

4th FLO-RE-S / Bellis symposium - Dornach 2017

International Conference Evolving Morphology: 200 years Goethe's Zur Morphologie

As an attempt to encompass most of the nuances in the evolution of morphological thinking, the program of the conference was diverse, ranging from lectures, panel discussions with the speakers, research presentations, open space for specialised professional meetings (Symposia) to artistic workshops for nature observation and eurythmy with the interaction of the participants.

On Wednesday evening (4.10), Wolfgang Schad kicked off with an opening lecture on the phenomenon of temporalization of nature in the evolution of human consciousness, expressed in works of art and science, and its implications in the development of the idea of metamorphosis. Over the next four days, the theme of the conference evolved from historical and methodological aspects, passing through the philosophy of morphology, and diving into contemporary morphological research in Botany, Zoology and Medicine.

In such way, the conference was taking shape into a threefold-integrated whole by keeping with the intentions, content and nature of Goethe's morphological notebooks:

1. **The History of Morphology:** In Goethe's time, scientific writings were usually accompanied by much-appreciated historical and autobiographical treatments. The eminent historian of science and Goethean scholar, Dorothea Kuhn, stressed this aspect of Goethe's scientific writings, calling it the principle of the autobiographical form. Bearing that in mind, João Felipe Toni explored in his keynote the original intention and meaning of morphology as an independent and auxiliary scientific discipline in Goethe's *Zur Morphologie*.
2. **The Philosophy of Morphology:** Central to Goethe's conception of Form is his "anschauende Urteilskraft." This epistemic principle permeates the entire *Zur Morphologie*, prescribing the methods of morphological research ("vergleichende und entwickelnde Methode") and encompassing the 9 philosophical world-views presented by Rolf Sattler. Other aspects of Goethe's method were exemplified by the lecture of Peer Schilperoord on the model of the perennial plant as an aid to expanding the horizons of the concept of plant metamorphosis. Michaela Glöckler provided us an account on Steiner's philosophy of the seven life processes as a method of approaching the Goetheanistic mode of observation and its implications in medical praxis and training.
3. **The Science of Morphology:** Malte Ebach, Johannes Wirz, Rolf Rutishauser, Mark Riegner, Susanna Kümmel and Craig Holdrege addressed the content of morphology through presentations of contemporary work and evaluated the relevance of these concepts in current scientific fields like taxonomy and systematics, plant evo-devo, the social behaviour and biology of the honeybee, and the evolution of tetrapods, frogs, and birds.

The keynote lectures were then supplemented by research presentations on special topics: geomorphology (including landscape, agriculture and geography), plant morphology, animal morphology and anthropology. Historical and philosophical questions also continued to be addressed and deepen in the presentations, especially regarding the scientific debate in the Academy of Paris between Cuvier and Geoffroy Saint-Hilaire and Goethe's participation in the dispute.

The conference had also a special participation of some members of the FLO-RE-S research group presenting their latest work and findings in floral morphology and evolution. Here are the abstracts from our colleagues during the research presentation sessions "Plant Morphology I" and "Plant Morphology II":

Patrícia dos Santos

Morphology: A Science on the Verge of Extinction?

Morphology has always been one of the classical approaches of Botany. The form (morphe) of a plant is the first contact we have with it, thus for naturalists it has instinctively become one of the main topics in botanical studies and also one of the oldest. As a descriptive field of science, it is mostly used in visual identification and taxa descriptions. The importance of morphological studies has an historically undoubted recognition, leading the way and perspectives to new areas of research, which have greatly increased our understanding of life overall. However, the increase of specialization and the consequent creation of new fields of science has created a detachment from morphology by plant biologists in recent decades.

Kester Bull-Hereñu

Morphological changes in flowers linked to size shifts of meristems

To understand how flower and inflorescence form changes through evolution it is important to understand in the first place how the floral phenotype is achieved in the individuum, i.e. how the corresponding ontogenetic process occurs and under which principles it takes place. Understanding the ontogenetic process and its drivers is a powerful framework for understanding and inferring changes that the floral phenotype of a given lineage might have experienced in evolutive time. Since flower and inflorescences are formed on a meristematic tissue, the particular conditions found therein at the time of floral initiation should certainly have an influence over the resulting mature phenotype. Here we present three examples of how floral and inflorescences morphology has evolved in intimate relation to their evolving meristematic sizes.

Louis Ronse de Craene

Space matters: How spatial constraints affect the Morphology of Flowers

It is generally assumed that floral morphology is essentially regulated by the play of genetic and environmental forces. However, morphological novelties in flowers are often caused by subtle changes in the relationship of organs at their initiation. Three major factors are responsible in changing the spatial configuration of flowers: heterochrony (or shifts in the initiation sequence of organs), external and internal pressures of organs, and the relationship between organ size and diameter of the floral apex. A number of examples of the order Caryophyllales (Caryophyllaceae, Montiaceae, Phytolaccaceae) demonstrates the effect of spatial constraints on floral morphology and evolution. It is suggested that floral evolution is regulated by a changing balance of biophysical forces, genetic predisposition, and pollinator choice, which act in variable degrees.

Moreover, two Symposia were offered as an open space for people to meet, make connections, share ideas in smaller groups regarding certain topics and also for existing groups to present their research topic and open for potential participants. It was a remarkable moment for the **FLO-RE-**

S and BELLIS research groups to join the conference and to meet during the Symposia for an enlivening exchange on different topics in **Floral Morphology**, for example, there was one block dedicated to the topic of "synorganization in flowers". Since most of the members of both groups are engaged not only with research but also with teaching, it was also a great opportunity to gather and set up a conversation to introduce their work, approaches, and to bring forth potential collaborations that could lead into new questions regarding the conceptual framework, methodology and praxis in the research and education of floral morphology.