

Review by Marina Pavlovna Chernysheva  
of the dissertation by D. F. FLÜCKIGER  
"Contribution towards a Unified Concept of Information"

The significance of any new theory is judged by criteria such as the newness of the problem aspect, productivity in the solution of conflicts between already existing theories, as well as the prospects that exist for the further processing of the theoretical basis of the problem. The dissertation presented by D. F. Flückiger satisfies these criteria in every respect.

The new criterion of the relationship in the semiosis, the criterion of the directivity in the relationship between the object, the overlying signal (character) and the interpreter suggested by the author, have made it possible to resolve a whole range of contradictions between existing semiotic information concepts and to clarify a whole string of terminology. One of the latter is extremely important for all existing information theories – the notion about the nature of information. D. F. Flückiger makes use of the new criterion and also the mathematical apparatus and deduces the law about the "growth of knowledge/equilibrium of knowledge" that is similar to the second law of thermodynamics. Hence one of the conclusions of the law is: Information is similar to energy. The author considers, quite correctly, this thesis to be corroboration of Weizackers hypothesis about information as a manifestation of energy. This agrees with opinions of other authors about the important similarity of information and energy (H. Titze, H. Mey).

As confirmation of the correctness of this conclusion of the Flückiger law, one can quote one of the attainments of neurobiology that lends excellent support to this conception. I am referring here to the potential of the reaction that is registered in the membrane of the majority of neurones (and the cells of many other tissues) as response to an action. From the point of view of the information theory, the power potential can be presented as a single "character" namely then when during the transmission of a message, a defined chronological sequence of influence potentials (pattern of firing) of an information code via the influence and its parameters, represents the stimulated neurone to the next in the neurone chain. The influence potential is an electrical signal that arises on the cell membrane as a result of the trans-membranous ion flow. It is distributed over the axon through to its pre-synaptic end, where the secretion of chemical substances, the mediators, is evoked. Their concrete composition is dependent on the frequency and the pattern of the reaction potential, that is to say the d-syntactical information. As we can see, the information as a message in the case under consideration is based on the electrical and chemical energy plus time (frequency) as characteristic of the information flow. One can assume that the special feature of information as an energy aspect lies in the important role of its time aspect.

The example of the relationship between two neurones in the synapsis, which is used by Flückiger, admirably demonstrates the d-semantic relationship (for the post-synaptic neurone): It is based on the synapsis and the object and incorporates the decoding element, i.e. the content element. However, from the point of view of current knowledge about synaptic transmission, this example can also lead to certain contradictions that require more precise information. Firstly, the function of the post-synaptic neurone can simultaneously be semantic and pragmatic, since it not only encodes the information but also re-encodes it and passes it on – to the effector neurone or muscle. In parallel the post-synaptic neurone (i.e. the d-semantic element) additionally secretes other substances in the crack and through feedback in the synapsis (discovered by D. P. Matjuschkin) has an effect on the pre-synaptic neurone, i.e., it appears in the role of the d-syntactical element that confirms "signal received, have understood it as such" and even "do this, do that". From these clarifications it is evident that in the neurone chain in the process of transmitting information, the directions of the relation in the semiotics can change from time to time, just as the role of the semiotic elements can change. The phenomenon of the pragmatic element remains entirely complicated in this model: Structurally and in respect of time it can either distinguish itself

from the semantic element or be identical to it. But the logic of the author invokes no resistance in larger models, for example the brain. Apparently one can explain this difference through the various types of character, the code and the time-structure of the relationship for biological systems of various levels of complication. Flückiger, who is not alone in tackling this problem, is intuitively not so far away from a similar explanation since he quotes Morris's opinion that a character can represent objects and phenomena of various levels of complexity (colour, smell, a cloud, a formula, etc.). In this context one can imagine the "growth of knowledge/equilibrium of knowledge" in the biological sense as transitions from one level of complexity of the relationships to another.

One of the attractive aspects of Flückiger's new unified concept of information is its fertility, which lies in the fact that a whole range of contradictions between the existing theories has been resolved. So that the cautious comment by the author of the work that information is "A principle of the existence of all possible realities" effectively rescinds the limitations that result from the fact that one regards information simply as a characteristic of living, self-organising systems and not as a system of the inorganic world. It is no coincidence that in the introduction to his dissertation the author dwells on the two meanings of the Latin verb "informare", forms/shapes and to inform/to communicate. The structurally attributive modern information theories are effectively bound to the first meaning, and the functional cybernetic theories to the second. Flückiger's information concept unites both approaches: The semiotics in the neuro-biological model of the author has a structural aspect, and the same examples also show the unconditionality of a functional-cognitive debate. It is quite natural that for non-living systems the structural-functional unit as a characteristic of information is not so apparent. But it is difficult to deny that the type of crystal grid of a mineral also, for example, defines its properties, including its ability for self-organisation. Even the dimensions of time, as properties of the information in non-living systems, can be compared with that of living organisms. And the criteria and the law of information that have been introduced by Flückiger also function here.

From the point of view of neuro-biologists, the discussion by the author of the function of the "non-addressed information" as a situative context for "oriented" relationships is very attractive. This corresponds well with the teachings of A. A. Utomsky about the dominant factor, with the ideas about motivation. D. F. Flückiger emphasises that the non-addressed information, which in the specified instance plays a situative role, can at another point in time, be used as targeted information. This is in agreement with the concept about the dynamics of the functions of the nervous system, including also the perception, the processing, the storing and the use of the information. When looking closely at the concrete neuro-biological model, Flückiger conclusively uses the expressions of the concept he has created, but in the preamble he uses a notion about "the apparent similarity between the neuronal brain structure, the structure of knowledge and the perceptible truth" that is too schematic. Also the notion about the constancy and the veracity of the information demand further supplementation: In the biological systems the first is relative, the last requires the criteria to be worked out, which represents a separate problem that already has a very long history. The above expositions show the importance of Flückiger's unified concept of information for the information theory and the good prospects that they will be used in the discussion about neuro-biological phenomena.

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