

Developmental rule of complex science

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Through the extensive compilation of research history for the last 500 years in natural science, the evolution of complex science can be summarized into three periods. These are: (1) Period of Description, (2) Period of Classification, and finally (3) Period of Systematization. Regarding biology, the first period (Period of Description) lasted a long time, following the binominal nomenclature by Carl von Linne (1707-1778). Afterwards, the distribution of animals and plants was classified over the world, and Ernst Haeckel (1834-1919) proposed the phylogenetic tree of life. Charles Darwin (1809-1882) also speculated the evolution of life which is generally known as the Period of Systematization. Now in 21st century, a similar cycle is on-going in gene-level research, which includes (1) cataloging the kinds of genes and composing organisms including prokaryotes and Eukaryotes), (2) classifying a large database of genes), and (3) the development of a model to discuss the origin and evolution of life. This cycle is common in any natural science field. In the case of planetary science, (1) a catalog of planetary bodies was created by Copernicus and Brahe in the 16th century, followed by (2) classification performed by Galileo in the 17th century, and later (3) systematization done by Galileo and Kepler in the 17th century. And now, the second cycle is underway with an ever-growing catalog of exoplanets beginning with the initial discovery in 1995 and now totaling more than 6,000. In the case of Earth Science, the first descriptive period was the cataloging of Earth's surface geology, which continued over 500 years. The classification of on-land geology by 1945 resulted in the geosynclinal-development model, with ocean geology being left until 1965. In 1968, immediately after the classification of ocean-floor geology and geophysics, the theory of plate tectonics was proposed. And then, classification of geologic units between ocean and continent had been achieved.

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