Archibald and Dr. B. O. Koopman have been promoted to assistant professorships of mathematics.

DR. ALBERT E. BULSON, JR., has been appointed head of the department of ophthalmology of the Indiana University School of Medicine, Indianapolis.

DR. JOSIAH BRIDGE, associate professor of geology in the Missouri School of Mines, has been appointed as research professor at Princeton University.

ASSISTANT PROFESSOR J. D. TAMARKIN, of Brown University, has been promoted to a full professorship of mathematics.

DR. ADOLPH FRAENKEL, professor of mathematics at the University of Marburg, has been called to the University of Kiel.

AT the University of London, Dr. Robert Donaldson has been appointed to the Sir William Dunn chair of pathology, tenable at Guy's Hospital Medical School. Dr. S. J. Cowell has been appointed to the university chair of dietetics, tenable at St. Thomas's Hospital Medical School.

DISCUSSION AND CORRESPONDENCE

THE VIABILITY OF ALGAE

SPHAERELLA *Sommerfeldt* is a familiar and widely distributed alga. During moist periods the single-celled plants grow and multiply rapidly, being green and free-swimming. With the evaporation of the water, the motile cells come to rest, change to red and are provided with a thick wall. In this state they may be found closely adhering to the substrate, sometimes so abundantly as to give the appearance of red paint. Cemetery urns, house gutters and even discarded household pans are not unusual places where the plants may be found. In the dry condition, the alga may become detached and blown by the wind to other localities, sometimes distant, there to resume the motile green state with the coming of another supply of water. Presumably these plants are enabled to withstand considerable drying out and for considerable periods of time, but little reliable information bearing on the longevity or viability of the resting cells, especially under adverse or extreme conditions of environment, appears to be available. Undoubtedly the ability to withstand desiccation is one of the factors which has led to the wide distribution of algae such as the one mentioned.

It has been reported[1] that certain living algae have remained viable in samples of soil which had been stored in bottles for varying periods of years, in two cases for as long as seventy years. The samples were apparently partially air dried before being sealed, and at the time of opening the bottles the water-content of the soils was found to vary from 3 to 5 per cent. in some samples, to 10 per cent. in others. In no case, however, was it thought that there was present sufficient water for active vegetative growth during the time of storage. The present writer has followed the history of a collection of Sphaerella pluvialis *Flotow* through a period of nearly seven years; and while the maximum period of viability has not yet been ascertained, the results are sufficiently interesting to warrant recording at this time.

The sample of Sphaerella which has been under observation was collected by Dr. Francis H. Herrick on August 18, 1921, from a pocket of granite in Georgian Bay, Canada. The scrapings consist of a mixture of small twigs, a few partly decayed coniferous needles and some rock fragments. When received, the material was very dry, and in this condition was placed in a glass bottle, corked, and has since been stored for most of the time on a shelf in a moderately illuminated room. Except for opening the bottle occasionally to remove material for testing, the bottle has been kept corked, and no water has been allowed to reach the contents. The material has been tested for viability at least once a year by adding water to a bit of the dried scrapings.

At the start, the time required for the red resting cells to become green and motile did not exceed twenty-four to forty-eight hours. As time has passed, the time for motility to be attained has become appreciably longer, as would be expected. At this writing, a test has just been completed, using both tap and distilled water. Under the conditions of room temperature and moderate light intensity, the time required to "come to life" is now a matter of six to seven days. Once activity has been manifested, multiplication becomes rapid and the culture jar becomes a chamber swarming with active forms; and within a day or two longer the water has a distinctly greenish cast. The motile algae obtained in this way have been under observation for a number of weeks and have been subjected to various tests. So far as can be observed, in spite of nearly seven years of storage, during which time the alga has been without water, there has been no apparent deterioration of the cells, and they behave quite as do freshly collected ones.

The writer hopes to continue at intervals his tests for viability on this culture to ascertain how long the alga will remain viable. It is possible that other dated collections of algae, which normally undergo a resting period, have been or could be tested for viabil-

[1] Bristol, B. Muriel, "On the Retention of Vitality by Algae from Old Stored Soils," *New Phytol.*, 18: 92–107, 1919.

ity. The writer would be glad to receive small samples of such collections, together with the accompanying data on collecting and storage conditions, for the purpose of testing the viability. He would like also to receive any information bearing on the viability of such algae, if any one has made such tests.

CHAS. H. OTIS

UNIVERSITY OF WISCONSIN

WHAT IS THE FIRST FOSSIL COLLECTED BY MAN?

THE question has been frequently asked, "What is the first fossil collected or handed down by man?" Mr. Barnum Brown, in *Natural History* (Sept.–Oct., 1926) again raises the query. He presents curious evidence for the "claims" of discovery or collection of a tooth of *Elephas antiquus* by the ancients of two thousand years ago. The tooth was associated with sculptures and figures covered by débris in the ruins of the Asklepieion, the ancient medical school of Hippocrates, the father of medicine. There is no doubt of this collection and preservation by the Greeks, and it is obvious that the fossil tooth was brought in as an object of some kind of singular interest. Was it recognized as an elephant's tooth? Perhaps so; for the Greeks were of keen intellect, and may not have made the pious blunder of those north Europeans of but a few centuries ago, who flattered themselves by reinterring the bones of a mammoth as one of their giant ancestors. Even yet, in some of the mountainous districts of China considerable quantities of fossil bone are ground up for medicinal use!

Nevertheless, a far older instance of "collection" is that of the petrified plant type of the Capellini Museum of the University of Bologna, known as *Cycadeoidea Etrusca*. This fossil was certainly handled by the Etrusci as an unusual object over four thousand years ago. It was refound just fifty years ago on one of those striking stone tombs of the ancient Etruscan burial ground or necropolis at Marzabotto on the estate of the Count Aria, in the valley of the Reno amid the foothills of the Apennines, about eighteen miles west of Bologna. Evidently it was regarded by the Etrusci as some great curiosity or rarely marked block of black flint, to thus be given a place of honor and remembrance on one of their tombs. Further up the hillside there is seen the base of a small temple of a stately simplicity, and of the same period as the necropolis, though discovered somewhat earlier. And as a further confirmation of such an antiquity there is noted on one side of the fossil an elliptical polished out depression about the size of a woman's hand, very possibly of even a neolithic date. Here is a memento of a civilization as old as that which "chiseled out its code on the black diorite of Hammurabi."

The specimen itself is a segment of a medium-sized cycadeoid stem of the columnar type, just nearing the close of its flowering season. There is a faithful *papier maché* reproduction at Yale University, as well as thin sections cut from the original. This historic fossil is structurally important and was one of the first of its group to yield evidence for a flower-bearing, instead of the cone-bearing habit so long supposed to characterize ancient and modern cycads alike. Indeed, it was one of the flowers cut from this very stem that yielded to Capellini and Solms the first pollen grains ever seen in the cycadeoids.

LOUISE SUDBURY

NEW HAVEN, CONN.

QUERY ON "A REVISION OF THE FUNDAMENTAL LAW OF HABIT FORMATION"

WHILE reading a paper with the above title by Dr. Dunlap[1] the writer of this note wondered if psychological research had ever availed itself of the abundant data which might be obtained from music-teachers. The most successful of modern piano-playing methods —Leschitizky's—is based on the principle that the pupil should *never be allowed to make a mistake.* Pieces taken the first time are played very slowly and with the utmost concentration upon absolute accuracy. "Make no mistakes," said the writer's teacher, at the *Thomasschule,* "but if you do, get up, walk three times around the room, say the *Vater Unser,* and kick yourself! Then go back to the piano and play the passage correctly twenty-five times!" Rapid practice is absolutely forbidden until the piece is thoroughly mastered. Experience seems to show that if the student never makes a mistake in any given piece, he will never be able to do so, even when performing under unusual pressure. There are at present hundreds of pianists in the world who can reproduce hundreds of difficult, complicated pieces with a note-accuracy of at least 99.99 per cent.—repertoires which involve anywhere from a quarter of a million to a million individual notes. On the other hand, experience seems to show that if a piece is practiced carelessly at first no amount of subsequent diligence will ever bring it into a state of reliable performance. Long after all errors have been eradicated in private practice they will come out again if the piece is played in public or under unusual pressure.

The idea, based upon Dr. Dunlap's paper, that one could correct errors and learn to play a piece right by practicing it wrong is so revolutionary and would, if applicable, save piano-students such a vast amount of weary practice that the writer devised a test ex-

[1] By Dr. K. Dunlap, SCIENCE, Vol. LXVII, No. 1736.