devote a greater period of time to the work, while three conservatives prefer to view it as the balm for the doctorate candidate who is to be discouraged. Some readers may feel that the master's degree at present, as well as in past years, is largely meaningless. To the writer, however, the intergrading viewpoints expressed above as to the functions and requirements of the degree are in part at least responses to the prevailing atmosphere of the institutions granting them, and the largely local demands they feel they must meet. This is especially true of the colleges which have the troublesome care of graduate assistants.

As regards the time required in residence for completion of the requirements of the degree, sixty-one institutions indicate one year as the minimum period of study, while but two require two years. Thirty-one believe that the period of study should be prolonged beyond the normal time and generally to a period of two years in the case of assistants in instruction. Three limit the amount of service to be engaged in (three to fifteen hours), if the candidate desires to complete his work in one year, while but eighteen state that special consideration will be given the exceptional student if he endeavors, despite assistant's duties, to complete the work in the minimum period.

N. M. GRIER

DARTMOUTH COLLEGE

SAND FLOTATION

THE article on "Sand Flotation in Nature" given in SCIENCE for April 16, 1926, reminds me of certain observations I made on this phenomenon about twenty-five years ago. Surface tension is evidently the explanation of this flotation, but what especially interested me was the question how the sand, not necessarily in very fine grains, came to be deposited on the surface of the water so gently as to remain there. I found by observation that, in some cases at least, this occurs as follows: A gentle ripple, perhaps the last movement of a broken wave, runs up a beach, covering sand that has been dried and heated by the sun. As the water recedes, the very edge of it has a rolling motion, rolling toward the sea, and in this revolution it picks up some of the sand particles, probably by creating a partial vacuum over them for a moment, and then floats them off.

I have successfully imitated nature in this maneuver, using well-dried and perhaps slightly greasy sand in a domestic baking-pan. It is my impression that I published an account of all this in the *Youth's Companion*, probably about 1901.

EDWIN H. HALL

HARVARD UNIVERSITY

REQUEST FOR PUBLICATIONS IN THE FIELD OF ATMOSPHERIC ELECTRICITY

WE are planning to write an extensive treatise on atmospheric electricity and allied phenomena which will be published next year.

On account of the unfortunate shortage of funds of the libraries in the Austrian universities it is extremely difficult for us to obtain all journals and especially the bulletins and proceedings of the scientific institutions and societies in foreign countries.

It would be a great help to our work if the physicists and meteorologists in all English speaking countries would kindly send us reprints of their publications pertaining to atmospheric electricity including electric field of the earth and atmosphere, ionization of the atmosphere, thunderstorm electricity, electric properties of rain and snow, radioactivity of the earth and atmosphere, rays of cosmic origin, electric currents in the atmosphere, polar light, theories of the origin of the atmospheric-electric phenomena and propagation of electric waves around the earth.

All colleagues who are willing to assist us are asked to send reprints of their publications to the address given below.

H. BENNDORF
V. F. HESS

PHYSIKALISCHES INSTITUT,
UNIVERSITÄT GRAZ (AUSTRIA)

SCIENTIFIC BOOKS

Researches on Fungi. Vol. III, The Production and Liberation of Spores in Hymenomycetes and Uredineae. By A. H. REGINALD BULLER. Longmans, Green and Co., 1924. pp. 611.

THIS is the third volume of Buller's "Researches on Fungi," and at least one more is promised. It takes an ambitious, resourceful and trained scientist to turn out, as a side issue to teaching, work of the character of these books. The latest volume contains 611 pages of descriptive matter, including the table of contents and general index, and is illustrated with two hundred and twenty-seven drawings and photographs about equally numerous. The text includes not only observations made by the writer and his pupils, but also reference to work of previous investigators.

The book is divided into two parts of which Part I is by far the larger. This deals in the first eleven chapters with a technical discussion of the production and liberation of the spores in the Hymenomycetes; chapter XII treats of luminescent fungi; chapter XIII, with parasitic agarics; chapter XIV, with nocturnal spore discharge. Part II is concerned with the production and liberation of basidiospores in

the Uredineae. A summary of each chapter at the end of the book gives the hurried reader a chance to grasp the main features of the work. The book is dedicated to the long and favorably known English mycologist, William P. Grove. Space does not permit a detailed outline of the work, but some general idea of the fungi dealt with can be seen by the following short summary.

The Psathyrella sub-type of mushrooms is illustrated chiefly by *Lepiota cepaestipes* which takes twenty-two pages of descriptive matter, while *Lepiota procera* occupies six more of the first chapter, and *Psathyrella disseminata* takes up the second chapter of thirty-one pages. Chapter III deals with the Bolbitius sub-type, chiefly *B. flavidus,* and a comparison with the fruiting body of the genus Coprinus. The IV chapter treats, in more or less detail, with *Armillaria mellea, Marasmius oreades, Amanita rubescens, Amanitopsis vaginata,* Collybia sps. (chiefly *C. radicata*), *Pluteus cervinus* and *Nolanea pascua.* Chapter V is short, dealing with another sub-type illustrated by Inocybe. Chapters VI to XI, comprising two hundred and thirty-nine pages, treat of the Coprinus like fungi of which details are given of *Psathyra urticaecola, Coprinus plicatilis, C. comatus, C. sterquilinus* (treated in detail), *C. atramentarius, C. stercorarius, C. picaceus, C. lagopus* and *C. micaceus.*

The remaining chapters of this first part deal with the toadstools from a different point of view. For example, chapter XII treats of bioluminescence, giving detailed observations made on *Panus stypticus* form *luminescens,* found in North America, the European representative of this species apparently being non-luminous. A list of eighteen luminescent mushrooms is given and short notes are included on other fungi, bacteria and animals in which this phenomenon has been observed. Chapter XIII deals with fungi parasitic on other fungi, details being given of those agarics found on other agaric species. The final chapter treats of the nocturnal spore discharge of species of Pleurotus and a method of detecting it by an electric hand-lamp.

Part II of the book is comparatively short, dealing with the Uredineae in three chapters. The first of these considers the phenomena of spore discharge as illustrated by species of Puccinia, Endophyllum and Gymnosporangium. Chapter II discusses the teleutospore and the curvature of its basidium in relation to the dispersal of the basidiospores, illustrated chiefly by the germination of *Puccinia malvacearum.* Chapter III concludes the work with a discussion of spore walls and the dispersal of spores by water and wind.

While on the whole these books of Buller's are of chief value to the mycologist, there is much of interest to the general student of nature. Manitoba seems very remote even to an American, yet when an English trained botanist makes it his home and turns out such stimulating and exact work, we realize more fully than ever that the man, rather than the environment, counts most.

G. P. C.

Tales of Fishing in Virgin Seas. By ZANE GREY, author of Tales of Fishes, etc., etc. Harper & Brothers, New York.

ZANE GREY'S "Tales of Fishing in Virgin Seas" is an angler's book de luxe. It is elegantly printed on fine paper in large clear type, with a hundred illustrations, handsome and instructive. It describes in detail a three months' cruise of a three-masted schooner from Nova Scotia, answering to the name of *Fisherman* (née Marshal Foch). The angling described was all for giant fish of the open sea, especially sword-fish, sail-fish, marlins, tunnies and albacores. Incidentally also were taken groupers (garrupa), barracudas, onos (Acanthocybium) papagallos (Nematistius) Cavalla (Caranx), and others of less note and size.

To the ichthyologist the book is welcome as it gives records of these giants in waters which had never been fished before. Of a new species of sail-fish or volador, described by the writer in a paper now in press, a hundred or more were caught by Mr. Grey and his associates, and several excellent photographs are presented. Useful accounts are given of the ways of several of the marlins ("Marlin spike-fish") and of the yellow finned tunnies. A black marlin similar to others of Hawaii and Japan (Makaira mazara) was obtained off Guerrero in Mexico, and a good photograph given. Some other species may be new to science, but without good photographs one can not be sure. It is from photographs only that we can define most of these species, as mounted examples and casts must remain rare, and a black marlin of half a ton or more, or even a sword-fish of half that size, does not rest comfortably in a bottle.

DAVID STARR JORDAN

SCIENTIFIC APPARATUS AND LABORATORY METHODS

OIL-WATER MODELS ILLUSTRATING SURFACE FORCES AND FILMS IN BIOLOGICAL PHENOMENA

THE following models have been found useful as demonstration experiments in connection with the courses in pharmacology in this laboratory. They simulate the phenomena of Brownian motion, ameboid motion, pseudopod formation, contractility, cytolysis, chromatolysis, phagocytosis, anesthesia and selective swelling. The phenomena of adsorption, diffusion,