

Sign Function and Potential of the Printed Word

Douglas McArthur

Semiology is usually presented as “the science of signs,” but semiology is as yet far from being an agreed upon body of knowledge and method, partly because there is no agreement on a basic definition of the term *sign*. It is more appropriate to think of semiology as *the study of signs and related phenomena*. But even if the bases of the subject are not firm, and the domain of the subject is not yet clear, much progress has been made in understanding a range of forms of communication and expression. In particular, the semiological perspective is productive in that it encourages analysis of the similarities and differences between kinds of sign, and analysis of the relative efficiency of different kinds of sign in various situations. At a time when the forms of expression and communication are multiplying, a semiological approach keeps changing forms in perspective.

The Sign

Here is a working definition of the sign:

the sign is a tangible form (something that registers on the senses) which, in the mind of the user, is associated with a particular meaning (the meaning may be another tangible form, an abstract idea, an emotion or something else). According to Saussure, the sign is a combination of the sign-form (or signifier) and the sign-meaning (or signified). The gratuitous (or arbitrary, in one sense of the term) relationship between form and meaning can be contrasted with: cause-and-effect relationships, for example, heat melts butter; and part-whole relationships, for example, branch:tree. (Note, however, that through conditioning, sign-form and sign-meaning may become very closely linked in the mind of the user.)

The following, along with many other examples, may be considered signs:

speech, writing, mathematical symbols, choreographic and musical notations, calendars, maps, graphs, flow-charts and logic-charts, heraldic symbols, flags, uniforms and other styles of clothing, body-decoration, toys and dolls, money and tickets, photographs and films, statues, objects used for prophecy, color-codes in wiring, the sign-language of

1
See McArthur, D. 1987.
Le langage considéré
comme une techno-
logie. *Cahiers de Lexi-
cologie*, 50, 157-164.
Also McArthur, D.
1991b. Language as
Technology and skill.
*Deafness and Develop-
ment*, 2:1, 15-20.

2
The taxonomic prin-
ciple is applied system-
atically in artificial
languages like
Esperanto and Inter-
glossa and in many
forms of notation.
See also, McArthur,
1991b.

the deaf, etc. On later analysis, one might choose not to include some of these in the category of signs. (Note, too, that I include speech in the above list – some semiologists would give speech a special status, related to a special human faculty. Signs and sign-systems are human inventions.)¹

Sign examination yields many variables including:

Physical form:

the sense-mode (visual, acoustic or tactile, for example); whether the form is permanent, semi-permanent or ephemeral; whether the form is static or dynamic.

Relationship between the form and the meaning:

stable or casual (for instance: “Let $x = 20$ [in this sum].”); iconic (or representational), iconic in relationship to a metaphor (for instance: “high” notes are shown high on the musical staff), or purely arbitrary; whether the form is an economical presentation of the meaning or not.

Nature of the meaning:

whether the meaning is vague or precise, concrete or abstract, public or private.

Sign is part of a system of signs, a code, or not:

if there is a system, how extensive is it? If there is a system, is the taxonomic principle in evidence? (According to the taxonomic principle, signs with a common element of meaning, should have a common element of form, as in “nation” and “national,” for example.)²

Other variables include the relative ease of production of a particular form of sign, whether the particular sign is private or communal (for communication to take place, a sign must be “shared”), the intertranslatability of signs and historical relationships between sign-systems.

Functions of Signs

A major variable which requires longer comment is that of the function of the sign (in the sense of the purpose to which the sign is put). It is common to think of communication as the normal function – and perhaps even as the sole function of signs – but this is a false view. While it is true to say that the normal function, but not the only function, of spoken language is communication, written language and the act of writing, along with numerous other signs, can have a range of functions, and communication is not necessarily the most important of these. In this paper I emphasize the *non*-communicative functions of signs precisely in order to counterbalance the prevailing view.

Certain points must precede discussion of the range of functions. A given sign or group of signs may have different functions at different times: for example, a text written originally as a private diary (where the function is to record for personal use) may be subsequently published to communicate autobiography. Further, a given sign or groups of signs may have more than one function at a given time (probably with one

Figure 1 The Taxonomic Principle
 in Semiology

The generic divisions in common use for these shells are founded upon the plan of growth, or mode of numerical increase of the chambers. The following are the primary groups of *Rhizopoda* in the system of d'Orbigny:—

1. *Monostega*.—Body consisting of a single segment: shell of one chamber.
2. *Stichostega*.—Body composed of segments disposed in a single line: shell consisting of a linear series of chambers.
3. *Helicostega*.—Body consisting of a spiral series of segments: shell made up of a number of convolutions.
4. *Entomostega*.—Body consisting of alternate segments spirally arranged: shell chambers disposed on two alternating axes forming a spiral.
5. *Evallostega*.—Body composed of alternate segments not forming a spiral: chambers arranged on two or three axes which do not form a spiral.
6. *Agathisteya*.—Body consisting of segments wound round an axis: chambers arranged in a similar manner, each investing half the entire circumference.

According to the taxonomic principle, signs of similar meaning should have similar form. (Compare the representation of relative duration of notes in music, and the symbols for relative wind-speed on weather-maps.) Taxonomies are a form of mapping

Reconstructed from
 Richard Owen's
Palaentology 1861, p.12.

3

See Knowlson, J. 1975. *Universal Language Schemes in England and France 1600-1800*. Toronto: Toronto University Press.

Also Slaughter, M.M. 1982. *Universal Languages and Scientific Taxonomy in the Seventeenth Century*. Cambridge, United Kingdom: Cambridge University Press.

dominant function): for example, on a particular occasion a writer may be more concerned with clarifying his or her own ideas than with communicating them to others. It should be noted that communication includes various sub-functions like informing, asking for information, persuasion, giving orders, etc. The analysis and naming of the various functions is not always easy: in many situations a number of different things are happening simultaneously and it is not always clear whether these things are discrete or different aspects of one basic function.

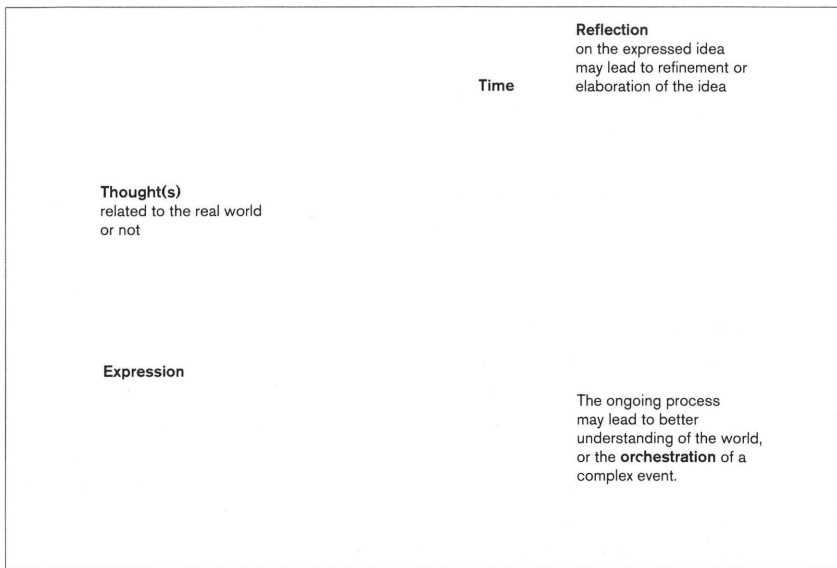
Consider some of the non-communicative functions of signs. It is probable that the very tangibility of the sign-form, and the fact that the form is finite (is an entity), help us to isolate and focus the meaning (or concept) expressed. Thinking or ideas may be imprecise, subtle or ephemeral, but if ideas can be closely associated with a particular tangible form, they are stabilized – they come under control. (Note that I do not accept the view held by some that concepts cannot exist before words and other signs.) Different concepts can be represented with different forms or groups of forms, for example, words in patterned phrases and clauses. Thus, there is the possibility of “mapping” all conceptual space; all experience, all ideas can be represented, in one sense of the term, in signs. When a standard expression is not available, one can create a new sign, possibly by adapting established sign stock, as in *private + ize*, or use standard signs in new ways, as in a metaphor, or use circumlocution. At the same time, it should be remembered that concepts are, in a sense, interpretations, and there may be considerable variation in concepts between individuals and between communities. If one takes language, for instance, there are differences in thinking and usage between members of a given language-community, and between different language-communities – translation always involves more than a one-to-one correspondence. The situation is even more dynamic as individual and communal interpretations tend to evolve through time – the map is redrawn.

Mapping

Scientific taxonomies provide an interesting example of mapping. Systematic knowledge of a given domain of experience, plants, animals or chemistry, for example, is represented in a systematic terminology, corresponding to phenomena interpreted as being related in some precise way. The terminology or names themselves are informative in a particular sense. In the seventeenth and eighteenth centuries, philosophers and scientists were deeply concerned with the relationship between taxonomy expressed in words or other signs and the advancement of knowledge (*see figure 1*).⁵

The process of mapping, and perhaps the mere activity of expressing in sign-forms, gives the user a sense of control. Any aspect of the real or the imagined seems to be more manageable when reduced to signs. We can often assimilate the vague and/or problematic into the

Figure 2 Conceptual Absence of a Final Form



4
For discussion of the
personal diary
as a form of therapy
see Field, J. 1952.
A Life of One's Own.
Harmondsworth.
United Kingdom: Pen-
guin Books.

For discussion of
drawing and painting
as therapy,
see Hudson, L. 1978.
Human Beings.
St. Albans,
United Kingdom:
Triad/Paladin, 51-56.

See also Ulman, E. and
P. Dachinger. 1975.
Art Therapy.
New York: Schocken.

established categories of thought expressed in traditional words or other signs. Perhaps it is in the nature of any sign-system to designate entities and relationships between entities and to distinguish qualities. The process of expression necessitates an effort of analysis and therefore a sense of understanding. Examples quickly come to mind, self-expression is often encouraged as a form of therapy for the emotionally disturbed, likewise professional writers and artists often comment on the unburdening function of expression.⁴ It is very likely that certain kinds of thinking are a sub-tangible signing (recall the usual expression, sub-vocal talking) and involve a similar ordering and clarifying of ideas.

When a concept (or group of concepts) is expressed, and particularly when it is expressed in a permanent or semi-permanent form, there is the possibility of reflecting on the concept, modifying it in one way or another, building upon it. In the process of producing the sign-forms, and in the process of reflection on the forms, concepts are likely to become more precise or more subtle. Unlike spontaneous face-to-face communication, there is time to think about the ideas or material with which one is involved. One may forget altogether any potential receiver of the message. For example, the decision to use one word rather than another is likely to become much more conscious. Too often writing and other sign activities are thought of as involving exclusively the expression of already formed thoughts, but initial thoughts are often modified or elaborated upon during the process of expression. When ideas are perfectly clear and final in the mind and are readily encodable in standard words or other signs, there is not the same difficulty in expression. In many different fields of human activity, however, it is common to make preliminary sketches or rough drafts along with many further drafts before the final stage. It is much more apt to think in terms of construction or process or gradual formation, than in terms of the expression of something precisely blue-printed in the mind, especially when the matter in hand is one of some complexity. Here are some examples from different fields. In the case of writing a computer program, there may be many revisions before the final successful form is produced. Or in the case of representational drawing, it has been said that drawing is discovery. In the process of drawing the likeness of anything but the simplest object we have to make many decisions and the need to make decisions obliges us to look again and again at the object, thus discovering the details of its form. In the case of programming and drawing, there is a notion of working towards a final form, but in many situations where signs are used, there may be no true final form because there is no limit to human imagination (*see figure 2*).

Abstract thought is aided by the use of signs, the tangible form gives a certain permanence and definition to any idea. With signs it is possible to elaborate on our thinking, to carry on complex thinking, and to maintain coherence in thought. Consider, as just one example, arithmetical calculation: the average person cannot carry out elaborate calculations without the help of visual symbols or some mechanical aid such as a calculator or abacus. Literacy and the use of other notations is likely

to favor the development of more elaborate and more complex philosophy, theology, science and literature.⁵ The terms elaboration and complexity can be understood in two different ways (at least). They can be applied to the overall structure of a work, for example, *The Divine Comedy* and Proust's *Remembrance of Things Past* have more complex narrative structures than the *Odyssey* and *The Song of Roland*. We can also apply them at the level of sentence structure, the poetry of Hopkins and Cummings and the prose of legal documents display a complexity which probably could not exist without writing.

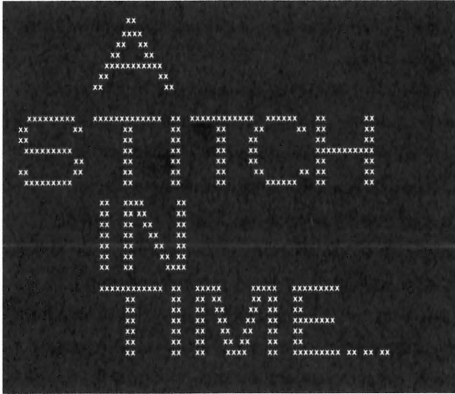
The elaboration of conceptual structures can lead to the realization of elaborate material structures or events (*see figure 3*). Consider the planning of symphonies, ballets, military operations, moon-shots, architecture and town planning. One could use the term orchestration in a metaphorical way for such a process of planning. The signs used in these projects might be words, mathematical or musical notation or scale models, but in every case they externalize and materialize concepts.

As demonstrated, signs can be used to record and develop ideas, but they can also record an event or a particular state of things. A note can serve as a reminder at a later date, it preserves information for reference. Calendars, diaries and logbooks locate people, ideas and events in space and time. Some written records are given special status as in the case of contracts and holy scriptures. The recording of information results in an accumulation of information over time which may be used for particular analyses and syntheses. From these, correlations can be made or conclusions can be drawn. Much science is the product of analysis and synthesis of observations recorded and maintained over time. Accumulated data is also important in the efficient administration and decision-making of any large organization whether a corporation or an empire.

Two aspects of sign use deserve particular attention: operations on sign-forms and memorability. Sign-forms are manipulated or processed as forms, in very precise ways. Consider how words are arranged alphabetically in dictionaries or directories. Where there are clearly definable and limited operations to be performed upon forms, the operations may be mechanized, allowing the task to be done quickly and efficiently by computer, for example. Modern methods of information storage and processing facilitate the task of administration. It is very important to note that machines process forms, not meanings (hence, *inter alia*, the difficulties in realizing machine translation).

There is also the question of memorability (or aesthetic character) in sign-forms. Memorability is a quality that one might attribute to abstract art, to music or to natural phenomena like rock formations. Memorability might be a product of features like repetition or regularity, contrast, balance, symmetry or pattern and variations on pattern. The forms of signs may be intrinsically memorable or may be modified in some way to be memorable or may be placed in memorable arrangements. The sounds of spoken words may be chosen and organized to make rhymes and patterns of rhymes, assonances, alliterations, and

Figures 4 The sign may have *dimensions* of information



patterns of syllables or stresses. Similarly, written or printed words may be chosen, arranged or modified in form and color to give memorable visual effects (*see figure 4*). Theoretically, any kind of sign-form might be modified to enhance its memorable effect, or might be used with other sign-forms to increase its memorable effect. (Note, by the way, that iconic signs are not necessarily memorable in this sense, galleries and museums are full of pictures and sculptures that are highly forgettable, except that they provide historical or other useful information.)

Pragmatics

Making an informed decision about the best form of sign to use on a given occasion requires consideration of a number of factors: the physical circumstances of sign use, the subject matter, the function of the sign(s), and so on.

Here are some of the general factors operating in the case of communication:

Physical situation:

depending on the relative proximity of the sender and receiver or the various forms of transmission available, one may speak, write or use some other form of sign;

Code sharing:

sender and receiver must share a code, use the same language or the same symbols;

Unambiguous signs:

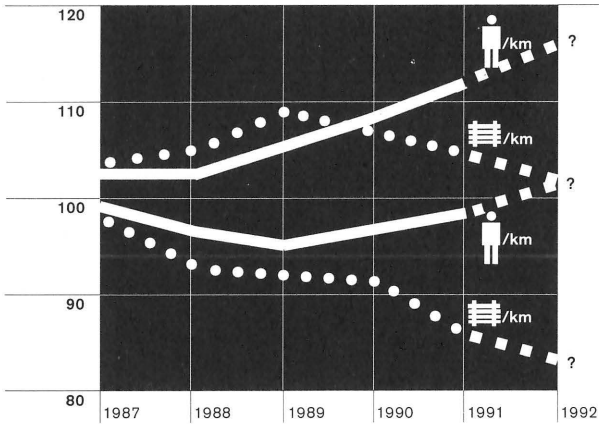
the sender should strive for clarity.

However, if one takes a more specific view and considers the question of the presentation of meaning (or information) and how best to present it, a large range of factors could be mentioned.

The Printed Page

As the discussion becomes more specific, focusing on information in a non-dynamic, two-dimensional, visual medium, one must keep in mind the possibilities of variation of form within the medium and the use to which these variations might be put for the expression of information. There may be dimensions of variation in form which can be correlated with different dimensions of information. Because the elements are familiar, the vocal medium of speech can serve as a preliminary analogical example. Words and their occurrence in a construction (a sentence, for example) may be considered a dimension of information, the linguistic dimension; but when a person speaks, their voice identifies them as a child or adult, as a male or female; their mood and perhaps the state of their health may also be evident; there may also be rhetorical and/or aesthetic features in their particular utterance. These different

Figure 5 This graph shows a hypothetical situation – the relative increase or decrease of transportation of passengers and goods by rail and road.



Graphs are economical presentations of information (of certain kinds).

Some of the signs here are “iconic” (or representational). The relative “height” of the curves is a metaphorical way of showing numbers, or “volume”.

The function of the squares here is purely esthetic – one could have used rectangles.

6 Compare ideas of the French philosopher Condillac. See also, Aarsleff, H. 1982. *From Locke to Saussure*. London: Athlone Press, 157-158.

7 The desire for visual symmetry, balance, regularity of pattern(s), etc., may well interfere with the process of analysis. See Ong, W.J. 1958. *Ramus, Method and the Decay of Dialogue*. Cambridge, Massachusetts:

Harvard University Press, figures IV and V, 80-81. The general Ramist principle of binary divisions reflects the same tendency. Compare also, C.S. Peirce’s triadic analysis of signs.

aspects may be considered different dimensions of information. The medium has the potential for modulation and variation – we perceive and respond to differences—we process simultaneously the different aspects of the sign.

Likewise, the printed page offers a range of possibilities, and the possible variations in form can express not only a range of information but different dimensions of information. The medium allows text, image, graph, table and other hybrid forms. The text may be presented in linear, line-by-line form, or in other ways, such as lists. There is the possibility of different shapes and sizes of letters. There may be sub-codes within the text such as punctuation or numerals, or changes in color or in spatial orientation of the text to signal position in a hierarchy. The printed page is based on many conventions some of which involve motivated forms or the insistence on certain dimensions of information:

Taxonomic motivation:

similar meanings are expressed in similar forms, for example, capital letters at the beginning of names, italics for technical terms or foreign words, use of rows or columns or similar indentation for related information – the result is a structural consistency;

Aesthetic motivation:

the search is for pleasing and/or memorable form and may involve, for example, a concern for symmetry or asymmetry or regularity or surprise;

Iconic (or representational) expression:

size or position can be used to express importance or hierarchy, for example (*see figure 5*).

A general distinction can be made between signs of linear form and signs of non-linear form. Spoken words are produced and perceived as a sequence (even if our understanding, for instance, of grammatical and other relationships is not perfectly sequential); written words are basically produced and perceived as a sequence (but the writer and the reader may depart from the sequence in various ways). It is in the nature of the medium of sound that there is sequence, but vision does not necessitate sequence – a visual form of some degree of complexity can be perceived immediately. Consider the relationship between different kinds of thinking and the form of the sign. Linear signs like writing may be appropriate for narrative or for presenting the steps of an argument (as in a geometric proof), but if our ideas and knowledge exist in the mind rather as a structure (perhaps an untidy and sometimes incoherent structure),⁶ there is a good case for presenting ideas in non-linear ways: with conceptual “maps,” graphs, etc. (Note that individual words, not prose, are used on such occasions, *see figure 3*.) Distance and location in space can be used to show relationships between ideas, such as strength of association. There is, however, always a danger that aesthetic motives may unduly influence analytical thought.⁷

Many writers tend to produce text that can be read aloud and which, in a general way, can be understood like speech. Even Proust’s 15-25 line sentences and the long, complex sentences of legal documents

Figure 6 Interruption of Grammatical Relationships

**EDIBLE
 OIL PROJECTS
 ENGINEER**

HICK, HARGREAVES of Bolton, Lancashire, require a Projects Engineer with detailed knowledge of modern refining techniques in the Edible Oil Industry for new work on vacuum treatment and processing of edible oils.

The successful candidate will preferably have had first hand experience of chemical and processing control in modern refining plants and should be capable of taking charge of a small team of Engineers and carrying new projects to commercial success.

Age is no bar to the job but Chemical Engineering qualifications are essential. The Company offers all the usual benefits.

Reply in the first instance stating qualifications and salary required to :

The Chief Engineer
HICK, HARGREAVES & COMPANY LIMITED
 Bolton, BL3 6DB, Lancs.

8
 See Ong, 1982.
 See also
Visible Language,
 22:2/3.

9
 See Jennings, S. 1987.
*The Complete Guide to
 Advanced Illustration
 and Design*. New Jersey:
 Chartwell Books, Inc.
 See also Simmonds,
 D. and L. Reynolds.
 1989. *Computer
 Presentation of Data in
 Science*. Boston:
 Kluwer Academic
 Publishers.

can be read aloud (and understood, but with difficulty in many instances). Perhaps we limit ourselves by generally believing that a text should lend itself to reading aloud. (The term *residual orality* has been proposed for features of written language carried over – perhaps unnecessarily – from the speech communication situation.)⁸

A potential strategy that is not commonly used is the display of syntactic structure. It is possible to present text in such a way as to indicate main clause and subordinate clause, coordination between noun or verb and modifier.

For example:	words and word groups	could be presented to show grammatical relationships and thus facilitate comprehension.
--------------	-----------------------------	---------------------------------------------------------------------------------------------------------

This kind of strategy is often used in posters and newspaper advertisement when similar form is used for similar information.

For example:	Product X is	new, efficient, and cheap.
--------------	--------------	----------------------------------

Editors and designers should at least be aware of this dimension of information. In particular, the narrow columns of many newspapers and magazines, which entail the frequent interruption of syntactic groups and word forms, actually frustrate the reader. Ignorance of this aspect has, on occasion, humorous or ironic consequences as in figure 6. The grammatical relationships are (edible-oil) + / = (projects-engineer). The desire for a certain kind of symmetry (aesthetic motivation) outweighed the concern for meaning. Where different dimensions of information are present or potentially present, the basic aim should be coherence or harmony between the different dimensions.

Conclusion

At this time, computers and other machines have made it easier to present information in a variety of ways.⁹ It is easier than ever before for those involved with communication to mix media and to use a variety of codes and forms within a given medium. The range of possibilities should be actively explored with a sensitivity to the potential dimensions of information, and if one is concerned with communication, with attention to established strategies.

There are lies.

There are damned lies.

And statistics.

Attributed to

Benjamin Disraeli,

nineteenth century

British prime minister

Clive Chizlett is a typographic designer and typesetter who has retired from full-time teaching and administration. He is active as a consultant in the publishing industry and is working on several parallel programs of research under the generic title Signs of

Meaning. Among the completed programs is an objective algorithm for describing and planning the form, content and layout of sign-posting networks.

The life and times of Otto Neurath are briefly outlined. The principles of his Isotype Picture Language are reviewed and are critically examined in the light of descriptive statistics. The pre-history and origins of Isotype are traced to the United States, ultimately to the pragmatist philosopher and pioneer semiotician, Charles Sanders Peirce, but more directly to the statistician, Willard Brinton and to Neurath's friend and associate, Charles W. Morris. Neurath's views of analytical philosophy and the social sciences are summarized and contrasted with ideas put forward by Popper and Wittgenstein. Finally, Neurath's personal credibility and scientific integrity are tested by looking at his contributions to Soviet propaganda in the early 1930s.

37 North Salts, Rye,
 East Sussex TN31 7NU,
 United Kingdom.

Visible Language, 26:3/4,
 Clive Chizlett, pp. 298-321,
 © *Visible Language*, 1992,
 Rhode Island School of Design,
 Providence, RI 02903.