"Mehr Licht!" Anschauung and Its Fading Role in Morphology

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Zusammenfassung

Anschauung spielt eine Schlüsselrolle, wenn es um die Beobachtung und ein Verständnis der Morphologie geht. Dennoch wird sie in der modernen Biologie als altmodische und subjektive Praxis angesehen. Darunter leidet vor allem die Taxonomie, die in einer zunehmend nicht vergleichenden und von Technologien geprägten Biologie irrelevant wird. Sind wir – ohne es zu merken – dabei, die menschliche Beobachtungstätigkeit und uns selbst aus dem Studium der Morphologie zu entfernen? Indem wir uns auf Goethes Wissenschaftsansatz besinnen, erobern wir die wesentlichen Grundlagen zurück, die die vergleichende Biologie und unsere Verbindung zur Morphologie unterstützen.

Summary

Anschauung is the key to observing and understanding morphology, yet it has been deemed by 21st century biology to be an outdated and subjective practice. One field suffering this fate is taxonomy, which is becoming irrelevant within an increasingly non-comparative, model-based and technology-driven biology. Are we unwittingly removing human observation, and ourselves, from the study of morphology? By returning to Goethe's way of science we regain the fundamental principles that underpin comparative biology and our connection to morphology.

Losing sight of Morphology

In almost every university, natural history museum and herbarium, morphology is seen as an outdated practice, one that is often thought of as a bygone field. Our eyes and vision, for instance, are viewed as inferior tools that are muddied by our own perception rending *everything* a scientist observes, which is unaided by technology, as potentially subjective. So extreme is this viewpoint that popular scientific spokespeople, such as US astrophysicist Neil deGrasse Tyson, have declared that observation "only really becomes science after you have replaced the human sensory system with an apparatus that can make an objective measurement" (*deGrasse Tyson* 2016). Note the use of the term "objective". The "human sensory system" is an essential part of morphology, which incorporates taxonomy (the study of morphological classification). Lately, taxonomy has faced similar criticism:

> *"We suspect that taxonomic inflation will become less of an issue as taxonomists adopt more objective species delimitation methods (such as [Molecular Bayesian Phylogenetic models]) and move away from […] subjective species diagnoses [morphology]"*
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> (*Fujita* & *Leaché* 2011, p. 494)

> *"Purely morphological research in invertebrate taxonomic research is becoming rare […] as molecular techniques become more popular."*
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> (*Pilgrim et al.* 2002, p. 184)

The devaluing of human observation, particularly in taxonomy, is not new. English botanist Agnes Arber had noted that the "work of the taxonomist, like that of the morphologist, is sometimes slighted as being purely 'descriptive', and hence of no theoretic interest […]" (*Arber* 1964, p. 8). As I will show, "descriptive" science, such as taxonomy, not only involves observation; it also involves an interaction with the mind, or *Anschauung* which Arber translates as "thinking with the mind's eye", something that "lies midway between sensors perceptions reached through bodily sight, and the abstract conceptions of the intellect" (*Arber* 1946, p. 85).

Anschauung and Discovery

One question often asked of my work is "What *question* are you asking?" Often I am compelled to lay a slab of fossiliferous rock in front of students and answer their question with another question "What is *that*?" After all, this is what many taxonomists do, describe taxa and attempt to understand what they are, often re-examining their morphology, a process that can take days, weeks, months or even years. But through observing the taxa and their anatomy we begin to understand what they are in context to the rest of life. In other words, we attempt to bring meaning to form through observation and experience of past observations. We may, for instance, see the same form in different taxa in various manifestations. We may compare our own forelimb to that of a cat or bat or whale. The same structures are found in all three forelimbs, but as different manifestations. Together, the observations and experiences reveal a whole form in our mind's eye. We see the mammalian forearm, not as a separate and singular object, but as an idea of form or *Urphenomenon* that exists between our own mind and the forms we have observed. The *practice* of observing and experiencing form is what Arber described above as "Anschauung", a term that derives from Goethe's scientific work (see *Goethe* 1954, p. 95–96). Anschauung is an activity that allows us to make discoveries. A slab of fossiliferous rock, such as the one shown below (Fig. 1), would immediately grab the attention of any palaeontologist.