but we are convinced that it is possible, by consultation and conference, to secure a cooperation thus limited which will prove beneficial to industrial education in general, as well as to the particular work of both institutions. By the more frequent interchange of instructors, by allowing to the advanced students of each institution such privileges of instruction in the other as may be practicable, by the common use of valuable apparatus, by the participation in University and Institute seminars of instructors and students of both institutions, by giving advanced courses of lectures to the combined classes of both institutions; perhaps by mutual agreement from time to time tc relegate certain branches of instruction to one of the two; by carrying out together advanced engineering researches and tests,—by these, and by various other ways that will suggest themselves, much may be accomplished in harmonious effort which should be highly beneficial to both the University and the Institute. This development, however, must be a growth. It can not be forced, as the proposed agreement would attempt to force it, for it is in the nature of continuous experiment, presenting problems for the solution of which no data exist.

SCIENTIFIC BOOKS.

Madreporaria, Parts III. and IV. By J. Stanley Gardiner, M.A., etc. (From 'The Fauna and Geography of the Maldive and Laccadive Archipelagoes,' Vol. II., Supplement I., pp. 933–957, pls. LXXXIX–XCIII.)

The first installment of Mr. Gardiner's report on the Madreporaria from the Maldive and Laccadive Archipelagoes has already been reviewed in the columns of this journal.* The second installment, which has just been received, contains an account of the Fungida and Turbinolidæ.

* Vol. XX., No. 511, pp. 503–505, October 14, 1904.

III. Fungida.—548 specimens, besides a number of young forms and fragments, were obtained. These are divided into 27 species and 2 varieties, representing 15 genera; against 24 species and 9 genera reported by Klunzinger from the Red Sea, and 15 species and 7 genera found by the author in the Pacific.

The following is a list of the genera with the number of species referred to each, and the names of the forms considered new: *Psammoseris,* 1; *Siderastrea,* 4, *S. maldivensis,* nov.; *Agaricia,* 1, *A. ponderosa,* nov., + var. *minikoiensis,* nov.; *Fungia,* 3; *Podobacia,* 1; *Halomitra,* 1; *Herpetolitha,* 1, *H. simplex,* nov.; *Cycloseris,* 2; *Diaseris,* 1; *Pavonia,* 1; *Leptoseris,* 3, *L. incrustans,* nov.; *Echinophyllia,* 1; *Pachyseris,* 1; *Coscinarœa,* 2, *C. donnani,* nov.; *Psammocora,* 4; *P. divaricata,* nov.

Mr. Gardiner does not follow von Marenzeller in referring *Stephanoseris* to the synonymy of *Heterocyathus* and *Psammoseris* to that of *Heteropsammia,* but combines *Stephanoseris* and *Psammoseris* under the latter name. He goes further and puts the type species of *Psammoseris* (*P. hemispherica*) in the synonymy of the type species of *Stephanoseris,* which was originally described as *Heterocyathus roussœanus.*

I somewhat doubt the correctness of the generic determination of *Siderastrea clava, S. lilacea* and *S. maldivensis.* Mr. Gardiner calls attention to these 'having in their surface parts the thecæ of neighboring calices quite separate from one another, joined together only by costæ, instead of fused together into a single dividing wall.' This difference did not escape his attention.

Mr. Gardiner himself doubts his *Agaricia ponderosa* really being an *Agaricia.* I feel rather confident that it is not an *Agaricia.* The type species of the genus is *A. undata* (Ell. & Sol.) Lamk; the type specimen is in the Hunterian Museum, Glasgow, where I have seen it and Professor J. Graham Kerr has kindly sent me photographs. The genus can be briefly characterized as follows: *Corallum* compound, thin, foliaceous. *Common wall* imperforate, naked, finely striate; no differen-

tiated corallite walls. *Calices* forming more or less definitely concentric series, which are bounded below by a subcalicular swelling or ridge; there is no swelling or ridge above, the septo-costæ running directly to the next series. Septa well developed, distinctly radiate, imperforate. *Columella* a single tubercle. *Agaricia fragilis* (Dana) agrees in generic characters with the type and is a closely related species.

I think that Mr. Gardiner's criticism of Professor Döderlein's monograph, 'Die Korallengattung Fungia,' is in some respects too severe. He says: "It is quite clear that that author [Döderlein] has, generally speaking, no scientific basis for his description of 'varieties.'" The word variety is difficult to define in a manner that will be satisfactory to all systematists, and Mr. Gardiner himself is guilty of an inconsistency. Under *Fungia dentigera,* he speaks of 'a true variety, the separating characters of which are discontinuous.' If the characters are discontinuous, the specimens belong to a distinct species. Mr. Gardiner in Part I. of his 'Madreporaria of the Maldives and Laccadives' says 'discontinuous or specific' variation. Variation in corals is so complex and its causes are so little understood that one should be very lenient in criticizing the efforts of a fellow worker to handle its phenomena. There are mistakes in Döderlein's work; some of his varieties can not be maintained by any of the usually accepted canons of zoological nomenclature, but his work is earnest and he has much advanced our knowledge of the genus *Fungia.*

I am glad to see that Mr. Gardiner considers *Podobacia* a valid genus, and heartily agree with him in that course.

As regards *Cycloseris* and *Fungia,* I agree with Döderlein. The only possible basis for their separation into two genera would be in *Cycloseris* having originally only six primary septa and *Fungia* twelve. The validity of this character is extremely doubtful, as it rests on a very slim foundation.

Without entering into a discussion of my reasons, I will state that I believe Quelch was correct in uniting *Cycloseris* and *Diaseris,* and, as stated in what precedes, I agree with Döderlein in combining both with *Fungia.*

IV. Turbinolidæ.—The number of specimens collected is not given. Six species, representing 4 genera, are referred to the Turbinolidæ. They are *Flabellum,* 2, *F. multifore,* nov.; *Tropidocyathus,* 1, *T. cooperi,* nov.; *Heterocyathus,* 1; *Paracyathus,* 2.

Mr. Gardiner's paper is an important contribution to the literature of reef corals. He gives valuable notes on variation, careful descriptions and figures all the forms described as new and several of those referred to previously described species.

The studies being made on the coral faunas of the Pacific and Indian oceans are bringing out many interesting facts of their geographical distribution. I have just completed a study of the Hawaiian Fungida, and may be pardoned for comparing them with those from the Indian Ocean. The following is a list of the species, with notes on their occurrence elsewhere: *Fungia* (*Cycloseris*) *patella* (Ell. & Sol.), east coast of Africa, etc.; *Fungia* (*Diaseris*) *fragilis* (Alcock), Indian Ocean; *Fungia scutaria* var. *dentigera* Leuckart, Indian Ocean, etc.; [*Fungia oahensis* Döderlein; *Fungia paumotensis* Stutchb. (*fide* Quelch), Philippines, etc.; *Fungia echinata* (Pallas) (*fide* Studer)]* Indian Ocean, etc.; *Bathyactis stephana* Alcock, Indian Ocean; *Stephanaria stellata* Verrill, Panama; *Stephanaria* n. sp.; *Pavona varians* Verrill, aff. *P. repens* Brüggemann; *Pavona* n. sp.; *Leptoseris* (1) n. sp., aff. *L. fragilis* M. Ed. & H.; *Leptoseris* (2) n. sp.; *Leptoseris* (3) n. sp., aff. *L. papyracea* (Dana); *Leptoseris* (4) n. sp.; *Psammocora,* aff. *P. superficialis* Gardiner.

A fair proportion of the species actually occur in the Indian Ocean, some as far west as Africa, or have there analogues so similar that specific separation is doubtful. As would be expected, the Panamic fauna is represented to some extent.

T. WAYLAND VAUGHAN.

May 15, 1905.

* I have not seen specimens of these from the Hawaiian Islands, but the type of the first is from there.