5. Language Games (Excerpt from an article by John Sowa, 20 October 2023)

Peirce and Wittgenstein made a major transition from their early philosophy to their later, and both in the same direction. One critic said that Wittgenstein began as a logician and ended as a lexicographer. Ironically, that remark, which was intended in a derogatory sense, is true in a higher sense. Both of them began with a deep study of logic, made major contributions, and later recognized the greater flexibility and expressive power of natural languages. For Peirce, the transition was marked by the 16,000 definitions he wrote or edited for the *Century Dictionary*. For Wittgenstein, it was his second published book, *Wörterbuch für Kindern*, which he wrote when he was teaching elementary school in Austrian mountain villages. He learned that children do not think or speak along the lines of his first book, the *Tractatus Logico-Philosophicus* (TLP).

In the TLP, Wittgenstein had claimed that "the totality of facts" about the world can be stated clearly in language or logic, and "Whereof one cannot speak, thereof one must be silent." That book set the agenda for formal semantics in the 20th century, but those theories were so rigid that they could not support the flexibility of children's speech. In the *Philosophical Investigations* (PI), he replaced the strict logic of TLP with an open-ended family of language games. As an alternative to definitions by necessary and sufficient conditions, he used the term *family resemblance* for the "complicated network of overlapping and criss-crossing similarities, in the large and the small" (1953, §66). Unlike his mentors, Frege and Russell, he did not consider vagueness a defect:

> One might say that the concept 'game' is a concept with blurred edges. — "But is a blurred concept a concept at all?" — Is an indistinct photograph a picture of a person at all? Is it even always an advantage to replace an indistinct picture with a sharp one? Isn't the indistinct one often exactly what we need?

> Frege compares a concept to an area and says that an area with vague boundaries cannot be called an area at all. This presumably means that we cannot do anything with it. — But is it senseless to say: "Stand roughly (ungefähr) there"? (§71).

Vagueness cannot be eliminated by replacing natural languages with artificial languages. Its source is the uncountable infinity of mathematical patterns that cannot be specified by finite strings of symbols. For many applications, fuzzy set theory and logics of ambiguity have provided useful approximations. But only a finite number of patterns can be specified.

When Wittgenstein's transition from TLP to PI is compared to Peirce's, the parallels are striking. To minimize issues of translation, it's important to compare Wittgenstein's German to Peirce's Greek-based English. Following are examples of the picture theory of meaning from TLP and PI:

> The picture [Bild] is a fact [Tatsache]. That the elements of the picture are combined with one another in a definite way, represents [stellt vor] that the things are so combined with one another. This connexion of the elements of the picture is called its structure and the possibility of this structure is called the form of representation of the picture [seine Form der Abbildung]. (TLP 2.141, 2.15).

> If we compare a proposition [Satz] to a picture, we must consider whether we are comparing it to a portrait (a historical representation [Darstellung]) or to a genre-picture. And both comparisons make sense. When I look at a genre-picture, it 'tells' me something ['sagt' mir etwas], even though I don't believe (imagine [mir embilde]) for a moment that the people I see in it really exist, or that there have really been people in that situation. For suppose I ask, "*What* does it tell me then?" "A picture tells me itself" is what I'd like to say. That is, its telling me something consists in its own structure, in *its* own forms and colours. (What would it mean to say "A musical theme tells me itself"?) (PI 522, 523)

In translating the TLP, Ramsey chose the word *fact* for *Tatsache* in sentence 1.1: "The world is the totality of facts, not of things." But later passages mention *Tatsache* in contexts that may be possible or even false. But a fact cannot be false. A better translation would be Peirce's *pheme*, which may be true of a phemic sheet for one universe of discourse, but false for another. The word *Satz* in German may be translated to English *sentence* or *proposition*. The word *pheme* is sufficiently general to include facts, sentences, propositions, and even stereoscopic moving pictures.

Logicians who praise the formality of the TLP rarely admit that Ramsey's English introduces connections that might not be intended. In TLP 2.15, for example, *stellt vor* is translated as *represents* and *Abbildung* as *representation*. If Wittgenstein had intended this connection, why didn't he choose *Vorstellung* instead of *Abbildung*? In PI 522, *Darstellung* was translated *representation*. These remarks are not criticisms of the translators, but observations that an exactly equivalent translation is only possible for texts on mathematics or a subject that is specified in mathematics. Lexicographers emphasize these issues, but the formal notations of logic cannot represent them.

With the terms *language game* and *form of life*, Wittgenstein (1953) analyzed issues that correspond to phaneroscopy, semeiotic, significs, and their implications for pragmatism. His analogy of a chess game relates words to chess pieces, utterances to moves in a game, and methodeutic to the strategy for playing a game. Each kind of game represents a form of life. The players correspond to Peirce's utterer and interpreter, which may be different individuals or different roles of the same individual. To describe language games, Wittgenstein chose a list of phrases, which happen to be semes.

> Giving orders, and acting on them – Describing an object by its appearance, or by its measurements – Constructing an object from a description (a drawing) – Reporting an event – Speculating about the event – Forming and testing a hypothesis – Presenting the results of an experiment in tables and diagrams – Making up a story; and reading one – Acting in a play – Singing rounds – Guessing riddles – Cracking a joke; telling one – Solving a problem in applied arithmetic – Translating from one language into another – Requesting, thanking, cursing, greeting, praying. (PI 23)

Unlike the abstract logic of the Tractatus, these semes embody actions and life. Even when the object is an abstract noun, such as *description, hypothesis,* or *arithmetic,* the phrase begins with an action verb, such as *constructing, testing,* or *solving*. A picture or recording would be a hypoicon that could also be a seme. But a conversion to a diagram or a verbal seme would lose information.

Wittgenstein's transition began when he took a required course on education and devoted several years to teaching children. The next major step occurred when Ramsey visited him in Norway and persuaded him to return to Cambridge. Ramsey had learned of Peirce when he was translating the TLP with Ogden, who had recommended a recent collection of writings by Peirce (1923). That book also contained a detailed list of Peirce's publications, which would be available in the Cambridge libraries. After Wittgenstein returned to Cambridge in 1929, Ramsey continued to discuss these issues with him for the next two years.

There is no evidence that Wittgenstein read anything by Peirce, but Nubiola (1996) noted strong parallels between the later writings of Peirce and Wittgenstein. The book *On Certainty*, which Wittgenstein wrote in his last years, covers issues Peirce addressed: "the basis for common sense beliefs, the justification for induction, the habits of memory, what is reasonable, and so on." There is one fundamental difference: Peirce explained his insights in terms of diagrammatic reasoning.

But diagrams called *semantic networks* were introduced by Margaret Masterman, who had been one of six students in Wittgenstein's course of 1933-34 whose notes were compiled as *The Blue Book*. In the 1950s, she founded the Cambridge Language Research Unit (CLRU) as a discussion group, which evolved into a pioneering center for research in machine translation and computational linguistics

(Masterman 2006). She also criticized the obsession with syntax by Chomsky and his students:

> My quarrel with them is not that they are abstracting from the facts. How could it be? For I myself in this paper am proposing a far more drastic abstraction from the facts. It is that they are abstracting from the wrong facts because they are abstracting from the syntactic facts, that is, from that very superficial and highly redundant part of language that children, aphasics, people in a hurry, and colloquial speakers, quite rightly, drop. (p. 266)

As an alternative, she proposed a *Neo-Wittgensteinian* method, whose organizing principle is a thesaurus of words classified according to the language games in which they occur.

- **Words** are the units of meaning, not abstract or artificial markers, features, or categories. Ambiguity is a consequence of the flexibility and extensibility of natural language, not a defect that can be eliminated by switching to an artificial notation.

- **Images** are the language-independent foundation for meaning. They are related by a small number of combining elements (about 50 to 100) represented by ideographs or monosyllables, such as IN, UP, MUCH, THING, STUFF, MAN, BEAST, PLANT, DO.

- **Language games**, not syntax, are the basis for organizing and using patterns of words for interpreting and generating texts: "I want to pick up the relevant basic-situation-referring habits of a language in preference to its grammar" (p. 200).

- **Word fans** relate each word to its multiple entries in a thesaurus (not an ontology) and to the corresponding language games for each entry. Then a dynamic method for linking combinations of fans is used to interpret sentences and paragraphs.

- **Analogy and metaphor** create novel language games for every branch of science, engineering, philosophy, literature, and common sense.

Figure 11 shows a word fan for *bank* with 11 *spokes* to areas of *Roget's Thesaurus*. The areas identified by the numbers and labels correspond to "Neo-Wittgensteinian families" for the word.
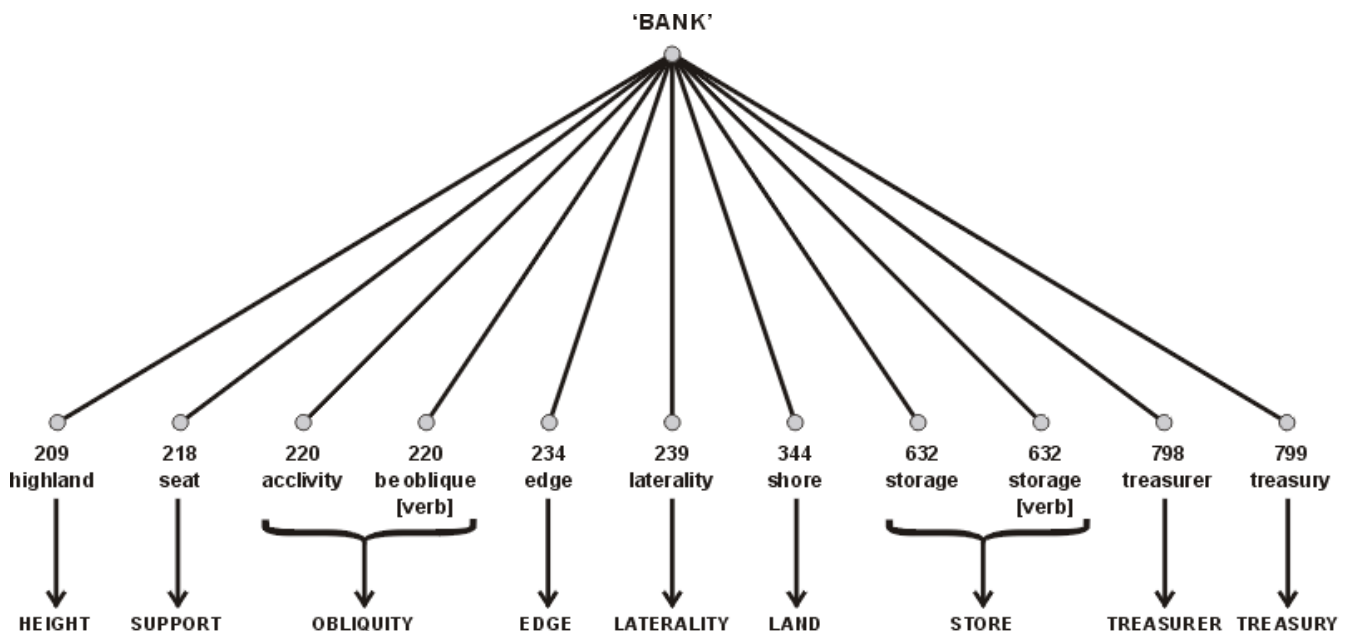

Figure 11: A word fan for *bank*

To show how word fans are used, Masterman analyzed the phrases *up the steep bank* and *in the savings bank*. All the words except *the* would have similar fans, and her algorithm would "pare down" the ambiguities "by retaining only the spokes that retain ideas which occur in each." For this example, it would retain "OBLIQUITY 220 in *steep* and *bank*; whereas it retains as common between *savings* and *bank* both of the two areas STORE 632 and TREASURY 799."

In summary, she wrote that "human communication consists of patterns of semantic interactions between ascertainably cognate subjects of discourse." Those are subjects that people discuss in language games, not in academic journals. "What is being talked about — that is, the actual subject of any piece of discourse, and the linguistic elements that carry it — is vastly more important than what is said about it." (p. 228) That view puts pragmatics first, semantics second, and syntax as the least important part of language.

Michael Halliday, a lecturer in Chinese at Cambridge from 1954 to 1958, was a cofounder of CLRU. His study of Chinese, which is radically different from European languages, had a strong influence on the discussions. Since both Chinese and English have a relatively simple grammar in Subject-Verb-Object order, any comparison would emphasize the sharply different semantics and pragmatics. Even though CLRU had not acquired a computer, they began to discuss issues of machine translation (MT). After implementing their theories on a computer, they became prominent in the field and organized the First International Conference on MT in 1961.

Differences between Halliday and Chomsky reflect differences in the languages they studied. Chomsky analyzed languages for which grammar and lexicon could be studied and described without reference to one another. Therefore, he claimed that grammar is fundamental to a language and the lexicon is a separable topic. But Halliday maintained that the lexicon cannot be separated from the grammar. Since Chinese does not make a sharp distinction between a word and a phrase. Chinese people who never studied linguistics claim that all words have just one syllable.

For example, the word *che* in Mandarin is a generic term for any kind of vehicle. But many standard Chinese combinations correspond to words in other languages. For example, a che with a motor is a QiChe (energy che), a bus is a GongGongChiChe (public use energy che), a taxi is a ChuZuQiChe (for-hire esnergy che), and a bicycle is a ZiXingChe (self powered che). But Chinese speakers rarely use those long phrases. If someone says "I parked my che around the corner," that would mean bicycle for a student or car for a public official. The sentence "I took a che to Beijing," could mean bus or train (KuoChe, fire che).

[Footnote: For more discussion of writings by Halliday and Masterman, see the book reviews by Sowa (2000, 2006b).

Sowa, John F. (2000) Review of Halliday & Matthiessen (1999), *Computational Linguistics*, **27:1**, https://jfsowa.com/pubs/Halliday.pdf

Sowa, John F. (2006b) Review of *Language, Cohesion, and Form* by Margaret Masterman, *Computational Linguistics* **32:4**, 551-553. https://jfsowa.com/pubs/mmb_rev.pdf]

For these reasons, Halliday emphasized context: the relevant knowledge of speaker and listener, and the purpose or function of what is said. That led to his *Functional Grammar*, which has a strong resemblance to methods that Peirce developed. Figure 12 shows a classification of experience by Halliday (2014, p. 216). The two circles contain 15 subdivisions, which may be grouped in five trichotomies. With some revisions, a classification of the phaneron based on Figure 12 would be an important step toward Peirce"s goal of phaneroscopy as "a strong and beneficient science."
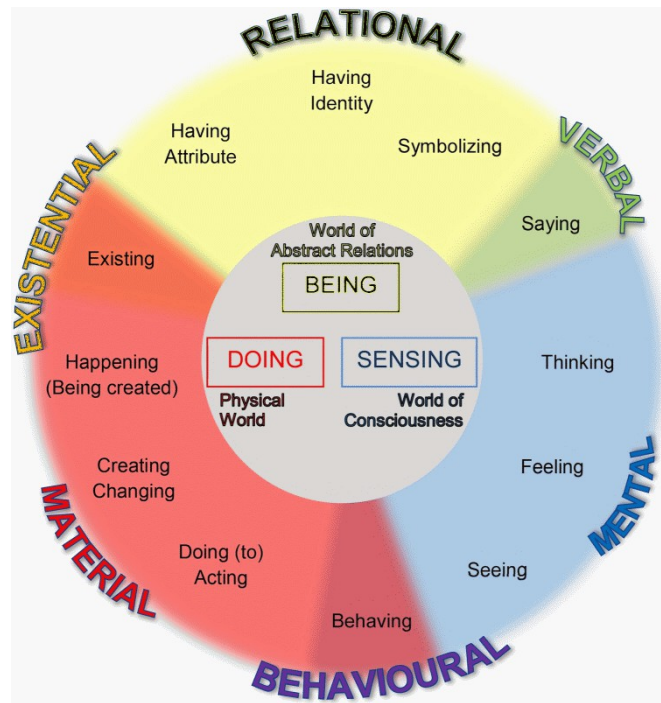
Figure 12: Halliday's classification of experience

The three nodes in the inner circle of Figure 12 represent the trichotomy [Being, Doing, Sensing], an example of Firstness, Secondness, and Thirdness. Being is a First that may be represented by a monadic relation or predicate. Doing is a Second that relates something to an action it performs. Sensing is a mental Third that relates some external First to an internal Second. Peirce would replace *world* with the term *universe of discourse*. He would avoid the word *consciousness* because he assumed a continuum of all living things, including bacteria. He would classify seeds and eggs as living things, but viruses are non-living signs that could be interpreted by living things.

The twelve categories in the outer circle represent four trichotomies, which Peirce could adopt with some modifications. The relational triad has a direct mapping to existential graphs: [Having identity, Having attribute, Symbolizing]. For the material triad, Peirce might replace Halliday's labels with Greek-based terms: [Happening (being created); Creating, changing; Doing (to), acting]. For the mental triad [Feeling, Seeing, Thinking], a generalization to [Proprioception, Perception, Interpretation] would include living things of any kind. Each term of the fourth triad combines aspects of its two adjacent triads: [Existing, Saying, Behaving]. But the word *Communicating* could be used for all living things; *Saying* is limited to one kind of human communication.

The five trichotomies in Figure 12 classify the phaneron in 15 types of images, which Peirce called *hypoicons*. In Section 3, the conversion rules for generalized existential graphs specify operations for mapping hypoicons from images to diagrams to languages, formal and informal. Figures 1 through 12 illustrate the issues. For more discussion of writings by Halliday and Masterman, see the book reviews by Sowa (2000, 2006b).

Although Halliday didn't cite Peirce, Welby, Ramsey, Wittgenstein, or Masterman in his late publications, his theories of language and cognition build on the century of research based on the foundations by Peirce and Welby. A solid proof of pragmatism could be based on Figures 1 through 12, quotations by Peirce, and citations from the latest research in the cognitive sciences.