World Language Without Words

by Rudolf Modley

A historian and designer of graphic symbols attempts to bring some order out of the chaos of our varied systems of communication through symbol.

The visitor to a medieval European city, frequently illiterate, was often guided to the shops he was looking for by the "public symbols" of the tradesmen—the barber's pole, the baker's pretzel, the pawnshop's three balls, the apothecary's mortar and pestle. Limited in number and often related to the image of the craftsmen's products or tools, these symbols became guides to those looking for guidance. Universally recognized, too, were the symbols of religious, political, and other institutions—the cross on the church steeple, the flags of friend and enemy, and the insignia and standards of the guilds of craftsmen and traders.

The pretzel did not stand for Baker Jones alone, the flag with the eagle for King Henry alone, or the cross for Bishop Harold alone. The pretzel represented all bakers, the flag King Henry and all his men and possibly his whole dynasty, and the cross stood for the Church itself. It is this characteristic of a comparatively simple geometric shape representing a concept—broad or narrow—which makes a graphic symbol and which differentiates it from a portrait or a photo of Baker Jones or King Henry and from any other effort to portray the Church.

The most widely used graphic symbols are simple geometric shapes.

While a few generally recognized graphic symbols—trade, religious, political, astrological—played an important role in the past, it is no exaggeration to say that modern Western civilization has rested, and still largely

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rests, on a few graphic symbols: the letters of our alphabet and the Indo-Arabic numerals.

It is important to note, too, that we have not expanded the number of these commonly used basic graphic symbols significantly in recent history. The child who learns to read and write and do arithmetic works with just about the same 50 basic symbols that were taught to his parents, grandparents, and earlier generations.

Enlarging our repertoire of graphic symbols could help us overcome some communication problems.

In spite of the enormous contribution which the 50 graphic symbols—and especially the 20-odd sound symbols—make to communication, we are beginning to realize serious shortcomings in written communication. Open any dictionary or thesaurus and you'll find that a single word can mean many different things. This often leads to misunderstandings when different meanings are imputed to identical words by the "sender" and the "recipient(s)" of a message. In sum, we are short of words with a firm and unique meaning. We may be able to create graphic symbols which have such unique meanings.

There are several thousand different languages and dialects in the world. Even if these languages were all written with the same alphabets (and they are not), people could not communicate freely. A few graphic symbols, universally understood, could overcome some of the language barriers.

"Word thinking" is complex. The words "turn right" have to be read, understood, and acted upon. No such series of steps is necessary when the eye glimpses the arrow pointing right. *Uniqueness* and *clarity of meaning, independence from language and cultural differences, and visual directness* are the ideal objectives which should underlie the creation of any new symbol system.

Symbologists (if we may use the term) disagree on how to make the first basic breakdown in trying to classify graphic symbols. Some think that graphic symbols should be divided primarily by their form into "pictographic" and "diagrammatic" symbols, others that the breakdown should be by use into "public" and "professional" symbols. We shall follow the latter breakdown for several reasons which will become clear in the course of the discussion.

We may define public symbols as those intended for the public at large—all those who use highways, schools, hospitals; work in factories and offices; travel in cars, planes, shops, or trains, and so on.

Industrial designer Henry Dreyfuss has published a "Symbol Sourcebook" which contains several thousand graphic symbols, many intended for "public" use, many for limited "professional" use. This collection, amassed over a period of many years from many diverse sources, is of great value to

students. It is also a convincing demonstration of how drastically most of the "public" symbols fail to conform to the objectives we have established. We may pick almost any one of the "public" symbols in Dreyfuss's book and we'll find that it is not "unique," that it is not "independent of language and culture," and that it does not "convey its message directly by its visual form." This, of course, is not an indictment of Dreyfuss's work but an indictment of the symbols which have been flooding the world without proper planning, proper coordination, and proper education.

There are a few graphic symbols which the public generally recognizes, accepts, and follows.

Several of these are symbols used in traffic; they have been accepted because they are either almost self-evident (the arrow indicating right or left turn) or have been learned by training, experience, or a combination with verbal instruction ("No Entry"). There are also a number of pictographic (image-related) symbols which, if placed in the proper environment, are generally recognized. But the largest number of "public" symbols, including traffic symbols, are poorly designed, insufficiently taught, and frequently misunderstood.

Recent tests at the Psychological Laboratories of the Universities of Utrecht and Vienna tend to confirm not only the fact that "standard public" symbols (such as Europe's "universal" railroad symbols on Dutch railways) have a high percentage of failure rates in recognition but also that the symbols in use often fail to correspond with the imaginations of the persons tested.

The most common failures of symbols intended for the public are these:

Conceptual failure: the symbol does not express the object or idea.

Poor draftsmanship: the symbol is poorly designed.

Conflicting meanings: several different symbols to convey one meaning or one symbol conveying different meanings.

Poor use of color: selection of color with disregard of color blindness, disregard of widely accepted color meanings.



"Public symbols" are graphic symbols which any person may encounter and need to understand. These are symbols used by the U.S. National Park Service in its sign system. A sign coordinator receives comments from the field as to possible changes or additions to the system. A red slash mark, running from the top left to the lower right, is used on symbols prohibiting the symbolized activity.



"Public symbols" used by members of the International Railway Union (UIC) in Europe. The failure of many passengers to understand some of these symbols is shown in a survey by Dr. H. J. B. Zwaga of the University of Utrecht, Netherlands.

Failure to fully exploit available background shapes: inconsistent use of background, failure to assign constant meaning to background.

Excessive symbol use: use of symbols even when symbols cannot explain the intended meaning.

Criticism, of course, is easy. It is more difficult to point the way to a solution. Before we do this, let me try to point out what, I think, graphic symbols *cannot* do.

First of all, it makes no sense to try to develop new universal picture languages—complete languages which are based entirely on graphic symbols. Historically, with a few exceptions among the Asian languages, pictographs have always evolved into alphabetic or phonetic scripts.

Most scripts in use today originally developed from pictorial signs into alphabetic scripts because those are the most efficient. They require the fewest different symbols. Any new ideographic writing system would, if it were ever accepted, revert to a simplified phonetic system in the course of time. Yet several efforts in the direction of all-picture languages have been made, many of them by authors who show considerable genius and skill.[1]

The fact that most of us communicate today primarily with about 50 graphic symbols should teach us the next most important lesson: any effort to add more than a sharply limited number of graphic symbols (other than purely pictographic ones) to our public communication system is doomed to failure. The letters of the alphabet, the numerals, the punctuation system, and the mathematical operators must be taught and learned. It takes several years of schooling and practice to do this. It would be very difficult indeed to expand the universally accepted number of non-pictographic graphic symbols from 50 to, say, 100 or even 80.

Although the Chinese and Japanese do succeed in learning and using several thousand originally pictographic characters, people in most other cultures find this extremely difficult and too time-consuming. Even in the

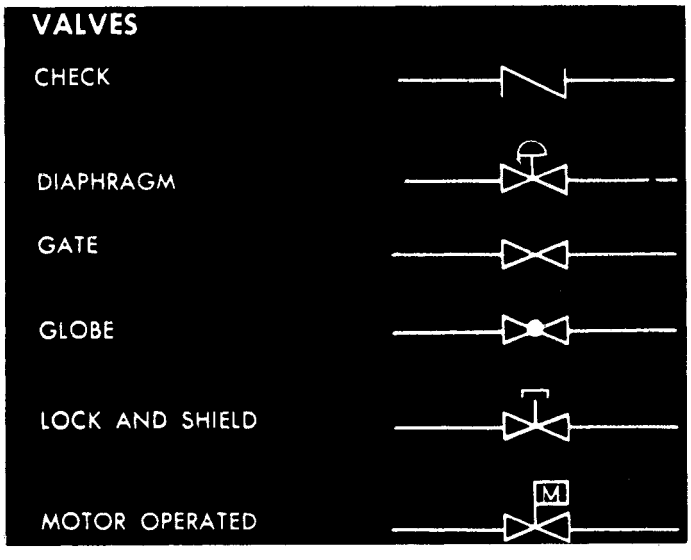
[1] Among the proposed graphic writing systems are the rather primitive SATO by André Eckardt (1955), developed from 1943 to 1951, and PICTO by Charles J. A. Janson (1958). More sophisticated systems have been developed by C. K. Bliss in his SEMANTOGRAPHY (1946), on which work was probably started in the late 1930's or early 1940's, and the most recent LOCOS by Yukio Ota. The major value of these efforts is that some of the symbols suggested may become part of a limited set of universal symbols.

highly literate Netherlands more than half of all rail travelers don't understand most of the "standard" pictographic symbols dealing with baggage (lockers, check-in, etc.), and a full one-third failed to correctly identify 29 different pictographic symbols in one survey. Thus, our aim should be realistic: maybe a dozen or two new abstract signs or symbols (for such concepts as "You Must," "You Must Not," "Caution," "Information," "Poison,") and a small number of image- or concept-related symbols whose meaning is easily learned.

This leads to a third warning. Don't believe that most pictographic (image-related, iconic) symbols are "self-explanatory" in the sense in which the symbol-creating agency intends them to be. There are several severe limitations even to pictographic symbols. Many pictographic symbols are understood only because of the environment in which they occur. A symbol of a cow may be understood as "cattle crossing" only because we subconsciously assume that an official highway symbol wouldn't just want to show us what a cow looks like.

Many pictographic symbols of man-made objects are subject to the technological change which the objects themselves undergo. One European railroad crossing symbol shows a railroad engine which looks more as if it were advertising a historic railway museum than a crossing. And how many people still recognize an automobile horn—a symbol still used in Europe and recently seen even in the U.S. to indicate "no horn blowing"?

Then there is the abuse of pictographic symbols to represent something



These are some typical "professional symbols" used by small groups of professionals who have been taught these symbols in professional training and who use the symbols continuously themselves. The symbols shown are taken from a U.S. standard published in 1949 and later reaffirmed. It shows the symbols for valves for heating systems to be used in professional drawings.

which they do not show. The worst example of this is the use of the symbol of a man or a woman to indicate the location of a toilet. In the Austrian experiment, only 19 percent of the respondents drew a man or a woman to indicate a toilet. More than half drew what they considered a toilet to look like.

Equally misleading is the abuse of pictographs to show concepts which require complex interpretation before the meaning becomes clear—if it ever does. Using a symbol of a broken egg or a broken wineglass to try to indicate "fragile" is futile. It may be possible to portray the proper handling techniques pictographically in some cases, or we may, some day, have an arbitrary symbol for "fragile." But let's not expect others to follow complex mental processes to guess what is meant by a pictographic symbol.

In sum, there are limitations on the use of pictographic symbols. The best proof of this is that our successful permanent and universal symbols are almost exclusively "arbitrary" symbols whose meaning is accepted by convention. This shouldn't keep us from using pictographic symbols where they have clear advantages. It should teach us to be careful in their use.

This leads to the question of how we should go about developing additional symbols for public use.

The problem of changing today's chaos into order is almost overwhelmingly difficult from a practical point of view. Theoretically, however, we can break it into simple steps: (a) organization; (b) research; (c) development, testing, evaluation; (d) education; and (e) application.

Organization. Only a single worldwide organization can cope with the symbol problem. Today, we have a large number of limited-purpose groups which "do their own thing," often with complete disregard for what orders have done. A European traveler who goes to an airport by train finds one set of symbols in the train, developed by the International Railway Union; those in the plane are another set, adopted by the International Civil Aviation Organization. Debarking in New York, the visitor who drives will have to cope with highway symbols which differ from the "international" symbols used in Europe.

The confusion is not limited to transportation; it continues in many different facilities. And to a great extent, the confusion encountered by the visitor is similar to that encountered by the American public in different parts of the United States itself.

What is needed is a pooling of the monetary and talent resources of national and international organizations and a willingness to make compromises. The problem has been recognized. A "working group" on public symbols of the International Organization for Standardization (ISO) has been set up. Representatives of different national standards organizations are working within their own nations. The secretariat of the group is the Austrian standards organization.



"Picto'grafics" have been developed over a number of years and trademarked by Paul Arthur and Associates, Ltd. About 200 different "public symbols" are sold in different sizes with commercial, medical, travel, recreational, and safety messages.

This first step in the right direction is probably the result of pioneering work done by the International Council of Graphic Design Associations (ICOGRADA) and its most active exponent, Peter Kneebone of England. However, the working group still lacks the financial resources and authority to take all of the essential steps required.

Research. Any organization dealing with public symbols will have to face the issue of making the best compromise among what is already widely used, what is needed, and what would be the best from a scientific point of view. This requires several lines of activity:

First, all the symbols currently in use should be collected with descriptions of their meanings, the areas where they are used, and the degree of acceptance they have found. This means the creation of symbol collections.

Next, these symbols should be classified by a system which makes it possible to locate symbols quickly and easily by their field of use as well as by their geometric (or pictographic) shape.[2]

An interdisciplinary international group of experts should be created to determine the maximum number of graphic symbols which could be accepted by the public, to develop a list of the most urgently needed symbols which might be adaptable to graphic treatment, and to specify the graphic characteristics which these symbols might have. A group of this nature should include psychologists, linguists, anthropologists, educators, designers, and administrators.

Development, Testing, Evaluation. The task of developing symbol systems and symbols on the basis of the specifications laid out by the interdisciplinary group should be assigned to one or more leading designers. The resulting proposals should be tested on an international basis, revised, and finally evaluated. If the outlook appears promising, final symbols should be designed.

Education. One of the elements most frequently ignored is the fact that ALL symbols must be taught. We do of course, recognize this when we think of letters and numerals, but fail to recognize that "public" symbols will

[2] Another working group of ISO is at work on this project.

require a comparable educational process. They will have to be taught in schools, in adult education courses, in driver training, in vocational training, in guidebooks, and through other avenues of education. This will be especially important when new symbols are to be placed in public circulation.

Application. Only after the steps enumerated above have been fully accomplished can symbols be successfully incorporated into the body of our basic communications. It is obvious from this that governments must become closely involved in the symbol-developing process. Only government cooperation with private institutions on a national and international basis can assure that universal graphic symbols can become a reality.

Because of the broad scope and the enormous complexity of this process, "public" symbols must be differentiated from the "professional" symbols to which we now turn. The standardization and international acceptance of "professional" symbols is much simpler and much further advanced than that of "public" symbols.

Early searchers into the secrets of the universe found out quickly that graphic symbols offered them valuable shortcuts in their work. The symbols of the astronomer, alchemist, and astrologist are testimony to that.

Many of the professional groups of today have developed their own graphic symbol vocabulary with which they construct diagrammatic designs which express clearly and unequivocally what they want to "say." The architect's blueprint, the cartographer's map, and the chemical engineer's process flow diagrams are written in graphic "language."

Because the number of professionals in each group is relatively small and their training already includes the learning of the trade's symbols, many professional symbols have become standards for their profession. The process of standardization, which has developed since the American National Standards Institute (ANSI), established as the American Standards Association in 1918, is comparatively simple. One or more technical societies request that a committee be set up to develop standards. Some 270 committees develop and revise standards. Some of these deal with graphic symbols: one is exclusively concerned with "Graphic Symbols and Designations." This committee, in turn, reports to the Graphic Technical Advisory Board, one of 20 advisory boards set up by ANSI.

From the national level, standardization moves to the international scene through representation by ANSI at the International Organization for Standardization (ISO) in Geneva and other international standardization bodies. ISO, in turn, has a Technical Committee on Graphic Symbols.

Thus, "professionals" have more or less successfully developed limited languages of their own and organizational structures to make necessary changes and additions. However, "public" symbols are still in a state of chaos. The first steps toward a solution have been taken—highly tentative ones in the United States, more sophisticated ones by ISO. But the task is enormous. It is a challenge to the scientific community, to the design profession, and to the governments of the world.