The general and the specific

As you read the literature on evolution, you will encounter the same argument in different guises. For example, one author talks about "nascent adaptations," another about "incipient adaptations," and still another about organs that are "not fully developed." But they are all making the same point. To make sense of this literature, you must learn to see through these differing labels.

It is easy to get confused not only by labels, but also by the different examples that may be used to make a single point. For example, Mivart [1869] uses several examples to illustrate the problem of nascent adaptations: *(1)* the neck of the giraffe, *(2)* coloration that makes an animal blend into the background, *(3)* coloration that makes one species resemble another, and *(4)* the position of the eyes on a flatfish. These do not represent four distinct arguments; they are four illustrations of a single argument.

To see through these differences, you need to express each argument in general terms. In terms, in other words, that do not refer to any specific example. I illustrate this process with the argument that evolution cannot produce complex adaptations. Here is one version of the argument, made by Murphy [1866, cols. 2–3]:

> Now, to give origin to such an organ as the eye, one favourable variation is not enough: there must be a concurrence of several. To form the eye of one of the higher animals is needed a well-expanded and sensitive retina, an elaborate optical apparatus consisting of, I believe, three distinct parts—the black pigment that prevents any confusion arising from reflection of light within the eye; a moveable eyeball; moveable eyelids; and an iris which expands or contracts with diminished or increased light, with its nervous connections, which are two—one for contracting, which has its root in the brain, and one for expanding, which has its root in the sympathetic ganglia. Here is a considerable number of parts and connections, every one of which would be useless without all the rest, and every one of which, consequently, pre-supposes all the rest.

Here is how Behe [1996] made the same argument:

> What components are needed for a cilium to work? Ciliary motion certainly requires microtubules; otherwise, there would be no strands to slide. Additionally we require a motor, or else the microtubules of the cilium would lie stiff and motionless. Furthermore, we require linkers to tug on neighboring strands, converting the sliding motion into a bending motion, and preventing the structure from falling apart. All of these parts are required to perform one function: ciliary motion. Just as a mousetrap does not work unless all of its constituent parts are present, ciliary motion simply does not exist in the absence of microtubules, connectors, and motors. Therefore, we can conclude that the cilium is irreducibly complex; an enormous monkey wrench thrown into its presumed gradual, Darwinian evolution.

These authors use different examples, but their logic is the same. To see this, it helps to restate the argument in general terms:

> The hypothesis of natural selection requires that each organ be constructed via a sequence of small, individually-beneficial changes. For complex organs—those with multiple parts that contribute to function in a coordinated way—no such sequence of beneficial changes is possible. Early versions of the organ would have lacked essential parts and could not have been beneficial. For this reason, natural selection cannot construct complex adaptations.

This more general statement of the argument makes it easier to see that Murphy and Behe are making the same point.

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