

formed their former estuaries into alluvial plains above which rise scattered rocky islands. This is particularly true of the northern tributaries of the lower Amazon, except the Trombetas, which has relatively clear water, and has not yet filled its estuary.

The author suggests that the physiographic features described above may be interpreted as the result of a moderate drowning of the region followed by the filling up of the estuary of the Amazon by the heavy silt burden borne by that river:

Gradually the alluvial land at the head of the bay extended eastward, filling up the estuary with islands. As this eastward movement went on, the branch estuaries were blocked up at their mouths by islands which formed in front of them. Where the branch received a muddy tributary it also filled up; but the clear water tributaries like the Tapajós, Xingú, and Trombetas, brought down no sediment, and their estuaries, closed at the mouths, assumed the form of lakes.

That the phenomena described are the result of changes in level and not merely of the ponding of the tributaries by sediment from the Amazon, is indicated, as the author points out, by the fact that the Tocantins River, which enters the sea directly, has a similar estuary.

The physiographic phenomena here described seem to point to a relatively recent period of lowered sea level (or land uplift) followed by a rise to the present position (or a sinking of the land). The phenomena may have been associated with the changes in sea level postulated by Daly, or they may be due to local crustal movements. Physiographic studies of a large number of tropical rivers would go far toward solving the problem.

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QUOTATIONS

A PIONEER IN PHYSICS

FORTY-SEVEN years of collegiate teaching constitute in themselves a sufficient title to honor, even though their number be only a record of faithful and continuous service. When the passing of these years has told also a story of

important pioneer work, of purposeful achievement and steady progress, it becomes a record to conjure with. Of such is the repute that Professor Charles R. Cross has established in the long period of his association with the Massachusetts Institute of Technology, and of such the honor which the institute and all men are glad to accord him as he now lays hold upon the satisfactions of a well-earned retirement. Being graduated from Massachusetts Institute of Technology in 1870, with the third class that went out from its halls, Professor Cross forthwith returned after the summer vacation to take up an instructorship in the department of physics. Upon completing a single year of this service he was made an assistant professor and by 1878 had been given rank as a full professor. In 1886 he became director of the Rogers laboratory and in 1907 was made head of department. It is the threefold mantle of these responsibilities which he wears to-day and which he now contemplates laying aside.

Such accumulated funds of loyalty to his institution, of prestige not only in its counsels but in the scientific world at large, and such skill of investigation and analysis as Professor Cross has acquired, constitute a tangible fortune which might well be assessed only for its large present values. Yet if one is to take his career in review, there must be observed in particular the contribution Professor Cross made to the establishment of electrical engineering as an independent department of modern scientific and technical training. In the early eighties, some time before the wondrous expansion in the practical uses of electricity had generally been foreseen, Professor Cross prophesied it and insisted on electrical studies as part of his teaching in physics. He offered them long before they were taken up by other educators throughout the country, he developed their technique and bore the brunt of a pioneer's labor. Later it was at his instance that Technology introduced the first courses leading to a degree in electrical engineering ever offered in America. All through this development, his influence made for the increasing use and effectiveness of experiments in the illus-

tration of lectures—that most important change of emphasis which came to pass in the method of scientific education. Professor Cross has won high place, which he will hold, whether or not in retirement.—*Boston Evening Transcript*.

SCIENTIFIC BOOKS

The Birds of Britain, their Distribution and Habits. By A. H. EVANS, M.A., F.Z.S., M.B.O.U., Cambridge, 1916. 8vo, pp. xii + 275, numerous halftone text-figures.

This concise and rather informal work is stated to be “primarily intended for schools,” but is designed also to serve as a “short handbook which includes the results of the most recent observations, and is adapted to modern nomenclature.” While this intention may be justified by the character of the main text, the introductory chapter, treating of “The Class Aves, or Birds in General,” might have been written a generation ago, and does not include “the results of the most recent observations,” as regards especially the subject of migration. Reference is made only to the creditable work of local observers in Britain, which has accumulated interesting facts regarding the movements of birds in England and Wales without furnishing generalized results, while the important work carried on elsewhere is passed without mention, including the researches of the late W. W. Cooke which have so greatly extended our knowledge of this subject.

In the main text, under the general heading “Classification,” with subheadings for the higher groups from orders to subfamilies, a paragraph, without special heading, is devoted usually to each species of regular occurrence in Britain, with a nominal list at the end of nearly 200 “occasional visitors” not formally mentioned in the preceding pages. The author manages to give in the half-page notices of the species of regular occurrence a comprehensive statement of their leading traits, distribution and diagnostic features, in a clear and direct way that should render his “little book” attractive and useful to many readers. The nomenclature is strictly modern, being

“almost exactly” that of the British Ornithologist’s Union’s revised Check-list. The illustrations, though said to be “from photographs taken for the most part from nature,” are in many cases obviously not from life but from stuffed specimens or from museum groups, and are thus not up to the standard of the text.

J. A. A.

SPECIAL ARTICLES

FACTORS IN THE GROWTH AND STERILITY OF THE MAMMALIAN OVARY

1. THE growth and, to some extent, the structure of the mammalian ovary depend essentially on the development of the ovarian follicles. The maturation of some follicles and the subsequent rupture leads to the formation of the corpus luteum; the retrogression (atresia) of follicles before they have reached maturity and ruptured leads in certain species to the formation of the so-called interstitial gland and in others to the accumulation of atretic follicles in which the theca interna is relatively prominent, without, however, the formation of an interstitial gland.

As we shall see presently, it is possible to inhibit the full development of the follicles experimentally. Under these conditions we find that the atretic follicles with relatively large thecae internæ, are especially numerous and constitute perhaps the greater part of the ovary. We may therefore conclude that it is the pressure exerted by the developing, expanding follicles which leads to the shrinking and ultimate complete disappearance of the atretic follicles, and that if this pressure is diminished these atretic follicles become relatively prominent. This explains their relative preponderance in the guinea pig during the period following ovulation, when no large follicles are present in the ovaries.

2. Former observations of the writer showed that under certain conditions mitoses in the granulosa cells of the follicles were especially frequent around the ovum. This suggested the possibility that the stimulus for the growth of the granulosa cells which ultimately determines the growth of the whole follicles, depends upon a substance given off by the ovum. Dr. L. S. N. Walsh in our laboratory