

tion as to the reality of the facts described. For instance, both a map and a photograph are given of Churchdown, the conspicuous outlier that rises above the Lias plain near Gloucester; while the description of the successive layers in the Victoria Cave furnishes an impressive picture of the history of British man. The statement of the loss of land along the Yorkshire coast demonstrates the effectiveness of forces now in action, and two successive views are given of the destruction of a chalk headland near Swanage.

The illustrations are practically all new, including a fine view into Lulworth Cove, taken from the hill at its west end. The printers have twice gone astray on the difficulties of *Rhynchonella* (pp. 60 and 79), and a bracket needs extension on p. xi to include the Cainozoic systems; but the mode of production shows how generously publishers are prepared to meet the demand for readable works on nature-study. G. A. J. C.

Catalogue of the Ungulate Mammals in the British Museum (Natural History). Vol. iii. Artiodactyla, Families Bovidae, Subfamilies *Æpycerotinae* to *Tragelaphinae* (Pala, Siaga, Gazelles, Oryx Group, Bushbucks, Kudus, Elands, etc.), *Antilocapridae* (Prongbuck), and *Giraffidae* (Giraffes and Okapi). By R. Lydekker, assisted by G. Blaine. Pp. xv + 283. (London: British Museum (Natural History), 1914.) Price 7s. 6d.

THE third volume of the British Museum catalogue of Ungulates completes the account of the antelopes (saiga, gazelles, oryx group, bushbucks, kudus, elands, etc.) and deals also with prongbucks and giraffes. Like its predecessors it is a fine piece of work with terse descriptions and scholarly synonymy. Its usefulness has been notably increased by the inclusion of fifty excellent figures, mostly of heads. As a work of reference it will be of great value and interest to those who have collected trophies of this sort. The prongbuck, the position of which has been the subject of discussion, is ranked by Mr. Lydekker as the only living representative of a separate family, *Antilocapridae*. Another interesting type, the Okapi, represents a genus along with the giraffe in the family *Giraffidae*. Among the many other interesting forms may be mentioned, *Ammodorcas*, *Æpyceros* (the Pala), the Saiga, and the Chiru.

LETTERS TO THE EDITOR.

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The Age of a Herring.

To my doubts as to the truth of Dr. Hjort's theories of the herring's age, Dr. Hjort and Mr. Einar Lea have now replied (NATURE, November 5) by recapitulating their main arguments. I can do little more than reiterate my own unaltered incredulity. My position is simply this, that a theory has been put forward which seems to me, *a priori*,

extremely improbable, and that the statistical data on which it is based are, to my mind, not strong enough to support it. The large assertion that the Norwegian spring herring have consisted, in preponderating or overwhelming proportion, year by year from 1908 to 1913, of fish spawned in 1904, is based (so far as I can discover) on only nineteen samples, or little more than two a year, averaging somewhat above 300 herring each. Dr. Hjort and Mr. Lea have no difficulty in showing that their 1913 herring, grouped according to scale-rings or alleged years of growth, form a curve which is a bad fit to a probability curve; but they do not remind us that this so-called sample is no sample at all, but is a conglomeration of three separate samples from far-distant localities. Dr. Hjort's full data have not been published, so far as I know, for the years since 1909; let us try to discover how, for the year 1908, he arrives at the figure 34.8, which he gives (*cf.* NATURE, August 27, p. 672) as the percentage proportion, in the entire stock of Norwegian spring herring, of fish spawned (according to the evidence of their scale-rings) in 1904. I find that this determination was based on two samples only,¹ from different localities, one consisting of 881 fish, the other of 549. In the former sample the percentage of 1904 fish is given as 15.9, in the latter as 65.2. The former determination, by Mr. K. Dahl, seems a little shaky: for an independent determination of a part of the same sample, by Mr. Einar Lea,² gave the alternative value of 10.2. But be that as it may, I find that Dr. Hjort's result is obtained by the simple method of adding together the two samples, one of 881 fish showing 15.9 per cent., the other of 549 fish showing 65.2 per cent., and so the resulting mean value of 34.8 per cent., decimal and all, is straightway arrived at. It does not need the eye of a mathematician to see that, in a problem of biological statistics, such a method of calculation is inadequate; and that it neither proves nor even renders probable the conclusion drawn from it, namely, that four-ringed herring (whatever those four rings may mean) constituted 34.8 per cent. of all the spring herring in Norway, in the year in question.

D'ARCY W. THOMPSON.

The Cross X as a Symbol for Multiplication.

HISTORIANS of mathematics attribute the first use of the cross \times as a symbol for multiplication to William Oughtred ("Clavis Mathematicae," London, 1631). See W. W. R. Ball's "Short Account of the History of Mathematics," fifth edition, 1912, p. 239; M. Cantor's "Geschichte der Mathematik," Bd. ii., 1892, p. 658; J. Tropfke's "Geschichte der Elementar Mathematik," Bd. i., 1902, p. 135. In some places, as, for instance, in Oughtred's "Circles of Proportion" (London, 1632, p. 38), the two bars of the cross are not quite straight, giving the symbol the appearance of the small letter x . In some of John Wallis's writings, as, for example, his "Elenchus geometriae Hobbianae," etc. (Oxford, 1655, p. 23), the symbol is not the usual cross, but is plainly the capital letter X turned on its side. In a paper by Lord Viscount Brouncker in the Philosophical Transactions (vol. ii., 1668, p. 646), the capital letter X occurs regularly as the symbol for multiplication. These and similar cases lead to the inference that the cross and the letter x were considered practically one and the same symbol for multiplication.

In this connection we desire to point out that the small letter x , and also the capital letter X , occur as symbols for multiplication before Oughtred (1631) in

¹ Hjort, "Rapports et Procès-Verbaux, vol. xx., p. 29. (Copenhagen, 1914.)

² "Public. de Circonstance," No. 53, p. 94. (1910.)