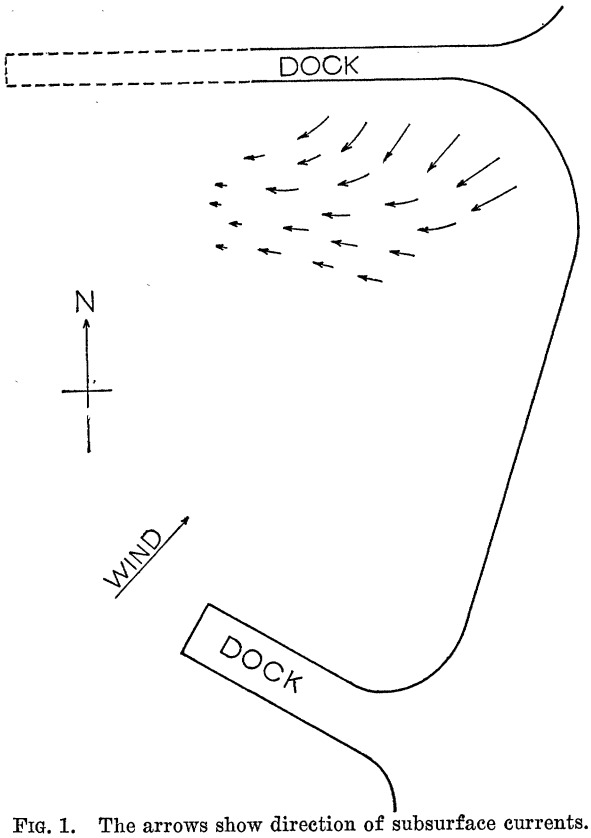

FIG. 1. The arrows show direction of subsurface currents.

feet. Here there was a steady definite outward moving undertow perpendicular to the shoreline with a velocity of one and a half to two feet per second. The wind was not entirely steady, and when the gusts held for two or three minutes the velocity of the undertow was increased considerably. About 50 feet from shore this subsurface current turned gradually and ran parallel with the old dock out toward the center of the lake. It was detected 75 to 100 feet further to the south but with decreasing intensity. As the current moved westward parallel with the dock it weakened as it came into deeper and deeper water until at a depth of six feet it had almost disappeared. It will be noted that this subsurface water was moving west, while the wind and waves were from the southwest.

Again on the northwest side of Silver Lake, which is circular in outline and about one and a half miles in diameter, a gentle southwest wind of five miles per hour gave waves about six inches high and five feet long. At 40 feet from shore in one and a half feet of water this caused a gentle but steady undertow.

Low ridges are frequently present on gently sloping under-water terraces on which there is a plentiful supply of sand. In the larger water bodies these ridges tend to be approximately parallel to the shoreline. They are probably built by the waves and currents during the heavier storms, but at other times they, themselves, exercise some control of the water movements. This was very noticeable on a part of Crystal Lake near Frankfort, Michigan. At Outlet Bay the underwater shelf extends out two thousand feet with a depth of only five feet at the outer edge. The bottom is of sand and gravel and the water is very clear. On this shelf are three sand ridges about one foot high and from 50 to 75 feet wide. The movement of the water on this shelf was carefully studied when the wind was blowing squarely into the bay from the north and the waves were about one and a half feet high. Between the beach and the first ridge, which was about 100 feet from the shore, no outward moving current could be detected, but there was some slight current at times parallel with the shore. However, on the offshore side of each ridge there was a definite but slow elliptical water movement as shown in Fig. 2. This was the general condition, although here

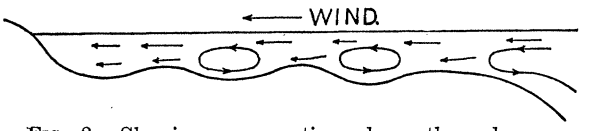

FIG. 2. Showing cross-section above the subaqueous terrace at Crystal Lake. Arrows show direction of currents.

and there a tendency toward a movement parallel to the ridges could be detected. So far as observed, the water movement over the ridges was toward shore but in some cases it was of an oscillating nature.

The studies described above were made on relatively small bodies of water. However, it is quite probable that the movements of water in small lakes are similar to the movements that take place in the larger water bodies under similar conditions. One strong indication of this is the uniformly successful results that have come from the use of working models at the U. S. Waterways Experiment Station at Vicksburg, Mississippi. Therefore these studies would indicate that with favorable conditions of wind, shoreline and bottom contour an undertow does exist.

O. F. EVANS

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FERTILITY AND INTELLIGENCE OF COLLEGE WOMEN

IN a previous communication[1] it was reported that college men scoring high on intelligence tests at matriculation produce more children in the first dozen years after graduation than do those scoring low and that the differential which is significant in this result is age at marriage. It was desired to learn whether the same is true of college women.

The class of 1927 of the Women's (now Pembroke)

[1] R. R. Willoughby, "Fertility and Intelligence of College Men," SCIENCE, 1938, 87, 86–7.

College of Brown University was selected for study; its members were tested in 1923 with the Brown University Psychological Examination. The scores of several could not be used because no information on their reproductive histories was available; they were not significantly different in intelligence from the remainder of the group.

The total group was divided at the median into a high-scoring and a low-scoring group of 54 subjects each; 36 live births had been reported for the former and 37 for the latter. Further subdivisions were made to correct for inequalities among the dates of latest reproductivity information, but no significant differences appeared beween the groups. A comparison of marriage dates also revealed no significant differences.

While these data are obviously inadequate, the tentative conclusion may be drawn from them that test intelligence is not a factor in the reproductive histories of college women, at least so far as the most fertile years are concerned. It is also incidentally evident that college women, like college men, fall considerably short of reproducing themselves. It is to be hoped that these conclusions and those of the inquiry previously referred to may be repeatedly examined as more data become available on the reproductive histories of the early test populations.

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THE ROLE OF THIAMIN IN ORGANIC EVOLUTION

IN connection with the article of Dr. R. R. Williams (SCIENCE, June 24, 1938), it may be of interest to point out that the assumption that thiamin is needed by all living cells, together with the statement that "only the higher plants can make it," would completely disrupt the concept of the evolution of higher from lower forms of life.

HUGO P. KORTSCHAK
EXPERIMENT STATION OF THE
HAWAIIAN PLANTERS' ASSOCIATION

DR. KORTSCHAK'S inference that my conception of the role of thiamin in the living world is at variance with the idea of the evolution of higher from lower forms of life is not one which I intended the reader to draw. On the contrary, I believe that our knowledge of the rôle of thiamin in living things has contributed a most important bit of chemical evidence that all forms of life have a common heritage. The single sentence which Dr. Kortschak quotes is taken from a brief paragraph in which I attempted to condense for the sake of perspective the results of some scores of experimental studies by various workers. It accordingly is lacking in accuracy of detail. Some, at least scanty, powers of synthesis of thiamin are doubtless to be found among the lower plants.

It does appear, on the basis of present evidence, that the higher plants are responsible for synthesizing most of the thiamin in living nature. However, it is not at all clear to what extent lower plants have failed to develop ample synthetic powers in this respect and to what extent past powers may have been lost through symbiotic or saprophytic habits.

R. R. WILLIAMS
BELL TELEPHONE LABORATORIES

SOCIETIES AND MEETINGS

AMERICAN GEOPHYSICAL UNION

THE *Transactions* of the nineteenth annual general assembly of the American Geophysical Union and the meetings of its seven sections, held from April 27 to 30, 1938, at Washington, D. C., and of regional meetings at Spokane, Wash., December 28 and 29, 1937, and at Davis, Calif., January 7 and 8, 1938, are now in press. Part I of 585 pages relates to the Washington meetings, and Part II of some 160 pages relates to the regional meetings.

Because of the importance of the minutes of the general assembly and of those of the sections, with their appendices, in the general view of the development of the union and of their interest to all its members, they have been included, for the first time, as a part of the *Transactions*. The total attendance of members and guests—534 at Washington—marks the character of the meetings in 1938 and the growing import of the union as a factor in the progress of geophysics in the United States. The attendance at the regional meetings also emphasizes this progress.

Included in the minutes are the reports of officers and of standing, special and research committees. Especially noteworthy are those of the newly formed planning and project committee and of the two committees on geophysical and geological study of oceanic basins and on geophysical and geological study of continents. These show the many problems calling for intensive theoretical research and potential possibilities of their applications in profound problems of earth physics.

The respective presidents, vice-presidents and secretaries of the union and its sections for three-year terms, July 1, 1938, to June 30, 1941, except as otherwise noted, are:

Union: R. M. Field; W. C. Lowdermilk; J. A. Fleming (1937–1940).