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.

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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.

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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.

periment on himself. In early youth he had often attempted pieces beyond his capacity and worked errors into his performances which later proved difficult to eradicate. One of these pieces—the Bach-Tausig "Toccata and Fugue in D minor"—was chosen for the experiment. A passage was selected which contained five "perilous points," *i.e.*, chords in each one of which a certain error was likely to occur. The writer practiced this passage, slowly and carefully, ten times daily, purposely putting in the wrong notes, for two weeks, trying meanwhile to impress himself mentally that this performance was wrong and should not be allowed in a regular rendition. On the fifteenth day the whole piece was attempted at a suitable tempo and—presto!—gotten over without an error. After several more perfect performances at intervals of a day or two the writer had the hardihood to attempt a final test by demonstrating the "perilous passage" to an advanced pupil. The result was disastrous and humiliating; every one of the carefully practiced mistakes turned up again!

Perhaps piano-playing is not exactly analogous to typewriting. Perhaps the conditions of this experiment were not correctly arranged. It may be that the laws governing ordinary habit-forming do not hold in performances which approach the upper limit of mental and manipulative dexterity. But if there is any way in which the idea of Dr. Dunlap's paper could be applied to instrumental practice the whole musical world would look up to him as a benefactor.

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GEOMETRICAL CONSTRUCTIONS ON THE SPHERE

THE Willson hemisphere is well adapted for the use of the individual student desiring to make constructions on the sphere. For demonstrating such constructions to a class it is, however, inconveniently small. To overcome this difficulty an opal glass light shade of spherical shape and about fourteen inches in diameter may be used. Such shades are commonly employed, one at the top of each lamp post, in parks and campuses. Lines may be readily drawn on them by using the type of pencil made especially for marking on glass. In addition to the advantage of large size, these globes represent considerably more than half of the sphere. If one desires to draw a great circle, a stretched string is a convenience, one end of the string being secured to a small rubber vacuum cup which will adhere to the spherical surface.

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SCIENTIFIC BOOKS

The Soils of Cuba. By HUGH H. BENNETT, soil scientist, Bureau of Soils, U. S. Department of Agriculture, and ROBERT V. ALLISON, formerly chemist and soil biologist, Tropical Plant Research Foundation. 101 illustrations. Pp. xxiv + 410. 4 maps, including large soil map of Cuba in folio with key to the principal soils of Cuba. Price, $6.25. Published by the Tropical Plant Research Foundation, Washington, D. C.

THIS book is a record of the most comprehensive study of the soils of a large tropical area that has been undertaken since the development of the more modern ideas on the investigation and classification of soils. After the introduction stating the reasons for carrying on the survey, the general characteristics of the soils are discussed, contrasts between most of the soils of this region and those of temperate climates being brought out. The basis for classifying the soils into families, series and types is considered. This is followed by descriptions of the soil series, the different related series being grouped into families.

The majority of the series, of which there are over ninety, are named for Cuban localities near which the soils were first studied and identified. Certain of the soils of western Cuba, however, are identical with and are described under the names of series occurring in the southeastern United States. Discussions and tables giving the results of chemical and physical studies of many of the soils are included. These include complete chemical analyses, studies of soil concretions (perdigon), H-ion concentration, base exchange values, mineralogical analyses and quantitative measurements of physical properties.

Following this are chapters on middle, eastern and western Cuba and the Isle of Pines. Each of the three Cuban areas is divided into a number of soil regions which are discussed separately. The profile characteristics of the important soil types of each region are described and the agricultural use of each discussed.

There is a short chapter on salt in Cuban soils and its relation to crop production. Another chapter deals with soil moisture studies. It appears that certain of the heavy clay soils through improper and infrequent cultivation have become so compact that they will hold very little water above the wilting point. There is also a chapter on the climate.

The final chapter dealing specifically with Cuban soils is given over to a discussion of the relation of soils to agriculture in Cuba. The importance of the soil type in agricultural studies is emphasized. The fact that different soil types respond to widely dif-