Goethe's Spirit Haunts a New Dynamic Biology

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Zusammenfassung

In seinen wissenschaftlichen Studien beschrieb Goethe Lebewesen als aktiv gestaltende Entitäten, die sich in Bezug aufeinander und auf ihre Umgebung ständig verändern und neu definieren. Hier diskutiere ich die jüngsten Entwicklungen in der Evolutionsbiologie, die für goetheanistische ForscherInnen von Bedeutung sein dürften. In den letzten Jahren haben einige etablierte BiologInnen die Auffassung vertreten, dass das Standardmodell der «modernen Synthese» einer Aktualisierung bedarf, um Studien, deren Bedeutung für die Evolution dort nicht ausreichend erfasst wird, adäquat einzubeziehen. Die vorgeschlagene «erweiterte Synthese» enthält mehrere Ideen aus der evolutionären Entwicklungsbiologie, wie z.B. die phänotypische Plastizität, die ein dynamischeres und reaktionsfähigeres Organismusmodell entwerfen als bisher. Diese Verschiebung im Konzept des Organismus scheint sich Goethes Perspektive anzunähern und könnte die Grundlage für einen fruchtbaren Austausch zwischen modernen Biologen und goetheanistischen Wissenschaftlern bieten.

Summary

In his scientific studies, Goethe described living organisms as generative entities, constantly changing and redefining themselves with respect to each other and their surroundings. Here I discuss recent developments in evolutionary biology that may be of interest to Goethean scientists. In the past few years, some mainstream biologists have argued that the current evolutionary model requires updating, to allow for the inclusion of studies that do not quite fit the "modern synthesis". The proposed "extended synthesis" includes several ideas from evolutionary developmental biology such as phenotypic plasticity, that present a more dynamic and responsive model of organisms than previously. This shift in the concept of organisms seems to converge towards a Goethean perspective and could provide a basis for valuable exchange between mainstream biologists and Goethean researchers.

Introduction

In biology, the poet and polymath J.W. Goethe is admired as a gifted "amateur" who secondarily made some notable contributions to botany and anatomy (*Goethe* 1789; 1817). Consequently, modern biologists have paid little attention to his methods of studying nature. Goethe's highly interconnected way of seeing, thinking and imagining, along with his descriptions of organisms are placed within the general context of Romantic tradition

and are not thought to be legitimate scientific practices (*Richards* 2004). However, more recently his way of working in science has begun to stir interest and small groups of researchers are exploring how methods inspired by Goethe's "ways of seeing" may be of practical use in education, therapy and potentially scientific research (*Code* 2019, *Sassoon* 2018, *Frances & Wride* 2015, *Gordon* 2015, *Riegner* 2013).

In this paper I would like to draw attention to an aspect of Goethe's biological studies and point out that certain trends in current evolutionary biology appear to be working with comparable concepts. I believe it is important for those interested in Goethe's methods to be aware of these advances, with a view to opening discussions and broadening perspectives. In the present times, the opinions of evolutionary biologists are influential. Evolutionary models have a high media profile and undeniably affect the way people think about their own identities and their place in nature. The way biology is conceptualised and presented can have an impact on human relationships with animals, plants and other people, even if only subliminally. Conversations between mainstream biologists and Goethean researchers could open up some interesting avenues of research in the future.

Both Goethe's poetic and scientific writings refer to nature's intense developmental activity: each living being and every living part strives to express its essential vital self in dynamic relationship with other striving individuals and parts. The tension and movements between these living entities, in Goethe's view, give rise to the creative and generative capacities of nature (*Goethe* 1987). Thus he consistently thought of plants and animals as highly mobile, fluid entities in states of continual, responsive and creative relationships. As I hope to show, this powerful moving image is becoming apparent in the way biologists model the living world; but not surprisingly the new models are approached from within the explanatory framework of the modern biological discipline. Nevertheless, these new concepts are causing biologists to re-think certain long-held notions in evolution (*Laland et al.* 2015). On several occasions Goethe himself entreated scientists to change their ideas with the same plasticity and flexibility that nature changes itself. In the near future, those who follow biology may be privileged to see evolutionary shifts within the discipline itself.

Current evolutionary models

It is well known that living organisms are able to adjust to environmental fluctuations and cope with moderate challenges from their surroundings (*Wong & Candolin* 2015). But how far can responses to these proximate situations stabilise into inheritance? How far do they influence the evolutionary future of descendants or even the whole species? The usual answer