

is not very long before birth, the conclusion might be drawn that the size of limbs and of body of the newborn are not negligible factors in the size and proportions in later life.

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- ¹ Huxley, J. S., "Problems of Relative Growth" (London, 1932).
² Teissier, G., "Les lois quantitatives de la croissance" (Paris, 1937).
³ Hammond, J., "Growth and the Development of Mutton Qualities in the Sheep" (Edinburgh, 1932).
⁴ Szabo v. Hangai, B., *Zuchtungskunde*, 4; H. 9 (1929).
⁵ Engeler, W., "Untersuchungen ueber die Entwicklung des schweizerischen Braunviehs" (Bern, 1935).
⁶ Carusi, A., *Annali dell' Istituto Zootecnico Sperimentale di Roma*, 2 (1929).
⁷ *Missouri Agric. Exp. Stat. Bull.*, 96 (1926).
⁸ Walton, A., and Hammond, J., *Proc. Roy. Soc.*, B, 125, 311 (June 1938).

Geographical Distribution of Zellerielles

REPORTING the occurrence of zellerielles in frogs at Capetown, Sandon¹ reviewed literature on the distribution of the genus geographically and by host families. He contends that the presence of Cape zellerielles is most easily explained on the basis of former land connexions with the other southern continents. Sandon noted that the American and Australian species are confined for the most part to the toothed bufonids and, following Metcalf², discounted the Asiatic record of *Zelleriella macronucleata* (Bezzenberger) 1904 from *Bufo melanostictus*. Nie's³ finding of a zellerielle in *Microhyla ornata* at Nanking, however, establishes it as an Asiatic genus as well. While Wenrich⁴ has shown that host specificity of the Opalinidæ is much less rigid than Metcalf supposed, the fact that in Asia (Microhylidæ) and in South Africa (Ranidæ) the host families are not toothed bufonids may be significant. Further, daCunha and Penido⁵ have found a *Zelleriella* in a catfish in the Paraguay River, while Carini⁶ and Wenrich report others from snakes.

In work on a truncate *Opalina* from *Rana boylei* of California, I have observed in the development of this species a flattened binucleate zellerielle-stage, whereas a cylindrical proto-opaline form is the larval type previously described as characteristic for the genus. This plasticity of form in development within the multinucleate genus *Opalina* suggests that the geographical occurrence of *Zelleriella* and the diversity of its hosts may be explained by the hypothesis that zellerielles have been derived from the cosmopolitan proto-opalines at various times and places.

Sandon's observations on the Ranids included the statement that only one species has penetrated to North America; the Wrights⁷ list twenty-four species and subspecies of *Rana* for the United States.

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- ¹ Sandon, H., *NATURE*, 141, 1143 (1938).
² Metcalf, M. M., "The Opalinid Ciliate Infusorians", *Bull. U.S. Nat. Mus.*, 120 (1923).
³ Nie, DASHU, *Contrib. Biol. Lab., Sci. Soc. China*, 11, 67 (1935).
⁴ Wenrich, D. H., *Proc. Amer. Phil. Soc.*, 75, 605 (1935).
⁵ daCunha and Penido, *C.R. Soc. Biol.*, 95, 1003 (1926).
⁶ Carini, A., *C.R. Soc. Biol.*, 112, 400 (1933).
⁷ Wright and Wright, "Handbook of Frogs and Toads" (Ithaca, 1933).

Antarctica and Glacial Ages

IN his interesting article on "Antarctica and Glacial Ages"¹, Prof. MacBride states: "If we add the breadth of the ice-shelf to the length of the Beardmore Glacier, we arrive at a total extent of ice-floe of about five hundred miles, and this is considerably longer than any glacier the existence of which we have evidence in the Pleistocene Glacial Age." But, as is well known, rocks of Scandinavian origin are found in the Pleistocene glacial tills of the north-east coast of Norfolk, and there seems very good reason to believe that these erratics were brought into East Anglia by ice originating in Scandinavia. Thus this Pleistocene ice-flow cannot have been much less than 500 miles long, and may have been considerably more. Again, on p. 98, Prof. MacBride claims—after enumerating the Penckian glaciations, that "The most interesting thing about these periods is that the bones and tools of the oldest indubitably human race are found in the inter-glacial interval between the Würm and the Reiss periods". Further, on p. 99, he mentions "the interglacial period between the Reiss and the Würm glaciations—the time indeed when Neanderthal man flourished". I imagine that Prof. MacBride is referring to the inter-glacial epoch (whether it is correctly assigned to that of the Reiss-Würm is another matter) when Late Acheulean man existed, and at the close of which the Neanderthal people lived in Western Europe and made the classic Mousterian implements. Is it to these races and implements that Prof. MacBride would confine the term "indubitably human"?

It is well perhaps to remember in this regard that Neanderthal man was, to say the least of it, a very peculiar, and, in several ways, simian being in his physical make-up, while, more ancient in time than the Late Acheulean and Mousterian implements, are those of Lower Acheulean and Chellean times. It is probable that the Lower Acheulean specimens date back to the inter-glacial phase preceding that mentioned by Prof. MacBride, while the Chellean artefacts are located in the deposits of the still earlier warm period—the Günz-Mindel. As both the Chellean and Lower Acheulean hand-axes exhibit a skill in flaking equal to if not exceeding that of the Mousterian implements, surely the former specimens are entitled to be classed as of the "indubitably human" standard.

As to whether "the drift into high latitudes affords a complete explanation of all glacial phenomena previous to the Pleistocene", I cannot express an opinion. But if this drift does at last provide a complete explanation of any glacial phenomena, it will be hailed with joy by all those who are making a study of these problems. For, up to the present, their explanation has been sadly lacking in completeness.

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¹ *NATURE*, 142, 97-99 (July 16, 1938).

I THANK Mr. Reid Moir for his valuable criticisms of my article "Antarctica and Glacial Ages". I shall reply as briefly as possible to the two points which he raises.

First, as to the size of the Pleistocene Scandinavian ice-sheets, I am well aware that these sheets extended