
 Book reviews

Elsasser, W.M.: *Biological Theory on a Holistic Basis*. Baltimore: Department of Earth and Planetary Sciences. John Hopkins University 1982. 136 pp.

In a recent interview (*Science* 216: 718–720) Ernst Mayr stated that physicists have great difficulty in understanding the theory of evolution. Since evolutionary theory is one of the fundamentals of modern biology, the same will hold for biology in general. Elsasser, the author of ‘*Biological Theory*’, is a theoretical physicist who also writes on biology and represents a typical example of Mayr’s statement.

Elsasser is anything but modest. He proposes a new theory which according to him will be like the Copernican or the Einsteinian revolution in physics (p. 16) and “the penalty for failing this step is stagnation” (p. 6). Indeed, Elsasser’s theory is far removed from the modern biological paradigm. In short, he states that for one cell an immense number of possible molecular patterns exists of which only some do actually occur. Hence, according to Elsasser, the organism selects among this immense number of possible patterns and the criterion of this selection is an ‘holistic memory’. This is different from genome replication and acts supplementary to it. The holistic memory has itself no intervening storage. Just as gravitational attraction is an ‘action at distance’ without direct contact, the holistic memory is a transmission of information over time without intermediate storage mechanisms. Elsasser’s ideas may become more clear by reference to the old dispute between the preformists and the epigenists. According to the preformists, all information for growth is present in the germ. The epigenist, on the contrary, states that during development extra information is put in which was not present in the germ. This type of regeneration of information without intervening storage is according to Elsasser the result of the holistic memory.

To many readers this all will sound as arrant nonsense. Elsasser is aware that his readers will “balk in protest” and say that he tries “to persuade them to accept black magic” (p. 43). Nevertheless, what are his arguments for proposing these ideas? If I have understood correctly his main argument is that the reductionist programme has failed in two instances. First, brain research has been unable to find the memory device. Therefore, there must be a ‘memory without storage’ (p. 89). Second, the morphology of species should change over long periods of time because according Shannon’s law, errors will cause a progressive loss of information. In fact, from the fossil record a constant morphology is observed over millions of years (Elsasser embraces the punctuationalist view of evolution). Therefore, something more must be involved than the mechanistic way of genome transmission: again the holistic memory.

Elsasser may be right in supposing a memory without storage, but his arguing will not convince any critical reader. For his main theoretical point, the discrepancy between the numbers of possible and actual patterns, Elsasser should have discussed the structural and historical constraints. His reasoning from the studies on brain and evolution is at best a fallacy. Elsasser seems to be totally unaware of the ideas in modern biology concerning his main points. Recently, similar proposals have been made by R. Sheldrake, but he at least tried to back up his speculations by marked anomalies in the current paradigm.

From the time of quantum physics many physicists have written on biology and some even turned into experimental biologists (the early molecular biologists). The second group made some important contributions to biology. I doubt, however, whether the first group has added anything of interest. Elsasser surely did not.

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