

# Do any vestigial structures exist in humans?

Jerry Bergman

The standard definition of 'vestigial' is an organ that once was useful in an animal's evolutionary past, but that now is useless or very close to useless. The list of vestigial organs in humans has shrunk from 180 in 1890 to 0 in 1999. Evidently to salvage this once-critical support for evolution, a new revisionistic definition of a vestigial structure is now sometimes used. This definition involves the idea that a vestigial organ is any part of an organism that has diminished in size during its evolution because the function it served decreased in importance or became totally unnecessary. This definition is problematic because it is vague and would allow almost every structure in humans to be labelled as vestigial.

## Classical definition of vestigial

The question, 'Do any vestigial organs exist in humans?' (or any other life form for that matter), first requires a definition of 'vestigial'. The most common definition of a vestigial organ throughout the last century was similar to the following: *Living creatures, including man, are virtual museums of structures that have no useful function but which represent the remains of organs that once had some use (emphasis mine).*<sup>1</sup> The authoritative reference *The Evolution of Life*<sup>2</sup> defines a vestigial organ as one *'which has lost its function in the course of evolution, and is usually much reduced in size'*.

The standard anatomy authorities usually define a vestigial organ as referring to a once-useful organ that now is useless or very close to useless. *Dorland's Dictionary* defines the term vestigial as *'a vestige, trace or relic'*, and defines the term as *'the remnant of a structure which functioned in a previous stage of a species [evolution]'*.<sup>3</sup> *Churchill's Dictionary* defines vestigial as an organ that has *'no obvious function'*, and notes that the word vestigial derives from the Latin *vestigium*, *'meaning footprint, imprint, track, trace'*.<sup>4</sup> A standard dictionary of biology defines the word vestigial as follows:

*'An organ that is functionless and generally reduced in size but bears some resemblance to the corresponding fully functioning organs found in*

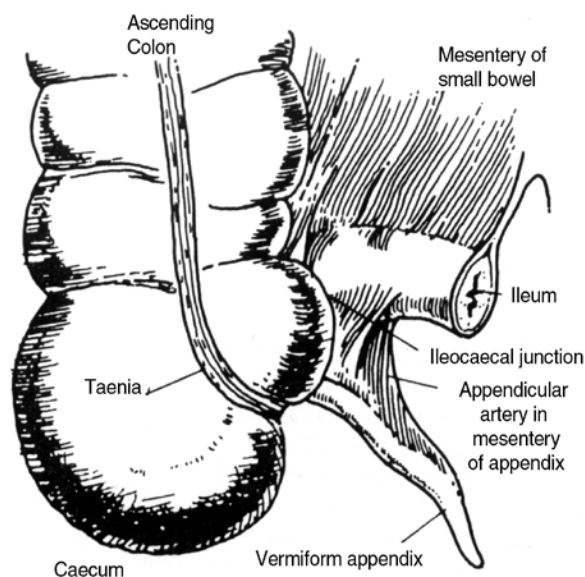
*related organisms. Examples include the wings of flightless birds, the limb girdles of snakes, the appendix and the ear muscles of humans, and the scale leaves of parasitic flowering plants. The presence of vestigial organs is thought to indicate that the ancestors of the organism possessed fully functioning organs ...'*<sup>5</sup>

Asimov<sup>1</sup> provides two examples of a vestigial organ: (1) the tiny bones posterior to the sacrum called the coccyx (which Asimov claims were *'once meant for a tail'*); and (2) the small muscles around the ears (which Asimov claims are *'unworkable muscles once meant to move the ears'*). As we will see, these conclusions are not based on empirical evidence but instead on evolutionary assumptions.

The above definitions of vestigial organs all focus on organs that once had an important function in an animal's evolutionary past, but have virtually no function in the animal today. The following example is typical of how the vestigial organ argument was used in textbooks in the past as a 'proof' of evolution:

**'Useless Organs Prove Evolution.** *Science has piled up still further evidence for its case. It has found a number of useless organs among many animals. They have no apparent function and must therefore be a vestige of a once useful part of the body. A long time back these vestigial organs must have been important; now they are just reminders of our common ancestry. One example is the vermiform appendix which not only is utterly useless in human beings but which often causes great distress [emphasis in original].'*<sup>6</sup>

This definition still is commonly used. One of the most popular modern life science textbook writers defined



*Once claimed by evolutionists as a vestigial organ, the appendix has many known functions.*

‘vestigial’ as follows:

*‘Evolution is not a perfect process. As environmental changes select against certain structures, others are retained, sometimes persisting even if they are not used. A structure that seems to have no function in one species, yet is homologous to a functional organ in another species, is termed vestigial. Darwin compared vestigial organs to silent letters in a word — they are not pronounced, but they offer clues to the word’s origin.’*<sup>7</sup>

In the past, evolutionists claimed that there were approximately 180 vestigial organs in humans, including the appendix, the tonsils, the pineal gland, and the thymus. Now we know that:

- The appendix is part of the immune system, strategically located at the entrance of the almost sterile ileum from the colon with its normally high bacterial content.
- The tonsils have a similar function in the entrance to the pharynx.<sup>8</sup>
- The pineal gland secretes melatonin which is a hormone that regulates the circadian rhythm and has other functions.
- The thymus is part of the immune system, related to T-cells. HIV attacks T-cells, rendering them ineffective and for this reason is always eventually fatal.

The number of organs that once were believed to be functional in the evolutionary past of humans but are non-functional today has been steadily reduced as the fields of anatomy and physiology have progressed. Few examples of vestigial organs in humans are now offered, and the ones that are have been shown by more recent research to be completely functional (and in many cases critically so, see Bergman and Howe).<sup>9</sup>

The idea of vestigial organs in humans also is discussed in popular books on science and medicine, whose authors frequently admit that the common examples no longer are considered as valid. One popular book on the human body which discussed vestigial organs stated that next to circumcision

*‘... tonsillectomy is the most frequently performed piece of surgery. Doctors once thought tonsils were simply useless evolutionary leftovers and took them out thinking that it could do no harm. Today there is considerable evidence that there are more troubles in the upper respiratory tract **after** tonsil removal than before, and doctors generally agree that simple enlargement of tonsils is hardly an indication for surgery [emphasis in original].’*<sup>10</sup>

### The revisionists’ definition

The claim by creationists that there are no vestigial organs in humans usually refers to the most common definition that has been employed for the past century, not the problematic, newer definition now being used by evolutionists in an attempt to salvage the idea — i.e. organs that

have ‘reduced function’ compared to their putative use in some vague, undefined past. According to the revisionists’ definition, a vestigial structure is:

*‘Any part of an organism that has diminished in size during its evolution because the function it served decreased in importance or became totally unnecessary. Examples are the human appendix and the wings of the ostrich.’*<sup>11</sup>

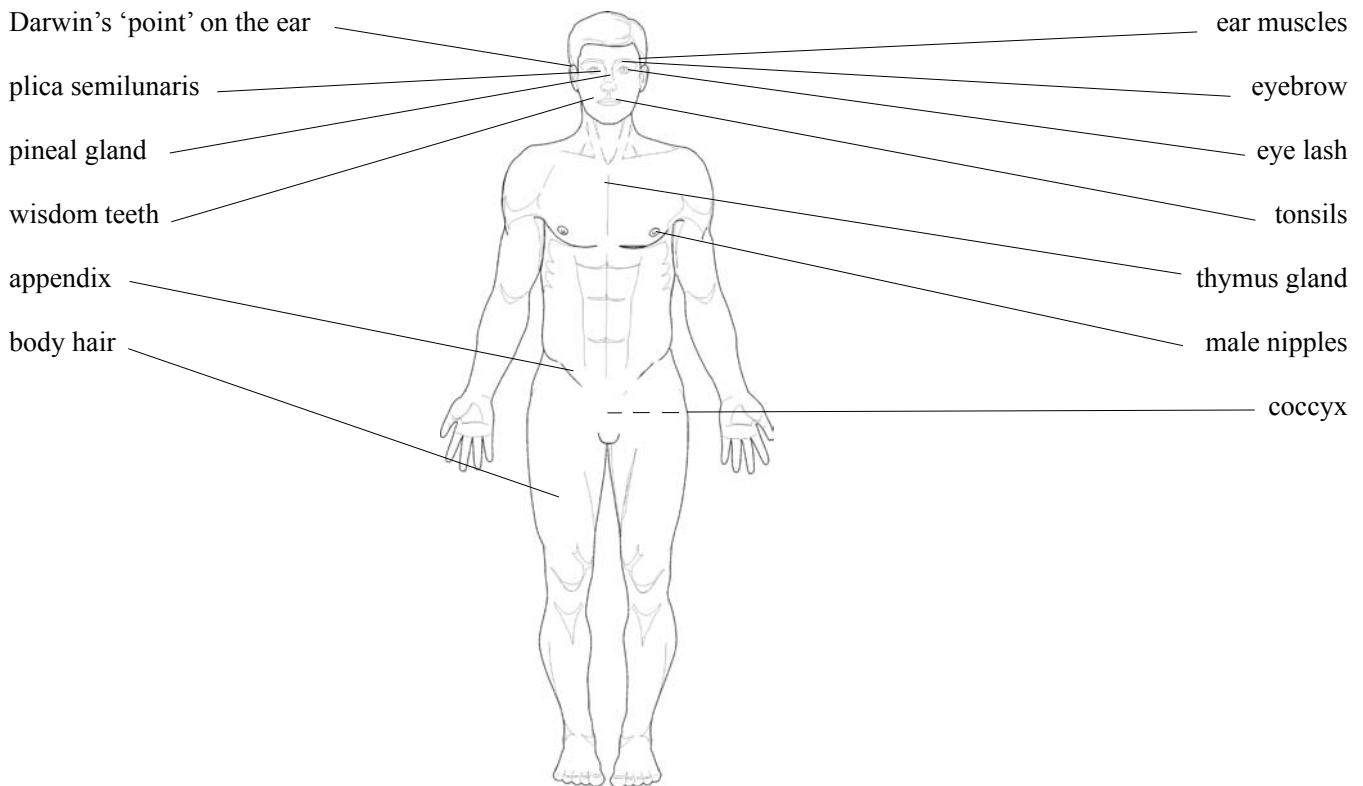
Another source defines a vestigial structure as ‘any organ that during the course of evolution has become reduced in function and usually in size’.<sup>12</sup> This revisionistic definition of ‘reduced in size and function’ is unwarranted for several reasons. For example, how much reduction is required before the label ‘vestigial’ becomes appropriate? Is 30 % a large enough reduction, or will a 1 % reduction suffice? In addition, there are so many examples of ‘reduced size’ (and sometimes function) that the label ‘vestigial’ becomes meaningless.

For example, an analysis of the skull morphology of our supposed evolutionary ancestors would lead to the conclusion that our jaw is vestigial, as compared to that of our alleged ancestors, since it is alleged by evolutionists to be comparatively *smaller* in humans today (and also has a reduced function, at least relative to its strength and ability to masticate food). In fact, as a result of our smaller jaw, some of our teeth (e.g. wisdom teeth) are claimed to be vestigial.<sup>13</sup>

This definition of vestigial also would necessitate the conclusion that because the external nasal orifices (the nostrils) are smaller in modern humans (compared to hypothetical ape-like ancestors), they, too, should be labelled as vestigial. Many people have problems breathing partly because their nostril passages are too small, as is obvious from the widespread use of nose bridge expander units and nasal sprays. This also is illustrated by the frequency of rhinoplasty surgery, especially surgery to repair a deviated septum. No evolutionists have claimed that our jaws or nostrils are vestigial, yet according to the revisionists’ definition they clearly would be vestigial structures.

Furthermore, since the human jaw, eyes, eyebrows, brow ridges, front limbs, nose, ears, eyes, and even mouth could be labelled vestigial, the term obviously becomes meaningless when defined in this fashion. The textbook illustrations of our alleged ancestors consistently show them with thick skulls and large protruding brow ridges that serve to protect their eyes. Our skull and brow ridges therefore would be vestigial. Why natural selection would cause these structures to diminish in size in modern humans is never discussed (especially since selection would appear to do the opposite).

Evolutionists even use the lack of brow ridges in humans as an example of poor design. For example, Colby concluded that the ‘human skull is too thin to provide adequate protection to the gigantic brain and the absence of brow ridges leaves the eyes poorly protected’.<sup>14</sup>



*A list of some of the 180 structures that were considered vestigial in the early 1900's. It is now almost unanimously agreed that most of these structures have at least one function.*

Furthermore, on the average, muscle mass, organ function, and strength have decreased in modern humans, no doubt through lack of use due to living in modern society. By the revisionists' definition, ageing alone produces vestigial organs in virtually every human.

If the definition of a vestigial organ is one that is *less* developed in a modern animal (compared to an ancestor) due to loss mutations, adaptation, etc., *all* organs in modern humans that were more developed in our alleged ancestors would be vestigial. This means that if macroevolution were true, and if humans evolved from lower animals, one could argue that virtually every structure in modern humans is vestigial because vestigial organs are defined as those that are somewhat less useful today than they were in the past. A rare exception would be the human brain — and even the brain could be *claimed* to be vestigial in size if we accepted Neandertals as our ancestors.<sup>15</sup> Neandertals, on the average, had a brain larger than modern humans — about 1,500 cc compared to 1,300 cc for people today.

Probably the best example of this definition of vestigial structures is the ability of some bacteria to digest the most common organic compound on Earth, cellulose. Cellulose is the chief component of plants (grass, leaves, wood, and tree bark are primarily cellulose; see Black<sup>16</sup>). The only reason that many animals (including cows, horses, sheep and termites) can use grass and wood for food is because they have a symbiotic relationship with certain bacteria that are able to digest cellulose.

Yet evolutionists postulate that higher organisms lost the ability to digest cellulose. Thus, most modern animals have a vestigial cellulose metabolism system. If humans possessed this ability, starvation and most malnutrition would be a thing of the past. Starvation and malnutrition have been major problems throughout history, and even today an estimated 60 percent of the world's population is malnourished. Evolution, it would seem, should select **for** the ability to metabolize cellulose, and certainly would select **against** those life forms that lost this ability.

The revisionists' definition of vestigial also requires that the evolutionary history of an animal is known, when, in fact, the history of most, if not all, life often is admittedly largely speculation. Furthermore, the judgment of vestigial is based on evaluations of *modern examples* of apes, rabbits, other animals, and humans. These judgments cannot be based on our actual evolutionary ancestors for several reasons. Although many fossil bone fragments have been found, no well-preserved mammals (or mammal organs) that are estimated to be 1,000,000, or even 50,000, years old exist. Consequently usually *only* modern examples can be used for comparison. Note Asimov's example:

*'In certain plant-eating animals, the caecum is a large storage place where food may remain to be broken down by bacteria so that the animal itself may more easily digest and absorb it. The appendix in man and the apes (it occurs in almost no other animal) is what remains of that large caecum. It*

*indicates that the fairly near ancestors of man and the apes were plant-eaters. The appendix is thus the useless remainder of a once useful organ; it is a vestige, from the Latin "vestigium" (footprint). Just as a footprint is a sign that a man once passed that way, so a vestige is a sign that a useful organ once passed that way.'*<sup>17</sup>

The example often given to support this conclusion, the modern human appendix, is judged vestigial when compared to an animal that has a larger appendix (such as the modern rabbit). What should be compared, though, is not modern humans and modern rabbits but modern humans and our *actual* ancestors — something that can only be estimated by examining extant fossil remains of our putative ancestors (most of which are badly distorted bone fragments). Much can be learned about an animal from bone fragments, but little can be ascertained about organs, organ tissues, cell structures, and most other key biological aspects of life because no examples exist in the fossil record. The only criterion for making judgments about organ evolution is an examination of modern animals (like the rabbit). The vestigial organ argument becomes a classic case of circular reasoning when it infers reduced organ size because of accepted phylogenies and then uses this alleged reduction to prove the phylogenies.

Yet another revisionist's definition suggests that any 'organ or structure that lacks function related to the animal's survival' should be labelled as vestigial. Actually, all organisms have large numbers of structures that fit this definition. To creationists, this fact argues for a designer, because such structures cannot be explained by natural selection for the simple reason that they confer no known survival advantage. Examples are everywhere, and in humans include the ability to create music, song, and dance. Even in the plant world there are many examples of structures that cannot be explained by natural selection. Some modern flowering plants (such as dandelions) are self-pollinating and consequently have no need for flowers. According to the 'lacking function for survival' definition, they would be vestigial.

### Conclusion

Creationists use these and similar examples to argue that much of God's creation was designed for human enjoyment and for God's own enjoyment, as He declared it 'good' several times before man was created. A field of dandelions is a thing of beauty that is famous the world over (and thus a favourite of photographers everywhere). Evolutionists never have explained how and why so many structures could exist in humans (like the complex structures that enable music, song, and dance) that confirm no survival advantage yet delight millions. Only Creation can explain this observation. The clear conclusion is that the concept of evolutionary vestigial organs is useless, or largely speculative, and certainly is not good science.

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