Observations of the Owl (20)

Valuable Vestiges

Who're more perfect – humans or owls? I think you know *my* opinion, just as I'm quite sure about *yours*. Compromises impossible, I guess.

Nevertheless, let's talk a bit about *perfectness*. Of course, owls and humans lead very different life styles for which, as a consequence, we have developed very different adaptive skills and features. Therefore, in this respect it always depends on the situation who of us can tackle it 'more perfectly'. You, for example, are definitely the better football players (not least, since we've never had even the slightest interest in aimlessly running and kicking a ball around) – on the other hand, challenge us to find and catch a mouse in the dark (something in which you humans at least occasionally *need* to take an interest). But before we get started, it's no use comparing apples and oranges; I am afraid that won't get us any further...

Hmm, but wait... perhaps this might help! Just recently, I read an article that dealt with vestigial structures and organs. You know what I mean? In biology, 'vestige' is the common word denoting reduced or rudimentary structures compared to the same complex structures in other organisms. Like the blind eyes of mole rats and certain cavefish, the leg bones of some whales, or the flowers and pollen of asexually reproducing dandelions.

These and all the other examples can easily be explained in evolutionary terms as constituting rudiments of once beneficial functions and structures of the organisms' predicted ancestors, which today are no longer needed to this extent. That, however, doesn't necessarily mean that vestigial structures lack any function at all; quite often, such a remnant structure has still retained or adopted some function but has become useless for the original, more complex function and, thereby, lost its 'greater' significance.

Take your appendix, for example. Millions of appendicitis patients have proven that you can easily do (and digest) without it but, as long as it is present, the appendix seems to serve as a reservoir for biofilms of symbiotic gut bacteria from which your gut flora can rapidly be re-colonised after diarrhoeal episodes.

But back to our topic. What do you think? Can one say that the more vestigial structures an organism has, the less *perfect* it is? Or, let's say, less *perfectly adapted* – at least as a rule of thumb?

Anyway, you can imagine how much fun I had in this respect when said article finally described how the German anatomist Robert Wiedersheim, in his book *The Structure of Man* catalogued 86 human structures that had, in his words, "lost their original physiological significance". Okay, that was as early as 1893. However, the article continued that later versions of Wiedersheim's list were expanded to as many as 180 human "vestigial organs". This is why in 1925 the American zoologist Horatio Hackett Newman stated that, "There are, according to Wiedersheim, no less than 180 vestigial structures in the human body, sufficient to make of a man a veritable walking museum of antiquities."

Great! A "veritable walking museum of antiquities". I admit, I had such a good laugh that I almost fell off my branch.

Of course, Wiedersheim's catalogue mainly constituted a "list of lacking knowledge" and the functions of most of the 180 human "vestigial organs" have, in the meantime, been discovered. However, some of them have remained vestiges until today: the appendix, the tonsils, male breast nipples, the sparse body hair and the goose pimple reaction, wisdom teeth, your tail bone (coccyx), to name but a few.

But now think! Do you know of any vestigial structure in us owls? No? Well, I performed an extensive Google search and I didn't find any, either. Concerning birds in general, there's just the one story about those weird relatives of mine – ostriches, penguins, kiwis, stupid chickens – that have wings, which are useless for flying. And that's it! Admittedly, as in all extant organisms, I'd expect our owl bodies to be hiding some vestiges of our evolutionary ancestors that are still waiting to be found. Nevertheless, I'd safely bet we'll never get to the point of being called "veritable walking museum of antiquities". (*Heehee…*)

> ***"So much for the still widely-held notion that evolutionary biology is a purely descriptive science."***

Okay, okay. Probably the amount and number of obvious vestigial structures doesn't reveal anything about being more or less *perfect* (or *perfectly adapted*). However – to change the subject – there is another aspect of evolution where vestigial structures in particular can help *a lot*. Just take the notion that vestigial characters are 'disfunctioned' rudiments of structures that were once functional and beneficial in the respective organism's ancestors. If this evolutionary explanation is basically true, then, in turn, no organism can have a vestigial structure that was not previously functional in one of its ancestors.

Do you see what that means? It opens the road to making a huge number of predictions about vestigial characters that are allowed and those that are impossible for any given species. For example, that we should never find vestigial nipples or traces of a placenta in owls, just as we should never find vestigial feathers or gizzard-like structures in humans. On the other hand, we can predict that you humans may have a "regressed" vomeronasal organ since you descend from small mammals that communicated extensively via pheromones (like mice) – and indeed you do.

Even more, this predictive power also extends to the molecular level. Since, for example, we owls descend from therapod dinosaurs, we can predict that we may still have large parts of the molecular information to grow teeth – and we do. And since you descend from small mammals with 'very fine noses', we can predict that your genome may still contain a couple of non-functional pseudogenes for odorant receptors – and it does.

So much for the still widely-held notion that evolutionary biology is a *purely descriptive* science.

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