Symmetry, Causality, Mind

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Symmetry, Causality, Mind is the title of a 630-page book which was published in MIT Press. The book is concerned with the following problem: By what rules is it possible to infer the causal processes which produced a given organization over time. We assume that the only data available is the organization as it exists now, within the present moment. Thus, we are asking this: How is it possible, by examining a configuration, to recover the causal history that produced the configuration, when we have no other information but the configuration within the present moment.

The book elaborates a 600 page rule-system for solving this problem. The system is exhaustive. That is, it provides the causal history of every single feature of the configuration. Thus the entire organization is made to yield its causal history.

We shall say that, when a configuration has been made to yield its causal history, the configuration has been converted into MEMORY.

In a substantial portion of the book, we demonstrate that the rule-system systematically derives, from any ART-WORK, the COMPOSITION of the art-work. This leads us to conclude that art-works are used by human beings as memory-objects. That is, since art-works have their effects via their composition, and since, the application of our memory extraction rule-system to art-works, produces the composition, we are lead to conclude that art-works function as memory-objects for human beings. In fact, we demonstrate that art-works are the maximal memory-objects that human beings can process. This therefore defines what an art-work is.

After the rule-system of the book was published, it was immediately used by scientists in several disciplines throughout the world. These disciplines include the following:
(1) Meteorology: The rule-system was used by researchers in connection with the National Weather Service of Canada, to systematically extract the causal history of storms from the current configuration of clouds.
(2) Radiology: The rule-system was used by radiologists to systematically extract the causal history of tumors from their current state.
(3) Chemical Engineering: The rule-system was implemented on the von Neumann supercomputer to extract the causal history of individual molecules in olutions of molecules.
(4) Linguistics: Researchers working on Indian Languages of Middle America, used the rule-system to disambiguate noun-systems, by applying the rules to pictographic symbols used in those languages.

(5) Forensic Science: Teams of forensic psychiatrists in Texas and Los Angeles have used the rule-system to analyze delusional misidentification syndromes in homicidal patients. Other applications that have been carried out include stock-market analysis, philosophy, etc.

Michael Leyton is President of the International Society for Mathematical Aesthetics. He is winner of the medal of achievement from the Society of Systems Analysis, and winner also of a Presidential Investigator Award for contributions to cognitive science.