organization of the thymic into modalities—and passional modulations or undulations in the unfurling of discourse. Thus, an attempt was made to present a more or less coherent foundation to complete the semiotic theory begun over thirty years ago.

In their study, elaborated in collaboration with members of the Paris School during their annual collective seminar, Greimas and Fontanille started from an intuition and imagined positions that enabled the polarization of the universe. This permitted, on the one hand, the positing of a sort of prototype of an actant, linked by G. W. F. Hegel to intentionality and rearticulated by Husserl in the form of the protensivity of the subject, a sort of minimal state of the subject who is not yet a subject but simply a subject striving for something. On the other hand was envisioned a sort of potentiality of the object, which made it possible to consider the world as value. What now appears to be the thorniest issue in the theory is the problematics of the object, not of the subject. To understand subjects as being, as meaning, they must be defined by the values they acquire. From this viewpoint, the semiotics of passions becomes a semiotics of the values acquired, lost, or suspended by the subject. In brief, theorists are now dealing with a subject defined by its protensivity, faced with an object of value that is unformed, a shadow of the value that can be semanticized. In a later phase, the shadow of value becomes the valence, which then leads to the question of the value of value. Thus, whether it is examining the semiotics of passions or the semiotics of aesthetics, the two main domains of current investigation, Paris School semiotics has as one of its fundamental preoccupations the problematics of value.

[See also Greimas; and Narratology.]

BIBLIOGRAPHY

Arrivé, M., and J.-C. Coquet, eds. Sémiotique en jeu à partir et autour de l'oeuvre d'A. J. Greimas. Amsterdam and Philadelphia: John Benjamins, 1987.

Barthes, R. S/Z. Paris: Seuil, 1970.

Coquet, J.-C., ed. Sémiotique: L'école de Paris. Paris: Hachette, 1982.

Coquet, J.-C., ed. Le discours et son sujet, vols. 1, 2. Paris: Klincksieck, 1984–1985.

Greimas, A. J. Maupassant: The Semiotics of Text: Practical Exercises. Translated by P. Perron. Amsterdam and Philadelphia: John Benjamins, 1988.

Greimas A. J., and J. Courtés. Semiotics and Language: An Analytical Dictionary. Translated by D. Patte and L. Crist. Bloomington: Indiana University Press, 1982.

Greimas, A. J., and J. Courtés, eds. Sémiotique: Dictionnaire raisonné de la théorie du langage, vol. 2. Paris: Hachette, 1986.

Greimas, A. J., and J. Fontanille. The Semiotics of Passions: From States of Affairs to States of Feelings. Translated by P. Perron and F. Collins. Minneapolis: University of Minnesota Press, 1993.

Parret, H. "Introduction." In Perron and Collins, 1989, vol. 1, pp. vii–xxvi.

Parret, H., and H.-G. Ruprecht, eds. Exigences et perspectives de la sémiotique. Amsterdam and Philadelphia: John Benjamins, 1985.

Perron, P., and F. Collins, eds. Paris School Semiotics, vol. 1, Theory; vol. 2, Practice. Amsterdam and Philadelphia: John Benjamins, 1989.

—PAUL PERRON and PATRICK DEBBÈCHE

PAROEMIOLOGY. The scholarly study of proverbs (in Greek, *paroimia*), one of the "primary" or "simple" communicative forms of oral cultures, paroemiology is not institutionalized as an autonomous discipline. It seems, however, to be as old as the collection and codification of proverbs (paroemiography), which has to deal with three interrelated paroemiological tasks: a definition of genre, the selection of the material, and the classification of it.

Explicitly semiotic approaches to the proverb are fairly recent; Pëtr Bogatyrëv (1893–1971) in the mid 1930s was one of the first to propose such an approach. In his studies on Moravian folklore, Bogatyrëv developed the concept of polyfunctionality: one and the same sign or text may serve different functions, just as one and the same function may be fulfilled by different signs or texts. The functions of a particular text are organized hierarchically but the dominant function may be replaced over time by another, previously secondary function. Bogatyrëv's awareness of the close interrelationship between function and meaning in general coincided with his concrete observation that the meaning of a single same proverb may change completely in a particular period of time.

Proverb scholarship focusing on the relation between pragmatics and semantics is also found in early pragmatically oriented studies such as those by Raymond Firth (b. 1901), a functional cultural anthropologist. In 1926, Firth claimed that the meaning of a proverb is made clear only when a full account of the accompanying social situation—the reason for

the proverb's use, its effect, and its significance—is given side by side with the translation. Still, one might consider the study of a proverb's function(s) and the pragmatic conditions of its use merely pre-semiotic or partially semiotic, since it lacks a comprehensive semiotic framework. This qualification also concerns the "ethnography of speaking" approach used by Ojo Arewa and Alan Dundes (1964) and the pragmatic approach of Barbara Kirshenblatt-Gimblett (1973), who argues that the meaning of a proverb emerges from its use in a specific context and that the researcher should focus on "the meaning of proverb performances."

These pragmatic-semantic approaches have succeeded in establishing the various functions a proverb may fulfill: they have either identified meaning with usage or, in a more moderate way, shown that the meaning of a proverb cannot be described adequately without reference to usage. Estonian scholar Arvo Krikmann (1984) has concluded from his observations on the semantic indefiniteness of the proverb that various modal, functional, pragmatic, or situational aspects and the chosen metalanguage are crucial factors influencing proverb meaning and usage; these factors are responsible for the proverb's semantic indefiniteness. Thus, it is impossible to define a proverb's meaning exactly; for him, it is a "mere semantic potential."

According to Krikmann, the analysis of a proverb may be oriented either toward the "absolute sum" of all possible meanings, which represent its potential of interpretability, or toward the sum of all real (actual) meanings manifested in all its previous realizations. Since we do not usually know all the actual realizations, the proverb's semantic potential must be explicated in such a way that it corresponds to its actual meanings. In doing so, we face the proverb's semantic indefiniteness. One of the most important sources of this indefiniteness is the multiple possible interpretations of the proverbial tropes (i.e., metaphors, metonymies, synecdoches, etc.) that are parts of the proverb text. In this context, Krikmann distinguishes two methodological approaches in attempting to explain a proverb's meaning. The first considers the proverb internally heterogeneous and tries to separate "content elements" (c-elements) from "formal elements" (f-elements). Formal elements are, among others, any kind of relational words or quantifiers, syntactic formulas, and others such as *every* and *all* and constructions such as *if . . . then* and *bet-*

ter . . . than. All other words belong to the c-elements, which can in turn be divided into semantically "literal" (c_1) and "transferred" (c_2) elements. The exact distinction between c-elements and f-elements may vary, of course, but all approaches along these lines share the assumption that poeticalness (or metaphoricalness) is not assigned to the proverb text as a whole but is restricted to its individual elements (or even to the c_2- elements alone).

The second approach considers the proverb text as internally homogeneous—that is, totally poetical. All of its elements belong to a specific, secondary ("poetic") language; they must be distinguished strictly from all (particularly the homonymous) elements of the primary ("ordinary," "nonpoetic") language, as well as from all elements of metalanguage used for describing the content of the proverb text. This constitutes an important step in paroemiology, since a proverb can then be construed as a secondary modeling system, in the terms of the Moscow-Tartu School—that is, the first, denotative level of signification serves as expression for the second level of signification (the connotative meaning).

Russian scholar M. A. Čerkasskij (1984) first applied this analytical method to proverbs; independent of him, Pierre Crépeau (1975) developed this idea with reference to Roland Barthes and Algirdas Julien Greimas. Čerkasskij's view that a proverb is, in fact, the "minimal unit of the supralinguistic semiotic level" provides arguments for considering proverbs as paradigms for cultural studies in general. For Čerkasskij, an utterance such as "The apple does not fall far from the tree" is the complex sign of a particular, individual situation, on the denotative level of signification; on the connotative level, it is the sign of a class of situations, and only in this case can the text serve as a proverb. Actually, the proverb itself is seen as a sign of a class of situations.

A heuristic model of proverb use proposed by Peter Seitel (1969) is based on the central assumption that the situation in which a proverb is used (the interaction situation) is not identical to the situation verbally inherent in the proverb text (the proverb situation) and that both of them are not necessarily identical to the situation to which the proverb refers or in which it is intended to be applied (the reference situation). According to Seitel, proverb usage is thus related to two distinct though closely related processes—namely, first, the process of relating proverb situation to reference situation and, second,

the speech act of applying the proverb in an interaction situation. This differentiation yields the results shown in figure 1. According to Seitel's model, proverb usage can be expressed by the analogy *A:B::C:D*, since we are concerned with an analogy between the relationship of entities of the proverb situation and entities of the reference situation (e.g., apple:tree::drunken son:drunken father).

However, the matter is even more complex than assumed in this basic schema, in which the proverb situation is restricted to the proverb's literal meaning; no attention is paid to the fact that in most proverbs, the secondary (connotative) level of signification is more important than the primary (denotative) level of signification. Therefore, when speaking of an analogy between proverb and reference situation, we are concerned with the proverb's abstract idea on the connotative level of signification rather than the proverb situation in its literal, denotative meaning. Furthermore, similar to any referential act in general, the individual and unique reference situation has to be interpreted as belonging to an adequate class or type of situation to which it corresponds as a situational token.

If a proverb thus conveys a situation on its denotative level of signification, we can term the abstract general idea on the connotative level the corresponding "situation model" (since it is an abstract model based on the concrete proverb situation); similarly, we can call the class of situation related to the individual reference situation the model situation. A proverb can thus be considered to be applied appropriately when, in a given interaction, that model situation is derived from the proverb situation, which is, as situation model, assumed to underlie the reference situation. This latter view implies that proverbs are not "eternal truths" but possible models that are true only under certain circumstances; this view also explains why there may be antonymous proverbs within one and

the same culture, such as "out of sight, out of mind" and "absence makes the heart grow fond."

Proverb usage thus involves a process of double analogy. If we call the abstract idea representing the situation model (or the model situation, respectively), *p:q*, we obtain the overall formula *A:B::p:q::C:D* (or, in the concrete example, apple:tree::begetted:begetter::drunken son:drunken father). This modification yields the results shown in figure 2. Ultimately, the relationship *p:q* obtains the status of an invariant: both the concrete verbal form (or even the language in which the proverb's idea is expressed) and the concrete situation to which the proverb is applied may vary, but the modeled situation remains invariant.

In trying to establish which invariant situations are modeled in proverbs, Grigorii L'vovich Permjakov's studies (1979) are highly relevant. For Permjakov, proverbs are "signs and at the same time models of various typical situations." Consequently, he postulates that "a classification of the situations themselves" has to be worked out if one wants to categorize proverbs on the basis of their meanings. Although Permjakov did not specify his notion of situation according to the above-mentioned schema, it seems clear that he had in mind the situation model, which he called the logicosemiotic analysis of the invariant types of situations.

Permjakov distinguished four different "higher logicosemiotic invariants." Two of them model the relationship between objects or that between objects and their properties; the other two are more complex in that they model the dependence between the relationships of things and the relationships of their properties. In detail, we obtain the following four invariants (the ultimate logicosemiotic classification was developed later in a more complex way than can be demonstrated here):

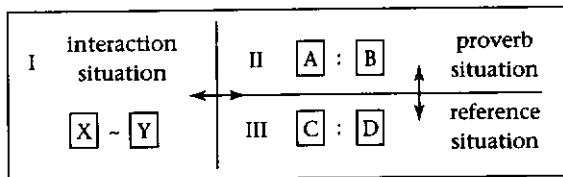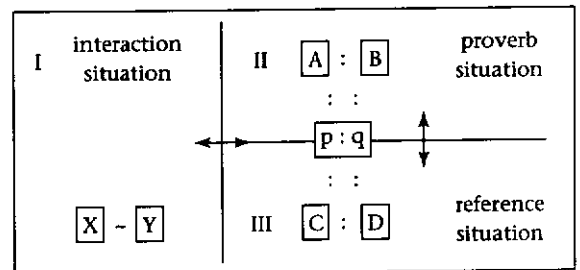FIGURE 2. *Double Analogy in Proverb Use.*

FIGURE 1. *Reference Versus Interaction Situation in Proverb Use.*

1A. Every object has a particular quality or property. (Example: Water always flows down, not up.)

1B. If there is one object, there is or will be another object. (Example: No smoke without fire.)

2A. The relationships between the properties of objects depend on the relationships between the objects themselves. (Example: Like father, like son.)

2B. The interrelationships of objects depend on the existence of particular properties of these objects. (Example: Four eyes see more than two.)

Permjakov's classification displays a clear parallel to Zoltán Kanyó's approach: both consider the logical operation of implication central to the proverb's logical structure. For Kanyó (1981), the most general and simple logical formulation of the proverb is: A_x $(P_x \text{ ?? } Q_x)$. Despite such convergences, there is a crucial difference between Kanyó's and Permjakov's approaches: whereas Kanyó logically classifies the proverb's linguistic surface structure, Permjakov ultimately strives for a logical classification of its semantic deep structure.

Additionally and, perhaps more important, a thematic classification complements the logicosemiotic classification in Permjakov's approach. He would classify three proverbs such as "No smoke without fire," "No rose without thorns," and "No river without bank," as belonging to invariant 1A: each of them maintains that one of the two objects mentioned cannot exist without the second object. Still, the meanings of these three proverbs differ completely: the first maintains that there can be no indication of an object unless the object itself exists; the second claims that there can be no good things without faults; the third says that no whole can exist without one of its obligatory parts. As a consequence, Permjakov added a thematic classification to the logicosemiotic one. He thus describes a proverb's meaning by a twofold reference to one of the logicosemiotic invariants and one or more thematic pairs such as *near* and *far, cause* and *consequence, hot* and *cold,* and so on. These semantic oppositions are very similar to those found in the semiotic analysis of culture.

Quite logically, a description cannot cover all semantic, functional, situational, and modal aspects in the concrete use of a proverb and, consequently, in its meaning. This indefiniteness might even give rise to contradictory meanings out of one proverb; for ex-

ample, whereas the Scottish interpretation of "Rolling stones gather no moss" seems to be "Keep abreast of modern ideas, keep your brain active," the English reading rather alludes to the desirable qualities of the moss found draped over stones in a peaceful brook. We seem to be concerned, then, with a question of cultural, not linguistic, differences; it seems clear that a proverb's meaning cannot be deduced simply from its verbal surface. It turns out that attention has to be paid to the important interdependence of three basic categories; polyfunctionality, polysemanticity, and heterosituativity. Since none of these three categories, which condition each other in one way or another, can be interpreted in isolation, no ultimate meaning can ever be ascribed to a particular proverb text.

[*See also* Cultural Knowledge; Implicature; *and* Speech Act Theory.]

BIBLIOGRAPHY

Arewa, E. O., and A. Dundes. "Proverbs and the Ethnography of Speaking Folklore." *American Anthropologist* 66 (1964): 70–85.

Čerkasskij, M. A. "Versuch der Konstruktion eines funktionalen Modells eines speziellen semiotischen Systems." In *Semiotische Studien zum Sprichwort: Simple Forms Reconsidered* I, edited by P. Grzybek. Special issue of *Kodikas Code—Ars Semeiotica* 7. 3–4 (1984): 363–377.

Crépeau, P. "La définition du proverbe." *Fabula* 16 (1975): 285–304.

Grzybek, P. "Foundations of Semiotic Proverb Study." In *Wise Words: Essays on the Proverb,* edited by W. Mieder, pp. 31–71. New York: Garland, 1994.

Grzybek, P. "Proverb." In *Simple Forms,* edited by W. A. Koch, pp. 227–241. Bochum: Brockmeyer, 1994.

Kanyó, Z. *Sprichwörter: Analyse einter einfachen form.* The Hague: Mouton, 1981.

Kirshenblatt-Gimblett, B. "Toward a Theory of Proverb Meaning." *Proverbium* 22 (1973): 821–827.

Krikmann, A. A. "On Denotative Indefiniteness of Proverbs: Remarks on Proverb Semantics 1." In *Proverbium: Yearbook of International Proverb Scholarship,* vol. 1, pp. 47–91. Columbus, Ohio: Ohio State University Press, 1984.

Mieder, W. *International Proverb Scholarship: An Annotated Bibligrahy.* New York: Garland, 1982.

Mieder, W. *International Proverb Scholarship: An Annotated Bibliography, Supplement 1 (1800–1981).* New York: Garland, 1990.

Mieder, W. *International Proverb Scholarship: An Annotated Bibliography, Supplement 2 (1982–1991).* New York: Garland, 1993.

Mieder, W., ed. *A Dictionary of American Proverbs*. New York: Oxford University Press, 1992.

Permjakov, G. L. *From Proverb to Folktale: Notes on the General Theory of Cliché*. Moscow: USSR Academy of Sciences, Nauka, 1979.

Seitel, P. I. "Proverbs: A Social Use of Metaphor." *Genre* 2 (1969): 143–161.

—PETER GRZYBEK

PAROLE. *See* Langue and Parole.

PARSING. While its literal meaning involves analyzing a sentence into its grammatical parts (or, more generally, examining something minutely), in computer science *parsing* refers to an operation that takes place in the process of compiling. When a computer program is translated into machine language, the computer cannot directly interpret a higher programming language, so this language has to be translated into a "machine assembler code" that the computer can "understand." This code can then be executed by the computer's central-processing unit (CPU). We have to differentiate between at least two phases in the process of translating. First, lexical analysis (lexical parsing), in which the primary code (i.e., the original program) is "cleaned up." This means that blanks, the programmer's comments, and other miscellany are removed. The text of the primary program is structured in elementary strings of symbols (i.e., tokens), which can be translated by the syntactic analyzer. The second phase of translation, syntactical analysis, is often called parsing. In this process, the formal structure of the code provided by lexical analysis is extracted and forms the basis for the final machine code. The process of parsing extracts, for instance, variable names, types, functions, and procedures. Using these results, memory can be allocated, structural and formal relations between various parts of the programs and variables can be detected, and so on. If the program contains syntactical errors, such as undefined variables, inconsistent type assignments, or unclosed loops, the process of parsing will detect it.

The program is then transformed into a parsing tree that abstractly represents the structure of the program and allows the analysis to proceed. There are two methods of working through the tree: bottom-up, which means that complex program instructions are built out of elementary parts of the tree, and top-down, in which one starts at the root of the parsing tree and works through to the leaves. Complex instructions are split up into simpler ones that represent the program. Both methods lead to a well defined machine program, unless there are errors in the original program.

The final machine code is generated in the process of parsing. This code is ready to be executed by the CPU. In case of an error in the original program, an inconsistency appears in the course of parsing. The parsing algorithm stops and, in most cases, can tell the programmer the cause of the error, which has to be corrected. The procedure of lexical analysis and parsing has to be repeated until no error is found. A positive parsing result (e.g., in the form of an executable program), however, does not guarantee the semantic correctness of the program; it entails only that the program is syntactically correct and does not make any statements about whether the program's executions lead to the desired results.

[*See also* Algorithm; Artificial Intelligence; Expert Systems; *and* Knowledge Representation.]

BIBLIOGRAPHY

Aho, A. V., and J. D. Ullman. *The Theory of Parsing, Translation, and Compiling*. Englewood Cliffs, N.J.: Prentice-Hall, 1972.

Backhouse, R. L. *The Syntax of Programming Languages: Theory and Practice*. Englewood Cliffs, N.J.: Prentice-Hall, 1979.

—MARKUS PESCHL

PEIRCE, CHARLES SANDERS (1839–1914), American philosopher, scientist, polymath, and pioneer in the modern study of semiotics. Although raised in an intellectual environment with strong currents of Anglo-American empiricism such as that of David Hume, Thomas Reid, and Sir William Hamilton, Peirce never accepted the notion that knowledge was a natural outcome of the result of a knowing faculty or that truth is what is knowably evident. Rather, Peirce studied the history of epistemology as an ethnologist studies a foreign culture, as an outsider trying to understand and make sense of an activity that appears at first blush to be uncomplicated, natural, spontaneous, and yet on reflection largely unintelligible. Peirce had to develop a new vocabulary for this new general science of knowing—the study of signs,

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