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.

G. WAKEHAM

UNIVERSITY OF COLORADO,
COLLEGE OF MUSIC

## 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.

H. R. GRUMMANN

DEPARTMENT OF MATHEMATICS,
WASHINGTON UNIVERSITY

## 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-