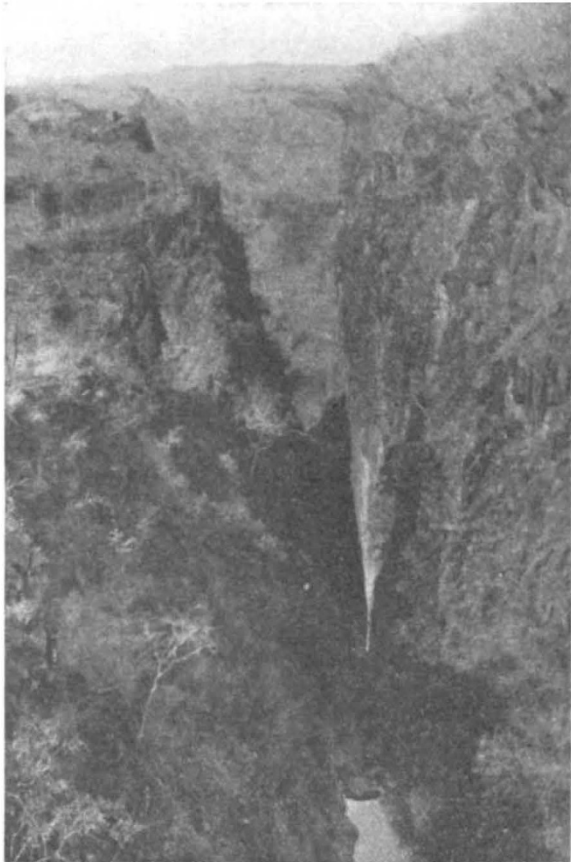


in the backward race. The narrowness of the cañon below the falls, as compared with the breadth of the river above them, shows that only by such concentration has the Zambesi been enabled to tear out its gorge so far back into the plateau.

Mr. Molyneux has rightly laid stress on the behaviour of the tributaries as proof of the erosive origin of the Batoka Gorge. Above the Falls the tributaries have so nearly reached their base-level relatively to the Zambesi that they hold deep back-waters where they join the main river, of which the Maramba, 2 miles from the Falls, presents a good example. But below the Falls they have at first been left in shallow open "hanging valleys," high above the main artery; and thus rejuvenated by a sheer drop of 350 feet or 400 feet, each little stream has begun to work vigorously backward into the



From a photograph by Mr. F. W. Sykes.

FIG. 2.—Kalonga's Cleft on the Karamba River. The walls are about 300 feet high.

plateau along its own line of drainage. Each waterfall tends to recede farther and farther within its own precipitous rift as we followed the Zambesi downward, so that while at first it was possible to round the heads of these by a detour of a few hundred yards, we found that farther east not only do they extend far back into the plateau, but many minor clefts branch out from them, rendering the country a maze of dangerous chasms. In these waterfalls and rifts the salient features of the main gorge are often reproduced in miniature. The most remarkable example that we visited occurs on the Karamba, a stream which joins the Zambesi about 35 miles east of the Falls. Some 5 miles above its junction with the Zambesi this stream drops by a waterfall from its open shallow valley into a gloomy recess, from which it escapes by swerving at a right angle between nearly vertical rock-walls, 300 feet in height, through a cleft only 15 feet to 20 feet in breadth (Fig. 2).

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If further proof for the erosive origin of the Batoka Gorge be needed, I would direct attention to the gradual falling off in the angle of slope of its sides as we descend the river. At the Falls, where the gorge is freshly cut, its walls are practically vertical; but a few hundred yards below they are already beginning to show the effect of weathering by a slight recession of their crest-line and by indications of terracing along the planes of stratification. At the Songwe confluence, 7 miles farther down, this recession and terracing have become so pronounced that the average angle of slope from base to crest is reduced to 60° or less; at the Tshimamba, about 30 miles below the Falls, it is no more than 35°; and at the mouth of the Karamba, 12 miles farther east, the sides of the gorge have been weathered down into bushy slopes, broken here and there by inconspicuous bars of crag, with an average inclination of about 30°, which is also the character of the cañon at the place where it was visited still farther eastward.

If time had permitted, I should have liked to discuss the curious difference between the broad basin of the Matetsi and the narrow trough of the Zambesi within the basaltic plateau, which presents an important problem in the physiography of the region, especially when we remember that the Batoka Gorge terminates at a short distance above the confluence of the Matetsi; but this would open up too wide a subject for the present occasion.

In the face of all the evidence we must conclude—not without a tinge of regret—that the Batoka Gorge can no longer be allowed to stand apart, a unique curiosity, among the valleys of the earth—that no exceptional forces have been brought into action to produce its wonders and its loveliness—but that the everyday effects of river and rain, with time—that indispensable factor to the geologist—a very long time—are ample to explain all its marvels, as they have already explained the marvels of many another noble cañon of the world.

I must not let pass this opportunity of expressing my gratitude for the kindness shown to me by the officers of the British South Africa Company in Rhodesia and also in London, by the engineers of the Wankie Coal Mine and of the Rhodesia railways, and by many other friends in Rhodesia. To Mr. F. W. Sykes I am peculiarly indebted for removing difficulties that, except for his self-sacrificing cooperation, might have proved insuperable.

G. W. L.

INDIAN DEEP-SEA HOLOTHURIANS.¹

THE most recent addition to the list of publications issued by the Indian Museum, Calcutta, deals with a collection of deep-sea Holothurians made by the survey ship *Investigator*, which has rendered valuable service in the interests of deep-sea research. The extreme utility of this work, which will help to elucidate many of the problems connected with deep-sea life, is enhanced by the fact that the investigations have been carried on over comparatively unknown ground, so far as the great depths are concerned.

The area examined by the *Investigator* is a comparatively wide one, and ranges over the northern part of the Indian Ocean from the Persian Gulf to the east side of the Bay of Bengal.

Most of the deep-sea expeditions appear to have confined their labours to the Atlantic and Pacific Oceans, and even the *Challenger* did not touch the northern part of the Indian Ocean. The *Siboga* Expedition reached the extreme south-eastern portion of the *Investigator* area, and a comparison of the *Siboga* Holothurians with those in the paper under notice provides an interesting study, and, incidentally, confirms the opinion that a knowledge of the distribution of deep-sea forms derived from an examination of isolated areas is apt to be misleading.

Of the seventy-five species and varieties described in the report, no less than sixty are new to science. The Synallactidæ appear to be the predominant forms amongst the deep-sea Holothurians of the Indo-Pacific region, both

¹ "An Account of the Deep-sea Holothurioida collected by the Royal Indian Marine Survey Ship *Investigator*." By R. Kœhler and C. Vaney. Pp. 123; 15 plates. (Indian Museum, Calcutta, 1905.)

with regard to species and individuals. In the *Investigator* collection twenty-nine species are placed in this family, and the Molpadiidæ and Synaptidæ are well represented. The authors have found it necessary to form ten new genera, and a seventh family—the Gephyrothuridæ—has been added to the Aspidochirota.

There was a large number of specimens of the genus *Pelopatides* and its allies in the collection, and the authors were given an opportunity of revising the genus. Five new genera were established to receive forms closely related to *Pelopatides*. *Dendrothuria* is peculiar in having dendrochirote tentacles and an enormously developed pharynx. *Pseudothuria* has no single distinctive characteristic, but all its characters taken together separate it from the neighbouring genera. The genus *Allopatides* has been formed from a single specimen, and its main difference from *Pelopatides* appears to be the richly dendritic form of the spicules. It may be doubted whether this difference is of generic value, especially as some species of *Pelopatides* also possess branched spicules not differing greatly from those in the new genus; the difference appears to be merely one of degree. The genera *Perizona* and *Bathyzona* have been formed mainly with regard to the position of the pedicels. Five other new genera are also described.

The new family—Gephyrothuridæ—is founded on two specimens which differ from all other Aspidochirotes in the possession of ambulacral appendages on the bivium only. In external appearance this form somewhat resembles the Molpadiidæ.

The collection includes some forms described by Walsh in 1891; the authors have deemed it necessary to remove all his species to other genera.

With every increase in our knowledge of the deep-sea fauna, it becomes more possible to formulate with some degree of completeness definite ideas as to the distribution and the mode of evolution of the deep-sea forms; and the work under notice is of importance in this respect, suggesting as it does many interesting points in zoological distribution.

Comparing the *Siboga* list of deep-sea Holothurians with that of the *Investigator*, it is surprising to find that in the two collections from adjacent areas there are only six species common to both. The two gatherings are almost entirely dissimilar with regard to the species present, but an examination of the genera shows a close similarity. It is perhaps noteworthy that those species common to both districts are not confined to the eastern portion of the *Investigator* area, as one might expect, but are scattered equally throughout it.

Of the fifteen species previously described, six are Atlantic and five Pacific forms; there are three species in the collection the distribution of which has hitherto been limited to the Atlantic.

The descriptions are clear and not too scanty, as is often the case, and the plates are good. Altogether the authors have made a most valuable contribution to the subject, and they appear to have done extremely well with material that was evidently not in the best state of preservation.

J. P.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The following decrees were approved by Convocation last Tuesday:—The curators of the University Chest were authorised to pay a sum not exceeding 150*l.* to the professor of botany to enable him to provide for the teaching of forest botany, until the appointment of a Sibthorpean professor under the new statutes of St. John's College.

Mr. Henry Balfour, Fellow of Exeter College, was re-appointed curator of the Pitt-Rivers museum for seven years at a stipend of 200*l.* a year, and the annual grant of 200*l.* to the museum was renewed for seven years.

An examination will be held next February for a Radcliffe Travelling Fellowship of the annual value of 200*l.*, and tenable for three years. Candidates must have qualified for the degrees of B.A. and M.B., and have been placed in the first class in a university examination, or

have gained a university prize. Names should be sent to the Regius professor of medicine.

The following is a list of the probationers for the Indian Forest Department and the Sudan nominated in 1905, with the colleges to which they are now attached:—C. W. Armstrong, scholar of Jesus College, Oxford; G. C. Clarence, Magdalen College, Oxford; T. Clear, science exhibitor of Balliol College, Oxford; C. G. E. Dawkins, Balliol College, Oxford; C. C. Gaunt, exhibitor of St. John's College, Oxford; H. S. Gibson, Trinity College, Oxford; H. M. Glover, mathematical demy of Magdalen College, Oxford; J. Gunn, Edinburgh University, now at St. John's College, Oxford; J. K. Hepburn, Queen's College, Oxford; N. W. Jolly, Adelaide University, now at Balliol College, Oxford (Rhodes scholar); W. A. H. Miller, St. John's College, Oxford; A. J. W. Milroy, Christ Church, Oxford; A. A. F. Minchin, Exeter College, Oxford; R. L. Robinson, Adelaide University, now at Magdalen College, Oxford (Rhodes scholar); E. A. Smythies, Christ's College, Cambridge, and Balliol College, Oxford; and G. C. Wilson, Queen's College, Oxford.

The Government of Mysore has sent two forestry students, M. M. Machaya and B. V. Ramaingar, both of St. John's College, Oxford, and of Madras University.

CAMBRIDGE.—The Forestry Syndicate has now issued its detailed report on the scheme for establishing a diploma of forestry. It is proposed that a committee of the Board of Agricultural Studies be appointed to be called the forestry committee, the duty of which shall be to manage the examinations in forestry and to direct the instruction and training of candidates for the diploma. Details as to the constitution and duties of the committee are printed in this week's *Reporter*.

The general board of studies has appointed Mr. J. G. Leatham, St. John's College, university lecturer in mathematics from Christmas, 1905, until Michaelmas, 1910, and has re-appointed Mr. C. T. R. Wilson, Sidney Sussex College, university lecturer in experimental physics from Christmas, 1905, until Michaelmas, 1910; both these appointments have been confirmed by the special board for physics and chemistry.

Mr. A. C. Seward, of Emmanuel College, has been appointed chairman of the examiners for the natural sciences tripos, 1906.

The late Mr. G. R. Crotch, of St. John's College, some years ago left his collections of insects and his books to the Museum of Zoology, and also after the death of certain relatives his personal estate to the same museum. His brother, Mr. W. D. D. Crotch, who recently died, has left his residuary estate, the value of which is about 8000*l.*, to the same museum.

SIR ALEXANDER R. BINNIE will distribute the prizes at the Merchant Venturers' Technical College, Bristol, on Thursday, December 21.

THE Public Schools Science Masters' Association will meet for the annual conference on January 20, 1906, at Westminster School. The president for the year, Sir Oliver Lodge, will speak on the place of science in general education. Papers will be read upon the army examination and on the possibility of introducing a comprehensive syllabus of science teaching within the time limits of a classical curriculum. After the conference there will be an exhibition of scientific apparatus by various makers in the new science buildings of Westminster School.

THE North of England Education Conference will be held at Newcastle-upon-Tyne on Friday and Saturday, January 5-6, 1906. Among the subjects to be discussed are the following:—The teaching of elementary mathematics, paper by Prof. R. A. Sampson, F.R.S.; openers of discussion, Dr. Jude and Mr. J. H. Kidson. Regulations for secondary and higher elementary schools, papers by Mr. W. Edwards and Mr. W. J. Abel; openers of discussion, Miss M. Moberly and Mr. P. M. Greenwood. Organisation of evening classes, papers by Principal J. H. Reynolds and Mr. J. Crowther; opener of discussion, Mr. A. M. Ellis. Physical Training, papers by Prof. T. Oliver and Captain H. Worsley-Gough; openers of discussion, Dr. Ethel Williams and Captain F. C. Garrett. All com-