its prophylactic value, and possibly its wide application for promotion of the health, vigor and increase of economic value of birds, particularly under certain unfavorable climatic conditions or during winter months.

However, these results are far from final. At present it is even impossible to predict with appreciable accuracy the prophylactic, therapeutic or economic application of this method in poultry production. More thorough work under well-controlled conditions is needed towards the evaluation of the exact influence of other factors involved in this method of ionization of air, such as production of ozone, nitrous compounds and possibly thermal effect, presence of ultra-violet, x-rays, etc., and then the standardization of ionic concentration, doses and duration of exposure of birds of various ages and physical state of health.

In general, the initiative of Professor Tchijevsky and his co-workers is of significant biological interest. It may serve as an inspiration to those who wish to attack the problem and to get some definite and perhaps useful results. There are many possibilities, however, not only in animal production but in various fields of animal and plant economic biology. Moreover, it suggests a wide field of research in relation to medicine, preventive and curative.

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## EXPERIMENTAL ADAPTATION OF FRESH-WATER CILIATES TO SEA WATER

YOCOM[1] maintains that he has not been able to find any record of an attempt to adapt fresh-water ciliates to sea water. He obviously overlooked Finley's paper. Finley[2] asserts that he tested fifty species of fresh-water protozoa and that he succeeded in adapting twenty of them, including *Paramecium aurelia* and *Paramecium caudatum*, to pure sea water, with no significant change in the morphology and only a "relatively slower pulsation of the contractile vacuoles."

I have repeated Finley's experiment several times, using *Paramecium caudatum* and *Paramecium multimicronucleatum*, but I was unable to confirm his contention. The animals always died when the concentration of sea water approached 40 per cent. There were also marked changes in the morphology of the animals, and there was a marked decrease in the frequency of the pulsations of the contractile vacuoles. I hope to publish a more detailed account of these experiments in the near future.

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## DISTRIBUTION OF SEPARATES OF CERTAIN PAPERS BY THE LATE DR. BASHFORD DEAN

THERE have been placed in my hands, by Mrs. Bashford Dean, for distribution among students of fishes, certain reprints of Dr. Dean's studies on the archaic fishes, found among his effects after his untimely death.

If research men who are interested in the morphology, anatomy and embryology of the cyclostomes, sharks and ganoids will go through Dr. Dean's bibliography either in Vol. 1 of the "Bibliography of Fishes" or in Art. 1 of the Bashford Dean Memorial Volume, and will indicate to me what articles they desire, I will forward these so far as they are available.

It may be some time before the actual sending out can be done, but I should like to have all requests in before the distribution is begun.

E. W. GUDGER
AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK, N. Y.

# SCIENTIFIC BOOKS

## PRIMITIVE LAND PLANTS

*Primitive Land Plants, also known as the Archegoniatae.* By F. O. BOWER. Macmillan, London, xi + 658 pp. 465 ill. Price, $8.00.

PROFESSOR BOWER may be said to have devoted a long life of research chiefly to those plants collectively known as the Archegoniates, that is, to the mosses, liverworts, ferns and so-called fern-allies—the club-mosses and horsetails. Any intelligent person working in this field would naturally be much concerned with the beginnings of land floras, and Bower published "The Origin of a Land Flora" in 1908. Since then he has summarized his work on "The Ferns" in three important volumes (1923–1928) and formulated his ideas on "Size and Form in Plants" in a stimulating work (1930).

Meanwhile there has been a notable accumulation of additional facts regarding both living and fossil Archegoniates—especially the recognition of the Devonian group Psilophytales. These discoveries have served to draw together the Bryophyta, Pteridophyta, Lepidophyta and Arthrophyta, and, it seems to me, put an end for all time to notions that the earliest land plants were polyphletic transmigrants of Algae.

Bower now returns to the origin of land plants in

[1] Harry B. Yocom, *Biol. Bull.*, 67: 273–276, 1934.
[2] Harold Eugene Finley, *Ecology*, 11: 337–347, 1930.