Embryology and Evolution: A Re-examination of the Evidence

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'Sit down before a fact as a little child; be prepared to give up every preconceived idea; follow humbly wherever and to whatever abyss Nature leads, or you shall learn nothing.'

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Abstract

A re-examination of evidence from comparative human and mammalian embryology which is normally classed under the general heading of 'neoteny'. It is argued that the significance of these phenomena for an understanding of the course of animal evolution has been overlooked, primarily as a consequence of a priori assumptions about evolutionary history which a careful examination of the facts does not support but rather demand a re-examination of orthodox theory, in particular in relation to the supposed descent of humans from ape-like ancestors. There are considerable consequences for science, evolutionary theory and religious belief.

Sir Gavin Rylands de Beer (1899–1972) was professor of embryology in London and subsequently director of the Natural History Museum for ten years from 1950–1960. He was generally considered to have been one of the leading embryologists of his day. In 1930, de Beer published a book entitled *Embryology and Evolution*, which was republished in 1940 in expanded form under the title *Embryos and Ancestors.* A revised second edition appeared in 1951, a third edition in 1958. All references are taken from this third edition, published by Oxford University Press.

In the Preface to this third edition, de Beer wrote that it was 'a particularly appropriate time [approaching the centenary of the publication of the *Origin of Species*] for a critical appraisement of the relations between embryology and evolution'. Having reviewed the facts that he had first presented nearly thirty years before, and having also considered '… a great deal of new evidence … [which had] become available … during the intervening years [especially between 1951 and 1958], [he had] seen no reason to alter the plan of [his] former book in the slightest degree'.

Indeed, '… these fresh data have fitted into place in my scheme like pieces of a puzzle'.

In this paper I will focus on those facts relating to human embryology and development which de Beer listed in Chapter VIII of *Embryos and Ancestors* – the chapter devoted to 'Neoteny' – in the section dealing with the evolution of man (pp. 63–91). Though the phenomena of neoteny and heterochrony are well-known to evolutionary biology and have received significant attention since de Beer's day (e.g. by Gould, McKinney and McNamara and others), the facts have been interpreted solely according to the dominant neo-Darwinian theory of evolution, with the result that their real significance has been missed. The essential facts remain as he described them. (For the purposes of this essay, it is not important whether the characters described by de Beer are indeed accurately termed 'neotenous', or whether McKinney and McNamara (*Heterochrony,* 1991) are correct in describing the essential process as one of 'hypermorphosis'.)

De Beer defines neoteny as the phenomenon '… in which the adult form of an animal bears features by which it resembles the young form of its ancestors, or, to put it the other way, in which the young features of the ancestor have been retained in the adult stage of the descendant' (de Beer, *op. cit.* p. 63). Such characters which are present or make their appearance in the young stage of an ancestral animal are referred to as *neanic* characters: '… evolutionary novelties … which first appeared in early stages of ontogeny' (*de Beer*, op. cit. p. 35).

'Interpreting these cases in terms of heterochrony, they imply a *relative* retardation in the rate of development of the body (soma) as compared with the reproductive glands (germen), so that in respect of certain characters the body does not undergo as much development in the ontogeny of the descendant as it did in that of the ancestor' (p. 63). *Heterochrony* is simply defined as 'the alteration and reversal of the sequence of stages' in ontogeny (*de Beer*, p. 8).

Thus, in relation to human development, de Beer is stating that humans, and in particular adult humans, exhibit features which resemble those of the young form (embryonic and neonatal) of the presumed ancestors, but which differ from the known or presumed characters of the adult form of those presumed ancestors, as they also differ from the adult forms of the descendants of the presumed common ancestors of man and his closest relatives, the apes.

De Beer includes the following among those 'features of the adult structure of man [which] show resemblances to those of the embryonic structure of the anthropoid apes':

– the relatively high brain weight
– the position of the *foramen magnum*
– the cranial flexure