about three thirty-seconds of an inch bore, "drawn" enough in one place to make the water level appreciably above D at slow rates of drop. A jar seven or eight inches high and three or four inches wide will be plenty large enough for T, and V need not be so tall.

I have made a number of record tests of the time accuracy of the drop, and find that it is perfectly reliable for one second to one eighth second, as shown by comparison with a 256-vibration fork. The drop will run much faster than one tenth second, if the size is properly controlled by the means mentioned above, but my key is too clumsy to record well much beyond one eighth. With a slight change in the key that difficulty will be obviated. From one second to six seconds my first records showed an apparent variation. These records for the longer periods were not intended to be extremely close, and were taken with a Zimmermann chronograph. I found later that the variation was in the chronograph, and have not yet tested these intervals with the tuning fork. Compared with a pendulum record, they appear perfectly regular. Intervals longer than six seconds I have not employed at all, although the apparatus is capable of furnishing them.

This device may be put to a variety of uses about a psychological laboratory. In addition to work in rhythm, I find it useful for time-records on the kymograph, for intermittent stimulation in work in fluctuation of attention, and for a time guide for an experimenter in the employment of definite intervals of preparation for a stimulus or between successive steps of an experiment. The key may be adjusted to give a regularity of current strength far greater than that of even mercury contacts of other time machines, making the apparatus especially valuable where this condition is of great importance, as in the rhythm and attention experiments.

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On Quinine Sulphate and Human Blood

Quinine sulphate when administered in small doses to healthy students has been found generally to slightly increase the phagocytic action of the polymorphous mentrophiles but in some cases it slightly inhibits.

In vitro an inhibitory effect, together with some laking was found when the strength of the sulphate ranged from 1/1,000 to 1/15,000 while from 1/16,000 to 1/1,000,000 dilution there was increased phagocytosis in periods ranging from 30 to 60 minutes, being most marked at a strength of 1/75,000. There was noted in all suspensions, which contained more than 1/20,000 of quinine sulphate, a marked absence of the granules from the polymorphous neutrophiles. The cell membrane was often gone. Vacuoles were very frequently present. As contrasted with those in the unquinized specimens their cytoplasm showed diminished staining powers which was strong evidence of the destructive action favored by the quinine.

A simple method requiring only a few hours for its accomplishment has also been worked out for studying in vitro the effect of any drug on opsonic index and in connection with the latter subject a means of standardizing the virulency of any organism has been suggested.

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Botanical Notes

Farm Botany

For botanists who may wish to learn something more about wheat, oats, barley and corn (maize) than is to be found in the ordinary botanical works, the little book, "Examining and Grading Grains" (Ginn), by Professors Lyon and Montgomery will be found useful. Many a botanist will be surprised at the number of things which may be seen in a careful study of these common plants. For classes in applied botany in agricultural schools and colleges it must prove very helpful.

Fossil Iowa Plants

Professor Macbride's paper on "Certain Fossil Plant Remains in the Iowa Herbar-

ium" is an interesting contribution which appeared recently in the *Proceedings* of the Davenport Academy of Sciences. It is accompanied with a dozen excellent plates. Several new species are described, namely, *Sigillaria calvini, Psaronius borealis,* and *Araucarioxylon occidentale.* Two modern species are recognized, viz.: *Picea mariana* from beneath the drift in Washington county, Iowa, and *P. canadensis* from the base of the blue clay in Keokuk county.

OUR FOREST RESERVES

UNDER the title of "The Use of the National Forests" the United States Forest Service has issued a booklet of forty-two pages, giving much information in regard to the National Forests (forest reserves), and intended to explain concisely what they are for, and how they should be used. A few well-selected half-tone reproductions of suggestive photographs add materially to what must prove to be a very useful publication.

HISTORY OF AMERICAN BOTANY

IN the June number of *The Popular Science Monthly* Professor Underwood publishes an entertaining account of the "Progress of our Knowledge of the Flora of North America," illustrated by half a dozen reproductions of plates from the old works of Porta, Bock, Cornut, Plukenet and Micheli, and a facsimile of a page of Linne's "Species Plantarum." The paper is well worth reading, especially by the younger botanists, who had no part in the work of the last half of the nineteenth century.

SOUTH DAKOTA CONIFERS

A BULLETIN of more than local interest is No. 102 of the South Dakota Experiment Station, devoted to "Evergreens for South Dakota." It was prepared by Professor Hansen, and brings together the results of many years of experience upon the prairies and plains of the northwest. While the treatment is necessarily quite popular, the bulletin contains much information which must prove useful to the botanist who is interested in the relations of climate, soil and other physical factors to the distribution of species. No botanist can run over these pages without finding that some of his notions as to the distribution of the conifers must undergo material change. Twenty-six half-tone illustrations help the reader to a better understanding of the text.

SEEDS OF COMMON GRASSES

MUCH like the foregoing is bulletin No. 141 of the Kansas Experiment Station, in which Professor Roberts and Mr. Freeman discuss and illustrate the seeds of certain common grasses, and the common adulterants and substitutes. Here again the botanist who is interested in a critical knowledge of plants may obtain many hints as to the usefulness botanically of such work as this in our experiment stations, when done as carefully as this seems to have been. Few systematic botanists have that accurate and detailed knowledge of the "seeds" of grasses which was necessary in the preparation of this bulletin. It may indeed be considered a valuable contribution to the morphology of systematic botany, as well as a helpful bulletin for the practical farmer.

A TROPICAL SCHOOL OF BOTANY

PROFESSOR DOCTOR KELLERMAN, of the Ohio State University, Columbus, Ohio, has planned a tropical school of botany for next winter, which ought to attract the attention of some of our young men who are fitting themselves for their life work as teachers of botany. The session extends from December 19 to March 19, and will be held in Guatemala, Central America. The camps will be located at Zacapa (100 miles from the coast), Los Amates (40 miles inland), Izabal (on Lake Izabal), and perhaps also at Livingston (on the coast). Only a small number of young men will be accepted, and those who intend joining are advised to do so at the earliest day possible. The fee for the three months, including traveling expenses, board and lodging, is $226.00. The project is one that should be of interest to botanists generally, as affording excellent opportunities for instruction along unusual botanical lines.

DR. MAXWELL T. MASTERS

THE July number of the *Journal of Botany* (London) contains a portrait and short account of the life of the late Dr. Maxwell T. Masters, the well-known English botanist, who died on the thirtieth of May last, at the age of seventy-four years. He wrote "Vegetable Teratology," a book that for nearly forty years has been the standard and practically the only work on the subject. He was also the editor of the *Gardeners' Chronicle*, perhaps the foremost horticultural journal in the world.

PROGRESSUS REI BOTANICAE

ANOTHER *Heft* (3) of Dr. Lotsy's "Progressus Rei Botanicae" (pub. by Fischer, Jena) has made its appearance. It carries the first volume from page 533 to its conclusion (p. 642), and contains but one article (by R. P. van Calcar) "Die Fortschritte der Immunitäts- und Spezifizitätslehre seit 1870."

NEW EDITION OF CAMPBELL'S BOTANY

AFTER five years the Macmillans bring out a second edition of Campbell's well-known "University Text-book of Botany." So well written was the first edition that it was not necessary to make many changes in the text; in fact the new book is so little different from the old that it may be used in the same class with no inconvenience. It is practically the best general text-book to-day for the American student of advanced botany.

EXPERIMENTS ON THE INFLUENCE OF LIGHT

IN the October *Annals of Botany* Professor Peirce records certain experiments made by him to determine the kind and amount of irritability of certain young plants in relation to light. Although his experiments were interrupted before completion (by the San Francisco earthquake) he shows that as the direction of illumination is usual or unusual certain plants have their normal form, or some other wholly different. "It is evident," he says, "that unless the young plants developing from the spore are exposed to influences like those under which their parents developed, they will be unlike their parents." A broader statement of this conclusion is that "certain physical factors of the environment, constant or periodic but unchanging, constitute means of repeating parental characters generation after generation, and these environmental influences are as essential as the substance. Given the same chemical compounds and the same arrangement of these in the fertilized egg as in the parents, the young must be like the parents *if* their environment is the same." The paper is well worth careful reading, and it is to be hoped that Professor Peirce will be able soon to resume his abruptly interrupted experiments.

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CONCILIUM BIBLIOGRAPHICUM

DR. HERBERT HAVILAND FIELD is visiting this country in connection with the Zoological Congress and the interests of the Concilium Bibliographicum of Zurich. Visitors to the Congress will find a set of the cards of this great zoological catalogue on exhibition in the Harvard Medical School. There is also a complete set arranged to date in the American Museum of Natural History. A duplicate set in the American Museum is available for immediate orders.

Dr. Field is seeking to organize the business affairs of the Concilium on a somewhat more permanent basis by the appointment of a director, on a salary to be fixed by American trustees, the director to administer the affairs of the Concilium without any pecuniary interest in its profits or losses, but solely with the interest of maintaining the high character of the bibliographical work which it has already accomplished. For this purpose and for the general expenses of the Concilium an annual sum of $5,000 is needed either from an endowment fund of $100,000 or from a special annual subscription fund.

It seems appropriate that a special effort should be made by American zoologists to raise such a fund in order to further the interests of the Concilium, which reflects such great credit upon this country as well as upon the Swiss government, which has so cordially