing attention to the encouragement of research on fundamental chemical problems. This attitude is the result of altruistic motives and of the realization that such studies are necessary as a background and stimulus for industrial research. Since this department was established, it has published nineteen papers on various subjects in pure organic chemistry. Most recently its work has been on the acidic carbohydrates occurring in plants.

Of the sixty-one fellowships now active, twenty-nine, approximately half, have been in operation for five years or more. Fifteen have completed more than ten years of work. These facts bear witness to the growing realization by industrialists that long-time, fundamental research is profitable.

Information concerning the subject-matter and progress of many of the fellowships is not releasable. The following developments during the year are

[1] On the institute's air-pollution investigational program, see L. W. Bass, SCIENCE, 70: 186, August 23, 1929.