in this direction. The University of Chicago has consciously inaugurated a new idea; it has established a true university department of medicine; it has erected an observatory and laboratory for the study of disease.

RUFUS COLE

HOSPITAL OF THE
ROCKEFELLER INSTITUTE,
NEW YORK CITY

THE BIOLOGY OF LAKE BAIKAL

MY wife and I have just returned to Irkutsk from a most interesting trip to Lake Baikal and Archan. We went first to the Biological Station of the University of Irkutsk, on the shore of the lake, some distance north of the village of Listvenitschnoe. It was our good fortune to be accompanied by Mr. W. Jasnitsky, of the botanical department of the university, who is working at the station and has charge of its affairs at the present time. Leaving Irkutsk, we went on the train to Baikal, a station at the beginning of the great and swift Angara River, which flows out of the lake. Taking the ferry across the Angara we were met by a boat in which we were rowed to the station, a journey of several hours. It was after dark when we saw a faint light across the waters, and presently came to a log house with several rooms, in which teachers and students live, and the work is carried on. Although the resources of the station are pitifully small, and would be considered quite inadequate in most countries, the group working there is a happy one and is doing work of great value. The surroundings are charming, with meadows full of flowers and hills covered with trees in the background. Across the lake at a distance of 40 or 50 kilom., but seeming much nearer, are the great Transbaikal Mountains. The water of the lake is usually calm in morning and evening, but more or less disturbed during the middle of the day. Occasionally there are storms so severe that it is impossible to land from a boat. The principal work going on at the time of our visit was that of W. Jasnitsky on algae and plankton; M. M. Kojoff on the Baikal fauna and especially the spermatogenesis of the snail *Benedictia baicalensis*; Ivan Rubtzoff on planarians, of which he has discovered several new species, one of which is oviparous; W. W. Jzossimoff (of Kazan University) on general hydrobiology, and especially oligochaetes and water-mites; Nina A. Epoff on the flowering plants of the vicinity; N. M. Wlassenko on the parasitic worms of fishes; Galia A. Muromoffa (University of Tomsk) on the plankton of littoral zone; Lidia A. Wasilewskaia on the plants of a defined area. In addition to these, a house close by is occupied by Professor Dorogostaiski, who has charge of the establishment for breeding useful native animals, deer, foxes, sables, squirrels, etc. Some of the foxes are Siberian, others from Alaska. The deer are from the Maritime Province, and were only recently received. The professor is an all round zoologist and has published a very important work on the amphipod crustacea of the lake. He showed me the exquisite colored drawings for a new paper on the amphipods, with many new species, to be published by the Academy of Sciences at Leningrad next year. In spite of the limited resources, there are enough facilities for good work and the good fellowship and romantic surroundings give the place an indescribable charm, accentuated by the sense of peace and remoteness from the troubles of the world. It is an unfortunate circumstance that the authors of the resulting papers have to pay about half the cost of printing, except in the case of specially interesting work, when assistance may be obtained from Moscow, or of course in the rare case of papers published by the Academy of Sciences at Leningrad.

Leaving the university station, we next visited the establishment of the Russian Academy of Sciences, situated at Maritue, south or rather east of the Angara. We were very fortunate in finding there Professor Nassonov, whom I was especially pleased to meet, as I used to correspond with him about Coccidae in the days before the war. Professor Nassonov explained that the house at Maritue was not to be regarded as a biological station, but only as a base for the Baikal expeditions sent out by the Academy. At the moment there were three parties working in North Baikal—a botanical one under Professor Mayer; one on fish and fish breeding, and chemical analysis of water, under Professor Soldatoff; and the third on general zoology, but principally Cladocera, under Verschagen. They have a motor boat, which enables them to reach distant parts of the lake. Nassonov himself had just returned from an expedition and was about to leave for Leningrad. He gave me some very fine and large amphipods, which I shall send to the U. S. National Museum, as Miss Rathbun tells me they have none of the Baikal crustacea. The Academy has in view the establishment of a larger and permanent station, at Tanhos or Mysovsk, preferably the latter because of the great depth of water nearby. Both are on the transsiberian railway, as is Maritue.

The more we study the Baikal problem, the more evident does it become that it includes matters of the greatest interest for biological theory. In spite of the unexplained presence of the seals (*Phoca foetida sibirica* Gmelin), which are said to be nearest related to the Caspian form, the marine elements which figure so largely in many discussions are evanescent. The nudibranch, the pteropod and the nemertean

are doubtful and can not be confirmed. The nudibranch was found in a bottle labeled Baikal, but probably never came from the lake, as no traces of it can be found at the present time. The large sponge *Veluspa baicalensis,* which I found washed up on the shore and also saw dredged, is suggestive of marine relationships. The copepod *Harpacticella* and the amphipod *Gammaracanthus* are also cited in the same connection. The seal does not help the theory of marine origin, as such origin must date far back of the evolution of the species *Phoca foetida,* or indeed presumably of the genus Phoca. Supposing there to have been connection with the sea, some have imagined it to be by way of the Caspian, others have suggested the Arctic Ocean. Professor Nassonov thinks rather that the Sea of Japan holds the key to the understanding of the origin of Baikal. He has found a new genus of Rhabdocoelida, with several species in Lake Baikal, and a marine species on the coast of the Maritime Province, not far north of Korea. Professor Dorogostaiski, I understand, believes that whatever may have been the origin of the lake, its fauna was at a remote period reduced to a few species, and when conditions became favorable these evolved into many, in the absence of competition. Thus the case would parallel that of the Hawaiian Islands, which were populated by a small number of insect and mollusc types, accidentally carried over sea. These groups have in the islands given rise to vast numbers of species, so that while the genera are few, the species are very many. On continental areas the potential species-making ability of a genus can not be realized, most of the possible forms being cut off in the struggle for existence. There are good reasons for thinking that the parallel here suggested is not fanciful, and thus the Baikal biota acquires a new interest. This phenomenon of species-multiplication is probably connected with mutations or changes in chromosome numbers. It will be of extraordinary interest to study the chromosomes of the amphipods, planarians, etc., and see if they exhibit the phenomena of polyploidy.

Baikal appears to be the deepest lake in the world, with a maximum depth of about 1,560 meters. The water is very cold, and saturated with oxygen, the oxygen content being even greater than that of the small streams flowing into it. The water is fresh, with very little mineral matter in solution, and as a consequence the shells of the mollusca are very thin. Thus the conditions are quite unique, and it is not surprising that the fauna is peculiar. When I went down to the shore I expected to see some of the peculiar water-snails, but there are none along the water's edge, where snails would be expected in other places. A little later the dredge was used in a few fathoms, and many snails, planarians and amphipods were brought up. It was very interesting to see *Benedictia baicalensis* alive; the head, tentacles and body above black, but the sole grey. When the dredge brings up such a variety of molluscs, planarians, etc., all attached to the same stones, one gets the impression that species-formation has gone on without diversification of conditions and special adaptations. Nevertheless, there are many species showing special adaptations. Thus the snails of the genus *Benedictia* present a series of species at various depths, those of the lowest zone (*B. fragilis*) being very large, with very thin shells. Similarly the deep-water amphipods show special characters, as pale coloration and long appendages. Some of the deep water amphipods come to the surface at night, and while I was at the station I saw a living *Macrohectopus branickii* (Dybowski), a very translucent species, taken in the plankton the night before. It regularly inhabits a depth of 300 meters. The fauna of the lake includes the following: Mammalia, the seal, of an endemic subspecies; fishes, about 34 species, with an endemic family, and seven genera and 17 species endemic; gammarid crustacea, over 300 species now known, and new ones still being found, all endemic except the common *Gammarus pulex*; Branchiopoda, 12, not endemic; Copepoda, 11 recorded, a few endemic, these and other small crustacea not yet well known; Gastropod mollusca, about 75 species, of which 68 endemic, with several endemic genera, and the family Baicaliidae; Lamellibranch mollusca, 15 species, of which 13 endemic; Planarian worms, over 100 species now known, all endemic (only about 50 species in all Europe!), new ones constantly found; Oligochaetes, over 30, nearly all endemic, with five endemic genera; Rhabdocoelida, shortly to be described by Professor Nassonov, who tells me that all the species of Baikal are positively heliotropic, while all those of other lakes are negatively heliotropic; efforts were made on a small scale to transfer the animals to other waters, but they died; *Gordius* (a specimen was brought in while I was talking to Professor Nassonov; he said it was the first record for Baikal); Bryozoa, three recorded, one endemic; sponges, 10, of which eight endemic and one endemic genus; Protozoa, not yet fully investigated, but proving extremely interesting. Professor Swartschewski, of Irkutsk, has been working on the suctoria commensal on amphipods, and in about three months has found about 50 peculiar species. At Maritue I met Miss Z. I. Senilova, of Moscow, who was working on the Infusoria. She mentioned the peculiar fact that Baikal was now full of a probably new species, which last year she could not find at all. The recorded Rhizopods are ordinary, but Professor Sche-

wiakoff, of Irkutsk, has taken up the study of this group, and important results may be confidently expected. The Tardigrade genus *Macrobiotus* occurs in the lake. The recorded algae are numerous, about 170 species, including a number of endemic *Draparnaldia*. A microscopic alga parasitic on mosquito larvae was described last year by Jasnitski. There is a recently described endemic *Hydra*.

The biota of the region around the lake is purely Palaearctic. The flowering plants include such genera as *Rhododendron, Cotoneaster, Rosa, Rubus, Pedicularis, Parnassia, Papaver, Aconitum, Polemonium, Spiraea, Alnus, Polygala, Scutellaria, Lamium, Ranunculus, Veratrum, Silene, Myosotis, Zygadenus, Geranium, Thalictrum, Chrysanthemum, Linaria, Centaurea, Sedum, Agrimonia, Stellaria, Campanula,* etc. *Potentilla fruticosa* and *Epilobium angustifolium* are abundant, and quite the same as we get in America. A common tall labiate with pink flowers is *Phlomis tuberosa*; I found also a form *albiflora*, with pure white flowers. Land snails are very few in all this region; the only peculiar one I found is apparently the *Eulota asiatica* Dybowski, described as a variety of the European *E. fruticum*. The scarcity of snails may be due to the fact that after the ice age no migration was possible from the south, the Gobi desert intervening.

T. D. A. COCKERELL
GEOLOGICAL COMMITTEE, IRKUTSK, SIBERIA,
AUGUST 17

SCIENTIFIC EVENTS

MEMORIAL OF PROFESSOR BRUCE FINK

THE committee of the university senate of Miami University, appointed by President Brandon to prepare a statement for the senate record in memory of Professor Bruce Fink, submits the following:

Early on the morning of July 10, 1927, Professor Fink died just after entering his laboratory.

He was born in the village of Blackberry, Illinois, December 22, 1861. He was graduated from the University of Illinois in 1887, and received the degree of M.S. in 1894. He continued his graduate work at Harvard University as a Townsend scholar, where the degree of A.M. was conferred upon him in 1896. His work was completed for a doctorate at the University of Minnesota in 1899. He studied at the University of Chicago in 1903. From 1887–92 he was engaged in secondary education; from 1892–1903, professor of biology in Upper Iowa University; from 1903–06, professor of botany, Grinnell College, and from 1906 to the time of his death, professor of botany, Miami University.

A partial list of his activities outside of the immediate conduct of his department indicates his wide general interest in promoting botanical research and something of his standing among his fellow botanists. He took part in a botanical survey of Minnesota, 1896–03; was in charge of botanical studies at the Marine Biological Station, Puget Sound, Washington, 1906, and was associate editor of *Mycologia* from 1908 on. He was a fellow of the American Association for the Advancement of Science; member of the American Society of Naturalists, of Botanical Society of America, of the Botanical Society of the Central States, the Sullivant Moss Society president, 1910. His leadership in scientific circles was recognized by becoming president of Iowa Academy of Science in 1904, and of the Ohio Academy of Science in 1912.

His productive work as a scientist is indicated by the long list of titles of his publications—more than one hundred, mainly relating to lichens. During his study of these plants he amassed a large collection of some 15,000 specimens, one of the most complete in this country. He was generally recognized as the leading American lichenist and one of the two greatest in the world. At the time of his death he was bringing together the results of his long research in the form of a monograph, "The Lichens of the United States." His work was so far advanced that it will be possible to complete it essentially as he had planned to do himself.

He was much interested in young people and helped them in many ways. He was an especially keen judge of ability in students and was able in many instances to encourage individuals of promise to enter the field of science as a life career. More students went into graduate work from his department than from any other in the university. Among these many have become leaders in various fields of botanical research.

As a citizen he had a high sense of civic responsibility, and was active in many enterprises promoting community welfare or adding beauty to its environment. He was always interested in public affairs, was well informed on political questions, both state and national.

His passing leaves a vacant place in our university group, one that will not soon be filled. As a colleague he will be long remembered for his genial fellowship and fine spirit of cooperation. Many of the younger members of the faculty will recall the cordial interest he showed towards their problems and ambitions. All the older members will preserve the memory of his unfailing friendship.

B. M. DAVIS, *Chairman*
S. R. WILLIAMS
C. H. HANDSCHIN
F. L. CLARK
W. H. SHIDELER

THE THIRD RACE BETTERMENT CONFERENCE

PRELIMINARY announcement of the Third Race Betterment Conference, the first to be held since the war, has been made by Dr. C. C. Little, president of the University of Michigan, who heads the conference committee.

The two-fold object of the forthcoming conference, which will be held at Battle Creek from January 2