may be allowed for this research according to arrangement with the individual universities under whose supervision they are undertaken. Each fellow will be required to submit a written report at the completion of his fellowship grant and the text of that report shall remain the property of the National Tuberculosis Association. Candidates will be considered not alone on academic standing, but on experience and general fitness for research work. The fellowship grants will date from the beginning of the academic year in the fall of 1931. They are for a twelvemonth period and the fellowship grant amounts to $1,500 for that period with a month's leave for vacation. Interested candidates should write to Jessamine S. Whitney, Statistician, National Tuberculosis Association, 370 Seventh Avenue, New York City, for further information.

ACCORDING to the London *Times* an advisory Standing Commission on the British National Museums and Galleries is in process of formation. It is understood that the following have been invited to serve upon the commission: The Earl of Harewood, Lord Hanworth, Mr. C. R. Peers, Sir Richard Glazebrook and Sir Henry Miers. The creation of such a standing commission, which should review each year the draft estimates of the National Museums and Galleries, and advise generally upon the position, was among the recommendations of the Royal Commission on National Museums and Galleries. While such a body is intended principally to act as mediator between the various institutions and the treasury with a view to discouraging extravagance and assessing rival claims, it was suggested by the Royal Commission that it could also promote coordination between the national and provincial museums, and incidentally stimulate private benefactions. The function of the commission will, it is understood, be purely advisory, and it will not have executive control, apart from any influence exercised through the treasury or other government offices, over the trustees and similar bodies which at present govern the various institutions.

DISCUSSION

DEPOSITION OF SEDIMENT IN LAKES BY GLACIAL STREAMS

ON June 13, 1930, the writer had the opportunity to observe, from the deck of a steamer, the discharge of the Rhone River into Lake Geneva. At this time there was rapid melting of snow from the mountains and of the ice of the Rhone Glacier (seen about a week later) and the river was a yellow flood of cold water. From thermometric observations made on similar streams in Alaska, in 1909, it may be inferred that these snow and glacially derived waters of the Rhone had a temperature only a few degrees Fahrenheit above the freezing point, that is, they were within the temperature range where fresh water is most dense. The surface waters of the lake, on the other hand, were sufficiently warm to attract a few bathers to a beach at the head of the lake, a mile or two distant from the Rhone outlet.

Immediately on coming in contact with the lake waters, at what was evidently the edge of the steep, fore-set slope of the delta, the river waters sank beneath the surface. The demarcation between the blue waters of the lake and the yellow waters of the river flood was of line-sharpness; no zone or belt of turbidity could be seen, nor was there any turbidity of the surface waters of the lake at distances farther out in the lake. At the line of disappearance the yellow river waters had still a strong current, to the degree of being rippled on the surface; a current probably competent to transport coarse sand in suspension. The line of separation between the lake and river waters made the pattern of a delta with the base, in the lake, generally straight, and several times longer than the stream width at the apex of the triangle. In detail this base-line front of the delta had a crenate outline; a pattern that served to round off the angles between the base and the other two sides of the triangle.

From these observations it would appear that where the waters of a glacial stream, at temperatures where water is of maximum density, empty into a body of fresh water with relatively warm surface layers, sinking of the cold waters, together with their sediment load, is abrupt and complete at the outer edge of the top-set beds. Accordingly, if the water of the lake is of adequate depth in relation to the developed thickness of the delta deposit the fore-set beds should be of the maximum steepness permitted by the angle of rest under water of the material deposited. Further, their composition and cross bedding should be comparably heterogeneous to that of the top-set beds.

These deductions are fulfilled in a marked degree by the form and composition of the hanging deltas built into proglacial lakes at various levels, as found in the Finger Lakes district of central New York. The higher levels of such deltas quite invariably have very steep fronts, forty and more feet high, with straight rather than curved or serrate outlines. Where such delta terraces have been cut through in building operations or for use as a source of sand and gravel they show little difference in composition or coarseness of materials between the top-set and fore-set beds.

While there is such correspondence between the form of the deltas deposited in the proglacial lakes and the process observed at the Rhone River-Lake Geneva junction, it is probable that the deposition of the deltas in the proglacial lakes was only exceptionally done under the extreme conditions of temperature difference present at the Rhone River-Lake Geneva site. It may be presumed that the surface waters of the proglacial lakes were ordinarily colder and that the stream waters were warmer and chiefly derived from precipitation on land. However when the higher level terraces of these delta deposits were made the streams were in part, at least, fed by ice melting.

On June 15, 1930, the conditions and phenomena noted at the Rhone mouth in Lake Geneva were also observed where the Lutschinen stream from the Lauterbrunnen valley empties into the Lake of Brienz at Interlaken. At this site the lake waters at the delta front were very shallow and the sediment load was so great that the advance of the front of the delta might be said to be quite entirely brought about by top-set beds. That is, there was the same abrupt checking of the current of the stream as with the Rhone but the Lutschinen was visibly transporting coarse gravel to the line of disappearance of the glacial flood.

In contrast with these conditions are those present at the mouth of the Cayuga Inlet stream that enters the south end of Cayuga Lake, New York. There the stream waters are, during spring and early summer, commonly warmer than the lake waters, especially in periods following a prevailing south wind. Consequently it is a conspicuous phenomena that the lake waters during flood flows of the Inlet stream are discolored for a half mile or more out from the mouth of the stream. The lake waters over this section are very shallow, the bottom having a very gentle slope. In this instance the colder lake waters appear to exert a significant effect in buoying up the finer sediment and giving it a wide-spread deposition.

In addition to their bearing on the interpretation of delta forms and deposits generally these observations may have some significance in relation to the conditions under which deposition of varved clays in glacial lakes comes about.

O. D. VON ENGELN

DEPARTMENT OF GEOLOGY,
CORNELL UNIVERSITY

SUFFOCATION POINT IN THE HORNED LIZARD, PHRYNOSOMA CORNUTUM

THE horned "toad" or horned "frog," as this lizard is commonly called, has won a great deal of publicity in recent years concerning its ability to withstand suffocation and starvation for long periods of time. The following article will serve to supply some definite information on its hardiness and lethal point in respect to suffocation. Two series of a number of different individuals each were used, and the results seem fairly consistent. One series was run in respiratory chambers where the carbon dioxide discharged by the animal was allowed to remain and accumulate, while in the other series, soda lime was used to absorb the carbon dioxide as it was produced.

The animals were placed in stoppered bottles, properly arranged to serve as respiratory chambers. The size of these chambers was between 900 and 1,000 cc in volume. When the animal had been kept in the respiratory chamber for the desired length of time at a known temperature and in a known volume of air, a sample of about 9.5 cc of the air was drawn from the outlet of the chamber directly into a portable Haldane gas analysis apparatus and analyzed for carbon dioxide and oxygen. The weight of the animal was also noted in each case. The samples were taken either immediately after the animal was dead or after it was in great distress, shown by labored gasping and struggling, which indicated that it would very soon die if allowed to remain in the chamber.

According to the results of these experiments, the animals which were actually carried through until death in the chambers where the carbon dioxide was allowed to accumulate consumed the oxygen down to a point where the air in the chamber contained between 4 and 5½ per cent. oxygen. Normal air contains about 20.93 per cent. oxygen. Carbon dioxide was produced in these chambers until it reached percentages ranging from 12 to 15 in different individuals at death, while normal air contains only approximately .03 per cent. The other animals included in the series, which were at their limit and would have died very soon, show an oxygen and carbon dioxide range that is very similar to the range for the ones which were killed.

The second series of experiments, where the carbon dioxide was absorbed, show the animals reaching the lethal point of suffocation only after the oxygen content of the respiratory chamber has gone down to 3.21 per cent. on the average. One or two individuals in the first series were able to survive until the oxygen content went down to about 4 per cent., but this was not the rule. It is seen immediately that the carbon dioxide effect is quite marked here.

The larger animals of course consume more oxygen and can survive a much shorter time than a smaller animal in a chamber of similar size. As would be expected, the temperature affects the rate of respiration quite sharply in this lizard, especially during the summer, and of course enters prominently into the