VESTIGIAL ORGANS DO NOT PROVIDE SCIENTIFIC EVIDENCE FOR EVOLUTION

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ABSTRACT: Recently, Scadding (1981) argued that vestigial organs provide no special evidence for the theory of evolution over and above that provided by their homologies. Subsequently, Naylor (1982) raised objections to Scadding's position and argued that vestigial organs are indeed evidence for evolution. This present paper rebuts Naylor's objections and reaffirms the claim that vestigial organs do not provide scientific evidence for evolution.

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The existence of functionless 'vestigial organs' was presented by Darwin, and is often listed by current biology textbooks, as part of the evidence for evolution. Recently, Scadding (1981) analyzed the practical difficulties in identifying functionless structures, and the nature of the argument, and concluded that 'vestigial organs' provide no special evidence for evolution over and above that provided by their homologies. This conclusion has been criticized by Naylor (1982) who argued that vestigial organs do provide powerful evidence for the theory of evolution.

In this present communication, I suggest that Naylor's critique is flawed on two major grounds. 1) He redefines 'vestigial organ' to include functional organs thus destroying the very argument he tries to defend, and then confuses the argument that vestigial organs provide evidence for evolution with the argument that homologous organs provide evidence for evolution. 2) He concludes that a theological argument against a certain variety of creationism is a valid sort of scientific argument for evolution, arguing that "given the nature of the two explanations any evidence in favour of one is necessarily against the other". I shall deal with each of these problems separately.

Naylor begins his critique by redefining vestigial organs so as to include fully functional organs under his revised definition. This redefining of the term is unjustified. Darwin referred to "rudimentary, atrophied, or aborted organs" which have subsequently been called "vestigial organs", and he defines these as "organs or parts in this strange condition, bearing the stamp of inutility ..." (Darwin, 1859, p. 450). Darwin goes on to say that "for the same reasoning power which tells us plainly that most parts and organs are exquisitely adapted for certain purposes, tells us with equal plainness that these rudimentary or atrophied organs, are imperfect and useless." (1859, p. 453). Wiedersheim (1895, p. 200) refers to "organs which may be rightly termed vestigial ... having become wholly or in part functionless ...". A lack of function in an organ having a functional homologue in ancestral species is the hallmark of vestigial organs. For a more recent definition, Dorland's Illustrated Medical Dictionary offers: vestige: "the remnant of a structure which functioned in a previous stage of species or individual development".

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This may seem, on the surface, to be cavilling over semantics, however, the entire argument of Darwin and others regarding vestigial organs hinges on their uselessness and inutility. Naylor is correct in his statement that "Darwin relied heavily on vestigial organs to counter the theological 'argument from design'". Darwin used rudimentary or vestigial organs, since they lacked any function or usefulness, as a powerful counter to any argument that proposed a perfect creation or a perfect design. However, if a function is admitted for vestigial organs, then this entire counter argument collapses. Thus, Naylor's discussion of "functional, vestigial organs" is not only self-contradictory, but more importantly destroys the very argument he seeks to defend.

This redefinition leads Naylor to mix up the vestigial organ argument with the homologous organ argument. Darwin treated these arguments separately recognizing that they were in fact independent. Homologous structures are those which are similar in fundamental structure, position, and embryonic development, but not necessarily in function. That all vertebrates, for example, are built along a common basic structural plan is obvious. This clearly suggests a common origin and this can be taken as evidence of descent with modification. In this regard, I agree with Naylor that these homologous structures are of great use in documenting evolution. For example, Naylor states that "Even if functions were to be ascribed to any of them," (vestigial organs) "they would still provide powerful evidence for the theory of evolution". I agree with this, but I suggest that this evidence is due to the homologies these organs illustrate and not to their vestigiality. Again, when Naylor argues that the variable manifestation of the vertebrate tail and its presence in the human as the coccyx with a somewhat different function, is to be taken as "reasonably explained on the theory of descent with modification", I agree with him. But, this is part of the argument that homologous structures provide evidence for evolution, which Darwin discusses in the "Origin of Species" (1859, pp. 434-439 in particular). It is related to but independent of, the vestigial organ argument which Darwin treated separately (1859, pp. 450-456). In the latter case, Darwin identified what he considered to be a separate and additional line of evidence for his theory of descent with modification in organs which were "useless", "bearing the stamp of inutility". It is this latter position which I have argued against (Scadding, 1981).

The second major point on which I disagree with Naylor is his claim that "Evidence for evolution is automatically evidence against special creation". That is, he treats evolution and "special creation" (which he does not unfortunately define) as if they were two sides of a coin so that if one side is up the other must be down. There are several problems with this approach. Firstly, there is an implied assumption here that there are two, and only two, possible theories of origins to be considered, and that they are mutually exclusive. That this is fallacious is apparent when one considers that there are at least three major groups of Christian creation theories (see for example the analysis of Bube, 1980), and a variety of different theories within each group, not to mention many others in other religious and philosophical systems. Thus, evidence against one of these creationist theories cannot be taken as evidence for evolution as Naylor suggests, because there are more than two alternatives. Secondly, the argument that Naylor presents is based on a theological assumption about the nature of God, i.e. that he would not create useless structures. Whatever the validity of this theological claim, it certainly cannot be defended as a scientific statement, and thus should be given no place in a

scientific discussion of evolution.

I agree with Naylor that Darwin relied heavily on vestigial organs to counter the theological argument from design. For example, Darwin wrote (1859, p. 480), "On the view of each organic being and each separate organ having been specially created, how utterly inexplicable it is that parts, like the teeth in the embryonic calf or like the shrivelled wings under the soldered wing-covers of some beetles, should thus so frequently bear the plain stamp of inutility". However, this argument constitutes a rebuttal of a particular theological view about the nature of creation, based on an assumption about the nature of God, namely that God would never create useless structures, and thus it is a theological argument rather than a scientific one. Thus, I reiterate the claim made previously (Scadding, 1981) that this is essentially a theological and not a scientific argument, and thus should have no place in a scientific presentation of evolution.

It is interesting to note in passing that the argument used by Naylor, i.e. that there are two and only two mutually exclusive, theories of origins, and that evidence against one is automatically evidence for the alternate, is often seen in the publications of creationists who basically claim that weaknesses in the theory of evolution are thus evidences for their particular interpretation of creation. Thus, publications of "creationists" often contain little more than a rehearsal of the supposed weaknesses of evolution. I have criticised this argument when used by creationists, (Scadding, 1978) and similarly oppose its use by evolutionists, since one of the premises of the argument, i.e. that there are two and only two possible theories of origins, is false.

Thus, in conclusion I find Naylor's critique to be without force since he has given no compelling reason to doubt my initial position that vestigial organs do not provide scientific evidence for evolution.

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References

Bube, R.H. 1980. Creation (A) How should Genesis be interpreted? J. Am. Sci. Affiliation, 32(1): 34-39.

Darwin, C. 1859. The Origin of Species. John Murray, London.

Naylor, B.G. 1982. Vestigial organs are evidence of evolution. Evolutionary Theory, 6: 91-96.

Scadding, S.R. 1978. Book Review of "Creation vs. Evolution Handbook". J. Am. Sci. Affiliation, 30(1): 40.

Scadding, S.R. 1981. Do 'Vestigial Organs' provide evidence for evolution? Evolutionary Theory 5: 173-176.

Wiedersheim, R. 1895. The Structure of Man. MacMillan and Co., London.