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KARCEVSKIJ, SERGEJ IOSIFOVIC (1884–1955), Russian linguist who, with Charles Bally and Albert Sechehaye, belonged to the first generation of Saussure's disciples in Geneva and played an important role in the development of structural linguistics. Born in Tobolsk, Siberia, Karcevskij emigrated as a political refugee to Geneva in 1907. In 1917, after the fall of the Czarist regime, Karcevskij returned to Moscow, where he stayed until 1919, lecturing on Saussurean linguistics at the Russian Academy of Sciences. Roman Jakobson repeatedly pointed out Karcevskij's important role in conveying basic Saussurean ideas to the youngest generation of Russian linguists during this time (e.g., Jakobson 1962, p. 631), a role that was all the more important since the first Russian translation of Saussure's *Cours de linguistique générale* appeared only in 1933 and then in an intellectual context that was critical of his ideas.

In 1920, Karcevskij became a lecturer on Russian language at the University of Strasbourg, where he was exposed to Antoine Meillet's linguistics. In 1922, he moved to Prague, where he taught in the Russian high school and became one of the founding members of the Prague Linguistic Circle; jointly with Jakobson and Nikolaj Trubetzkoy, he signed the phonological theses circulated at the First International Linguistic Congress at The Hague in 1928. In 1927, he returned to Switzerland to receive his doctorate from the University of Geneva, where he taught until 1954.

One of his best-known semiotic studies is "The Asymmetric Dualism of the Linguistic Sign" (1929). His starting point is the well-known fact that the two components of the linguistic sign (the signifier and the signified) do not stand in a one-to-one, reversible relationship: on the one hand, one and the same sign can have various functions (i.e., meanings), and, on the other hand, one and the same meaning can be conveyed by two different signs. A sign, according to Karcevskij, therefore is virtually homonymous and synonymous at the same time, and it is constituted by a "crossing of two series of mental facts." If a sign was simply static and served only a single function, then language would be a mere repertory of labels; if, on the contrary, the signs of a given language were only mobile, one could not signify anything in actual situations. Consequently, a linguistic sign is both stable and unstable (static and dynamic). Karcevskij's conclusion is that the two components of a linguistic sign are asymmetric in nature and in a constant state of unstable equilibrium: whereas the signifier tends toward homonomy or homophony, the signified is characterized by a tendency toward synonymy; homonymy and synonymy thus represent two coordinated correlatives. Still, each time we apply a sign to reality, its identity is maintained because a sign user "tends toward integration and refuses to note any modifications in the set of representations" and because she or he introduces a third term of comparison that guarantees that, in a process of denomination or designation, a given element of reality is categorized and attributed to a particular class. Thus, the meaning of a given sign is modified each time the sign is applied to reality.

Karcevkij's thesis was influential. Jakobson accepted it as an important explanation for language change, and Jan Mukařovský transferred it to processes of poetic denomination. More recently, Karcevskij's ideas have been compared to Jakobson's theory of the two axes of language, and they have been interpreted in terms of a process-oriented language theory.

[*See also* Jakobson; Saussure; *and* Sign.]

BIBLIOGRAPHY

Jakobson, R. O. "Serge Karcevski (August 28, 1884–November 7, 1955)." *Cahiers Ferdinand de Saussure* 14 (1956): 9–13.

Jakobson, R. O. "Retrospect." In *Selected Writings*, vol. 1, *Phonological Studies*, pp. 631–658. The Hague: Mouton, 1962.

Jakobson, R. O., ed. "Publications de S. Karcevski sur la langue et le style." *Cahiers Ferdinand de Saussure* 14 (1956): 14–16.

Karcevskij, S. "The Asymmetric Dualism of the Linguistic Sign" (1929). In *The Prague School: Selected Writings,*

1929–1946, edited by P. Steiner, translated by J. Burbank, pp. 47–54. Austin: University of Texas Press, 1982.

Steiner, P. "In Defense of Semiotics: The Dual Asymmetry of Cultural Signs." *New Literary History* 12 (1981): 415–435.

Steiner, P., and W. Steiner. "The Relational Axes of Poetic Language." In *Jan Mukařovský, On Poetic Language*, translated and edited by J. Burbank and P. Steiner, pp. 71–86. Lisse: Peter Ridder Press, 1976.

Steiner, W. L. "Language as Process: Sergej Karcevskij's Semiotics of Language." In *Sound, Sign, and Meaning: Quinquagenary of the Prague Linguistic Circle*, edited by L. Matejka, pp. 291–300. Michigan Slavic Contributions, 6. Ann Arbor: University of Michigan, 1976.

—PETER GRZYBEK

KNOWLEDGE REPRESENTATION refers to the manner in which an organism stores information about its environment in anticipation of situations in which it needs this information for survival. Cognitive systems live in environments to which they are connected by sensory and motor interfaces. To survive, they must have some kind of representation of this environment in order to operate and behave adequately. This raises many questions: which mechanisms must be provided in order to realize such a representation? What is the relationship between the structure of the environment and its representation? Does representation map the environment's objects, processes, and phenomena more or less iso- or homomorphically onto the representational structure? How is knowledge mediated by signs and symbols?

These questions have been long discussed by philosophers, epistemologists, and semioticians. Twentieth-century philosophy of language and logic have brought about a new understanding of the representational function and central role of language in it. Logical empiricism and formal logic had strong influences on the development of knowledge-representation techniques in the fields of cognitive science, artificial intelligence (AI), and cognitive psychology. However, alternative approaches such as connectionism have developed in recent decades.

The basic idea of the representational paradigm, called "symbolic representation" in AI, is that environmental structures are mapped onto propositional or linguistic structures. These structures and semantic categories (i.e., natural-language words, sentences, etc.) are formalized, and their syntactic structures are mapped onto formal symbols, which are manipulated according to rules that are themselves the result of a similar mapping process. The knowledge-representation system, thus, consists of symbols (and sometimes of relationships between these symbols) and a set of rules or inference mechanisms that operate on these symbols. One or more sentences (in the form of symbol strings) are the input to the system, and they are processed by applying rules. The output again is a string of symbols. Thus, knowledge is represented by formal symbols and rules. This approach to symbolic knowledge representation has been formulated by Newell and Simon (1976) and Newell (1980) in its most extreme form as the physical symbol–systems hypothesis, which claims that symbol systems have the necessary and sufficient means for generating intelligent behavior. Another exponent of this approach is Jerry Fodor (1981).

This hypothesis seems plausible, if it is assumed that all human cognitive processes are constrained by language. Critics of this approach point out that symbol systems are engaged in simulating and manipulating only on the syntactic level and that the semantic and pragmatic aspects of language are ignored. Although AI and cognitive science also claim to represent semantic features in symbol systems, these features are in fact nothing but more complex syntactic structures. From a semiotic perspective, formal and syntactic structures alone cannot account for the performance and representational power of natural language.

Moreover, a more or less isomorphic relationship between the structure of the symbolic knowledge–representation system and the outside world is assumed implicitly. The mostly successful use of language indeed suggests that the world can be described and categorized by linguistic categories. But scientific research on perception has shown that natural human cognitive systems are capable of representing a far richer view of the world that is much more fine-grained than language. Language itself results from a long and complex neural representational process aiming at reducing and categorizing this variety.

For the symbol-systems hypothesis, knowledge representation and processing are restricted to manipulating symbols in the form of, for instance, bit patterns. It is the external human user who ascribes semantic values to these symbols by interpreting them through interactions with the environment. The semantics of each symbol is thus established either directly or indirectly (via other symbols) by interactions with the environment. It follows that prag-

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