Bryophytes." "In the mosses * * * the persistence of the motile spermatozoid indicates the derivation of the Archegoniates from aquatic ancestors." "The Pteridophytes, also, show traces of an aquatic ancestry in the development of spermatozoids, which require water in order that they may reach the archegonium."

"Of the Spermatophytes the Gymnosperms are obviously the lowest types, *i. e.*, they show more clearly their derivation from the Pteridophytes." "The Angiosperms are preeminently the modern plant type. These have largely crowded out the other earlier types of vegetation, and at present comprise a majority of existing species." "It is among the Angiosperms that the plant body reaches its highest expression. In the keen struggle for existence among the manifold forms of plants the Angiosperms have shown themselves to be extraordinarily plastic, and have developed every possible device to enable them to survive this fierce competition."

We need quote no more from this very suggestive and very readable book. Every botanist and every earnest botanical student will read it with interest and profit.

CHARLES E. BESSEY.
THE UNIVERSITY OF NEBRASKA.

*Die Spiele der Menschen.* Von KARL GROOS. Jena. 1899.

Professor Groos follows up his work on Animal Play with his promised book on Human Play. He divides this last work into two sections, the first discussing the facts of play under headings, Touch Plays, Temperature, Hearing, Sight, Motor Plays of various kinds, and purely psychic plays; the second, discussing theories of play under headings, Physiological, Biological, Psychological, Æsthetic, Sociological and Pedagogical. The general grouping of facts is, as regards biological results, into activities which serve as exercise and those which serve as display in impressing others—that is in the two divisions, where individual significance is dominant, or social significance. Of course, this is a quite objective classification; the child not consciously taking exercise—this being really work—but continuing the activity for its immediate pleasurableness. The showing-off play is largely consciously such; there is here more of the subjective and teleological factor.

Under Hearing and Sight Plays Professor Groos is quite full and interesting, really giving in outline the evolution of these senses in the race and individual. We might ask why he divides Hearing Play into passive and active, and not other sense plays. The child is, indeed, diverted either by your singing, or by his singing to himself, but also both by your passing things before his eyes and himself passing things before his own eyes. Later he both looks at pictures in books and draws pictures for himself. Indeed, it is plain that gratification of any sense may be either active or passive, the active side leading off into art activity and art work.

Professor Groos's account of Motor Plays is hardly as full and satisfactory as that on Sense Plays. We find here, as elsewhere, too often a heaping-up of facts and of quotations with very cursory interpretation. Thus (p. 95) he rather hastily lumps the American habit of gum chewing with betel-chewing, and with the habit of chewing bits of sticks and grass, as motor plays for jaws and tongue. But while it is plain that the gum-chewer may use a piece gum as a mouth-plaything, yet to a large extent gum chewing is merely a morbid nervous habit, or a means of gratifying sense of taste, and in both these ways not play. So also the athlete who chews gum or other articles during a football game is not in this playing. Chewing is only play when it is chewing for chewing's sake, and not as a mere relief from nervous tension, or for taste pleasure or to help endurance and grit.

Professor Groos rightly regards the psychological mark of play not as imitation, but as direct pleasurableness. The mere biological activity comes first as outcome of bare physiological impulse; thus the infant grasping indefinitely feels something soft, experiences pleasure and keeps handling the object. Objectively and biologically all this activity is play, but psychologically only the later half (p. 95). As to physiology, "Es sind zwei Hauptprincipien, die eine psychologische Theorie des Spiels beherrschen müssen, das der Entladung über-

schüssiger Kräfte und das der activen Erholung erschöpfter Kräfte." The æsthetic social point of view is enlarged on throughout much in the same way as in his previous work.

In general the remarks we have made on Professor Groos's previous work (*Psychological Review*, Vol. 6, p. 86 ff.) apply also to this. The last book is larger, fuller and more cautions, but it lacks in clearness and directness and penetration. Though sometimes suggestive, it is rarely illuminating. Very comprehensive and learned, it is useful as a summary and discussion, but it has not the vitality of real research. The book is swamped in quotation, and we have more a history and discussion of opinion than a first-hand investigation. Though by bringing in everything of the least relevancy Professor Groos attains a certain completeness, it is greatly to be doubted whether in breaking ground in a new subject this is the most useful method. The foundations for a real science of play can only be laid by the direct detailed study of the life-history of the individual, the results being made to an extent verifiable by the photograph and phonograph.

HIRAM M. STANLEY.

BOOKS RECEIVED.

*The Elements of Practical Astronomy.* W. W. CAMPBELL. New York and London, The Macmillan Company. 1899. Pp. xii + 264. $2.00.

*Nature Study for Grammar Grades.* WILBUR S. JACKMAN. New York and London, The Macmillan Company. 1899. Pp. 407. $1.00.

*The Fairyland of Science.* ARABELLA B. BUCKLEY. New York, D. Appleton & Co. 1899. Pp. x + 252. $1.50.

*Electricity in Town and Country Houses.* PERCY E. SCRUTTON. Westminster, Archibald Constable & Co. 1899. 2d Edition. Pp. xii + 148.

*Report of the Commissioner of the United States Commission of Fish and Fisheries.* Pp. clxxv + 350.

*Corn Plants.* F. L. SARGENT. Boston and New York, Houghton, Mifflin & Co. 1899. Pp. 106. 75 cts.

*Anglo-American Pottery.* E. A. BARBER. Indianapolis., Ind., Press of the Clay Worker. 1899. Pp. xix + 161.

*Photographic Optics.* R. S. COLE. New York, D. Van Nostrand Company. 1899. Pp. 330.

*SCIENTIFIC JOURNALS AND ARTICLES.*

*The Botanical Gazette* for April contains the following leading articles: 'A Conspectus of the Genus *Lilium*,' by F. A. Waugh, which brings together and organizes the widely scattered material; 'Some Appliances for Elementary Study of Plant Physiology,' by W. F. Ganong, in which are described, with figures, a temperature stage, a clinostat, a self-recording auxanometer, an osmometer, a respiration apparatus, a germination box, a transpiration device, the graduation of roots, tubes, etc., and a root-pressure gauge; 'Oogenesis in *Pinus Laricio*,' by Charles J. Chamberlain, a paper with plates, in which the following results are announced: The ventral canal cell occasionally develops as an egg; the chromatin of the egg nucleus takes the form of nucleoli which finally collect from all parts of the nucleus to a definite area near the center and there develop into a typical spirem; the chromatin of the two sexual nuclei is in the spirem stage at fusion; the fate of the spindle indicates that the kinoplasmic fibers arise through a transformation of the cytoplasmic reticulum; a continuation of 'The Ecological Relations of the Vegetation of the Sand Dunes of Lake Michigan,' by Henry C. Cowles, the present part, profusely illustrated, discussing the encroachment on preexisting plant societies and the capture of the dune-complex by vegetation. Under 'Briefer Articles' Julia W. Snow describes (with plate) the life history of a new Ulvella (*U. Americana*), and Bradley M. Davis discusses recent work on the life history of the Rhodophyceæ. The number closes with the usual reviews, notes for students and news.

*American Chemical Journal*, April, 1899. 'On the Hydrolysis of Acid Amides:' By I. Remsen and E. E. Reid. The rate of hydrolysis of a large number of acid amides was compared and certain groups or positions of groups were found to exercise a marked influence on the reaction. In general the results agree with those obtained in the study of the rate of formation of ethereal salts. Ortho groups were found to exert a very marked 'protective' influence in many cases. 'Aliphatic Sulphonic Acids:' By E. P. Kohler. The author describes the preparation and reaction of (1) brome-