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Note: This written excerpt is typed onto the wax stencil without a proper draft - just as the thoughts came into my mind. Kindly excuse all the shortcomings .

SEMANTOGRAPHY FOR GEOLOGISTS

A Lunch-Hour Address given to the Student's Geological Society of the University of Sydney, 15th October 1951 by C.K.Bliss

Ladies and Gentlemen,

It's good to face again an audience of university students. You are the salt of the earth. And speaking of salt - first time I addressed university students, was 30 years ago - I myself a student of the University of Technology of Vienna. I had just passed the examination in Mineralogy with flying honours or colours or what the expression was at that time in Vienna. My fellow students, sadly lacking knowledge in Mineralogy, pressed me to coach them. I had to pay my way through college - so I did it. It was MINERALOGY IN 10 EASY LESSONS, for Non-Mineralogists, and those who want to become one.

But - as you know - this is not an easy task. A great part of Mineralogy-learning is just stuff for memorising. You have to know all the varieties of properties of hundreds of stones and minerals - stuff into your mind until it bursts and everything get's mixed up. Moreover, there is the practical examination. You are shwon many a mineral, and you have to diagnose it. Now, take common salt - sodium chloride. According to the text book, it should grow in beautiful crystal-clear tesseral cubes. But I have found, that in this form, it grows only in showcases. What you are shown of salt are lumps of all colours and forms. And this holds true with a number of other minerals.

I found a way to pass this knowledge to my fellow students. In true mining fashion I discovered a mineralogical poetical vein within myself and set down to put the whole of what we called Special Mineralogy in verses. The booklet became very popular and I still treasure a yellowed copy. And here is the first thing to do in a practical examination, when you are facing an array of hostile looking stones. Just remember the verse:

Oh thou - thirsty for knowledge
The first thing to do with a stone -
Just lick it - and if you should like it,
It's Sodium Chloride, be known.

And here is another verse

Two forms of Irondisulfide
Are call'd Pyrite and Markasite,
The tesseral - that is Pyrite
Rhombic - that's the Markasite.
You have to call this Dimorphy
And gen'rally Polymorphy.

And here we are, right in Semantics, the basis of Semantography. "You have to call it Dimorphy". Why Dimorphy? What's in a name, asked Shakespeare. A name is a word, and every word has a significant meaning. And in Greek, significant meaning is meant by the word semanticos. Semantics, that's the study of the Meaning of Words.

What does Dimorphy mean to a person, who does not know a single word of Greek? Would it not be better for him to learn the word Twoformness, the phenomenon of the same compound crystallising in two different forms? And Polymorphy may be called Manyformness, and Isomorphy - Sameformness. Surely it would be much easier to learn and to hold it in your memory.

Of course, the scholars who invented these words were right. They wanted to create a truly international word, and such words are formed from Latin and Greek word roots. Unfortunately, the knowledge of Latin and Greek is restricted more and more to a few only. Moreover, sloppy spech habits in different languages defeat the very purpose.

Those international words are created in order to help scientists, who speak different languages, recognise the same meaning. But unfortunately, scientists of different languages attach the adjectival ending of their language to many of these international words. Isomorphic is written in French isomorphique, and in German isomorphisch, etc.

These sloppy speech habits block understanding and create serious trouble, because the chemists have agreed that different endings should mean different things. Sodium chloride, or - chlorite, or - chlorate mean very different compounds. But we have also chloric in English, chlorique in French, chlorig in German, etc. to mean the very same thing.

Then there is different pronounciation and writing trouble. Chloride is written in German chlorid, and pronounced "chloreed" whereas the English pronounciation is "kloraid". To this comes different intonation and stress. In English we lay stress on the first syllable "chlOride", whereas in French it is "chlorIque". Now, all these difficulties are not existent, when English chemists talk with each other, or French chemists talk only with French chemists. But once two chemists of different languages get together, they have great difficulties with their "international" words, even if they know something of each other's language. I have experienced this difficulty many a times.

The only way out of this dilemma is a radical and decisive step - indeed the step which is the very basis of the idea of Semantography. It is the complete abandonment of phonetic writing FOR INTERLINGUISTIC COMMUNICATION ONLY. Instead, we should use an ideographic writing, which is independent of any language.

Among all scientists, the chemists have gone furthest in this respect. As soon as I wrote down NaCl, or $NaClO_2$, or $NaClO_3$, my French colleague, or any other colleague speaking any other language, understood perfectly what I meant.

Now, few scientists go on travel and meet other scientists. The great majority of the people of all the nations, be they scientists or non-scientists, stay at home. They read their scientific or non-scientific papers, and anything written in another language has to be translated, including (as we have seen) the "international" words. Only the ideographic writings of mathematics, chemistry, etc. can be understood in all languages, without the usual translation. 1 + 2 = 3 can be read and understood in all languages. H_2O means what is called water, or wasser, or acqua, or agua, or voda, etc. etc.

For more than half a century it was believed that Esperanto or another international language may solve the problem of interlinguistic communication. Today, we know that we don't like to learn foreign languages, even under the pressure and coercion of parents and teachers. We go for 7 years to French classes, and many of us can't ask correctly in French for a glass of water. Meanwhile, the road engineers have evolved simple picturegraphs for the highways where international understanding is a matter of life and death. A bent arrow ↱ means a CURVE in all languages.

SEMANTOGRAPHY is the logical continuation of a process, which has proved successful in all sciences, in commerce, traffic, music, etc. the replacement of phonetic words by ideographic symbols which everyone can read and understand in his comfortable mother-tongue. Semantography is the first practical fulfilment of a prophecy, made by the great mathematician Leibnitz 300 years ago, and it has been highly praised by a great modern mathematician Bertrand Russell. You understand now, why a chemist came to invent Semantography which provides simple symbols for the whole range of language. And here are the first examples.

This symbol □ indicates a material THING. I have chosen the square, remembering - yes, the beautiful tesseral cubes of salt or gold (which is less valuable than salt). My symbol for MATTER should indicate that matter is not the product of chaos. On the contrary, A divine simplicity and harmony reveals itself in the beautiful lines and planes of a crystal, and on the submicroscopic level, in the arrangement of the molecules. And here are derivations of my symbols.

□	⊙	⊙□	⊙□,2	×	⊙□,×	=	⊙□,=
material thing	eye	form	Dimorphy Twoformness	many (multiplication mark)	Polymorphy Manyformness	same equal (mathematical)	Isomorphy Sameformness

As you see, we have used a number of already recognised international symbols for our combinations. We have used the comma (,), the mathematical number 2, the mathematical symbols x and =. It is logical to put the symbol for the eye in front of the material thing symbol. It is with the eye, with which we behold any form of any thing. You may agree that these symbols are simple, that they are "difficult to forget", and that they are understandable in all languages.

Now, don't think me a fool who advocates that we should abandon the international words like Dimorphy and Polymorphy. I have shown an extreme case - that even international words can be misunderstood. We learn less and less of Latin and Greek and consequently these international words are a constant headache to the student, and difficult to remember. The symbols can be used in interlinguistic communication and at the same time, they would be a valuable educational aid for students, who have to stuff all those meanings into their head with the result, that as soon as the examination is over, many are forgotten. Let the student learn first the symbol and the familiar word Manyformness, then he will be more ready for Polymorphy.

A graduate of Sydney University, Dr. D. Everingham, has - during his students days - invented a new shorthand writing for the large organic structural formulae. For instance the formula for Methan CH_4, which is structurally written as indicated, can be written in a more simplified form as shown. These Everingham symbols are valuable where large structures are to be written down. As usual, Everingham faced criticism, because everything new seems absurd to certain people. Among the criticisms was one saying, the Everingham formulae would make it too easy for the chemical student to learn them. Surely an argument which would not convince any student. Fortunately, far-sighted men, like Mr. G.K. Hughes, Lecturer in Organic Chemistry, Dr. H.S. Wardlaw, Lecturer in Biochemistry and a number of other men of Sydney University acknowledged Everingham's pioneering work. Everingham is now an active supporter of Semantography.

H
H-C-H
H

I am fortunate to report, that scholars of the University of Sydney are in favour and support of Semantography, and I am extremely grateful to them and to the Sydney University Extension Board for their kind help. Among the praise which came from scholars outside of Australia is one, which has some bearing on the work of the geologists. Professor Oliver L. Reiser of the University of Pittsburgh, Pa. U.S.A. said in his paper "Unified Symbolism for World Understanding in Science" (written for the American Association for the Advancement of Science) that "Semantography...provides a powerful stimulus and aid to President Truman's "Point Four Program".

Point Four of Truman's Program is "A bold new program for making the benefit of scientific advances and industrial progress available for the improvement and growth of underdeveloped areas."

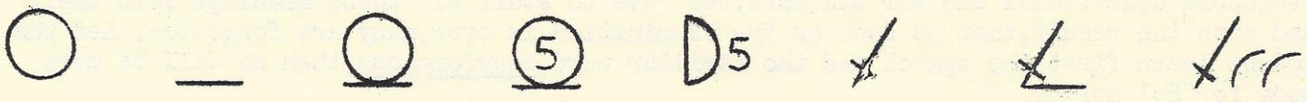
Here we have a classical semantic example of how a word can be misunderstood and misinterpreted. It is the word "industrial". The rulers of underdeveloped areas, and even many people outside of them, interpret this word as meaning the industrialisation of an area. Industrialisation involves enormous capital investments, and this should be provided by the American and British taxpayers, who had already contributed billions of dollars - never to be seen back. Moreover, industrialisation has its grave repercussions. A factory in a under-developed country, where the worker gets a mere pittance, soon swamps the developed countries with goods, which ruin industries there. A blast furnace erected in an underdeveloped area will soon turn out iron and steel for the making of guns, etc. etc.

Now read the Point Four Program again, and interpret it to mean that "the benefits of scientific advance and industrial progress" should be made available to develop the natural resources of an under-developed area, "for the improvement and growth" of that area. The natural resources of an underdeveloped area means the resources which are there. They may be hidden - in the mountains and the depth of the earth. Industrial progress in the industrial countries demands more and more of natural resources, oil and ore, minerals and mine products - in short THE GEOLOGISTS AND THEY ALONE, ARE THE MAGICIANS WHO CAN FIND THE NATURAL RESOURCES OF AN UNDER-DEVELOPED AREA. They are the real pioneers for the Point Four Program. Their science should be supported. They can alter the face of the earth.

But natives in undeveloped countries are opposed to progress. They are engulfed in superstitions, and won't take to improvements in agriculture, tools, hygiene. Scientists of the British Colonial Office have found the remedy. Natives are taught to be able to read and write, in order to be receptive to new ideas. The Geologist must be accompanied by the teacher. But unfortunately, those natives are divided in thousands of languages and dialects. In New Guinea, for instance, a population of less than 1 million souls is divided by more than one hundred different languages (not dialects). For natives Semantography offers a universal Picture Writing, which they can read in all their languages. THIS IS THE REASON, WHY PROFESSOR OLIVER L. REISER SAID THAT SEMANTOGRAPHY PROVIDES A POWERFUL STIMULUS AND AID FOR PRESIDENT TRUMAN'S POINT FOUR PROGRAM.

I hope therefore that the Geologists will favour and support the growth of Semantography. They, who travel through under-developed areas, they who are handicapped by the difficulty of making themselves understood, they are painfully aware that the Babel of Tongues is "a social problem of the first magnitute". Professor Lancelot Hogben used these words not only for the problems of the primitives, but for the problems of the scientists,

scientists "who have to turn to journals published in many languages for necessary information". And here is Lancelot Hogben's evaluation of Semantography. He wrote that it is "interesting...stimulating...fascinating...ingenious". Now, herebelow are some examples of semantographic symbols for a variety of purposes.

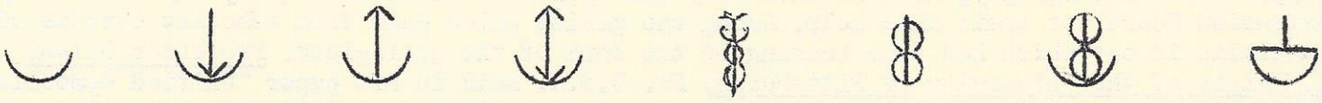


sun | earth | day (sun over e.) | Thursday (5th day) | May (5th month) | knife (cutter) | plough (earth cutter) | harvesting (cutting grain)

These symbols could be used for international calendars, and for directions on seed packages for illiterate farmers in under-developed areas.

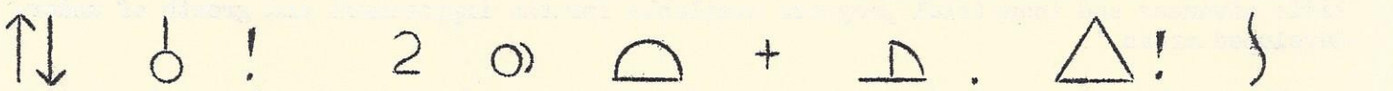
pen | to pen (Action) | letter | electricity (lightning) | telegram (electric letter) | bird | wings | airletter

These symbols can be used for general postal communication, even in literate countries.



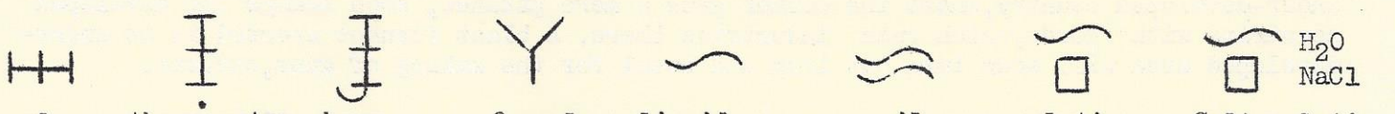
vessel (hold) | take in (RECEIVING) | give out (WITHDRAWAL) | exchange | Mercurius Rod (old merchant symbol) | money | business (money & hold) | ship

A few examples from the chapters on business, banking and transport.



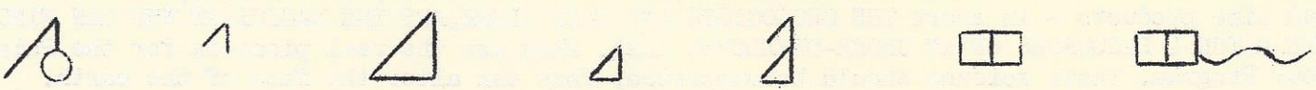
Shake bottle | Two pills | morning (sunrise) | and | evening (moonrise) | Danger (internationa) | inflammable (flame line)

These symbols can be used for medicine bottles, etc. also warning signs. The books contain complete lists of such symbols for medical service, emergency signs, etc.



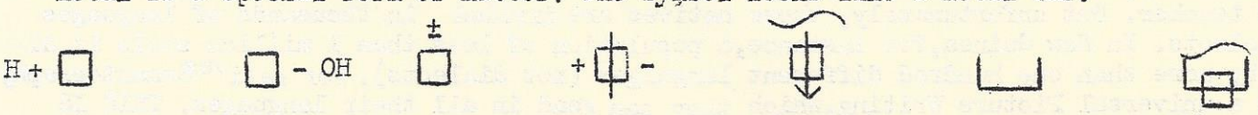
ruler (measurement) | thermometer | barometer | funnel (filtration) | liquid, usually water | oil | solution | Salt solution in water

The symbols for ruler, thermometer, barometer, funnel should carry the THING symbol (□). If we place the Action indicator on top, we mean the Action, measuring temperature, airpressure, etc.



chemical (retort line) | shorthand symbol | mountain | rock (stone) | ore (chemic. rock) | metal | metal melting

The symbol for metal is a repetion of the symbol for material thing, indicating that metal is a special form of matter. The symbol looks like a metal bar.



acid | base | salt | ionisation | precipitation | pot (vessel) | sediment

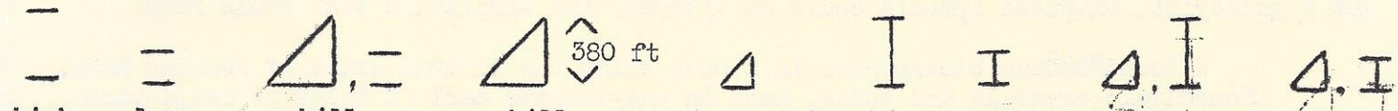
More symbol samples from the large chapter on physics and chemistry in the books on SEMANTOGRAPHY. It took me 3 years to write these down, after 4 years preliminary work. I realised that I would have difficulty to find a publisher for a manuscript containing over 500,000 words, and over 20,000 drawings. Therefore I typed it all down on wax stencils and duplicated it. Mr. John Metcalfe, Principal Librarian of the Public Library of New South Wales, recommended the purchase of this "extensive work" in this form to the larger public and university refrence libraries throughout the world." I have already sold a number of these books.

On this page we shall deal with symbols for geology. Geologists use many symbols, but mostly on their maps, not for interlinguistic communications. These map symbols are mostly directive, following a direction on the map and therefore unsuitable for writing. However, some of them can be used. The very fact that the geological symbols differ between the United States Geological Survey, the Geological Survey of Great Britain, of Canada, and there are even differences between the Survey of Western Australia and South Australia - this very fact alone, should convince every geologist that an international agreement on such symbols would be a good thing.

A few symbols for geological meanings have been shown on the invitation-leaflet, which is a part of this written excerpt. You are asked kindly to peruse this leaflet. Here are some more common meanings referring to mountains.

mountain ridge precipice foot of pr. many group massif chain (line)

In the following line symbols are shown to symbolise a hill (low mountain), a boulder (big stone), a pebble (small stone), etc. Naturally, a statement in figures is less ambiguous.

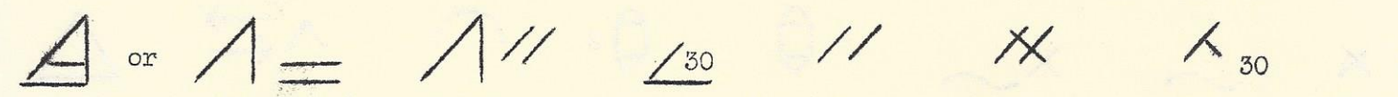


high low hill hill stone, rock big small boulder pebble

In the next line, we shall use some map symbols to indicate geological boundaries. These symbolic lines are taken from the Australian Standard Geological Symbols, Canberra 1950

geological (shorthand) boundaries geological boundaries accurate with dip approximate inferred probable inferred concealed

In the foregoing line, we used a "shorthand" symbol for mountain, to stand for "geological" In the following line we shall form some symbols for strata and then use a map symbol.

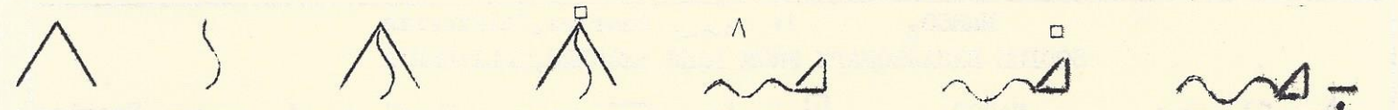


strata (horizontal) strata (horizontal strata general (add angle) angle dip strike strike and dip (map symbol)

In the following line "folds" (curved strata), and "joints" (cracks) are symbolised, also "faults"

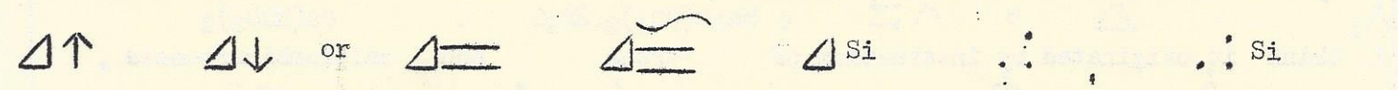
fold (general) anticline syncline joint joint fault fault

In the following line we shall use the Action indicator and the □ indicating a thing.



Action fire volcanic activity volcano magma liquid magma solidified plutonic rock (formed below)

In the following line "igneous rock" is symbolised simply by the arrow indicating that the rock came from below, and forced its way up, contrary to "sedimentary rock".



igneous rock sedimentary rock sedimentary rock aqueous rock (under water) silicous rock pulverised rock sand

These symbols are not so arbitrary as the already accepted map symbols. The symbols above indicate somehow the real outline. Any meaning could thus be expressed in Semantography.

A UNIVERSAL SCIENCE ABSTRACT

You have been invited to this lecture by a leaflet (attached to this written excerpt). This leaflet contains a short outline of a Universal Science Abstract, which can be put into operation by students, without publishers, without printers and even without money. The reader is kindly asked to read the attached leaflet. On this page a practical example will be given. I opened a book, containing abstracts on geological research and hit on the following abstract made by the author himself from his article which appeared in the magazine AMERICAN MINERALOGIST 25 (12) : 769 - 778, Dec. 1940. It comprises 70 words including the title.

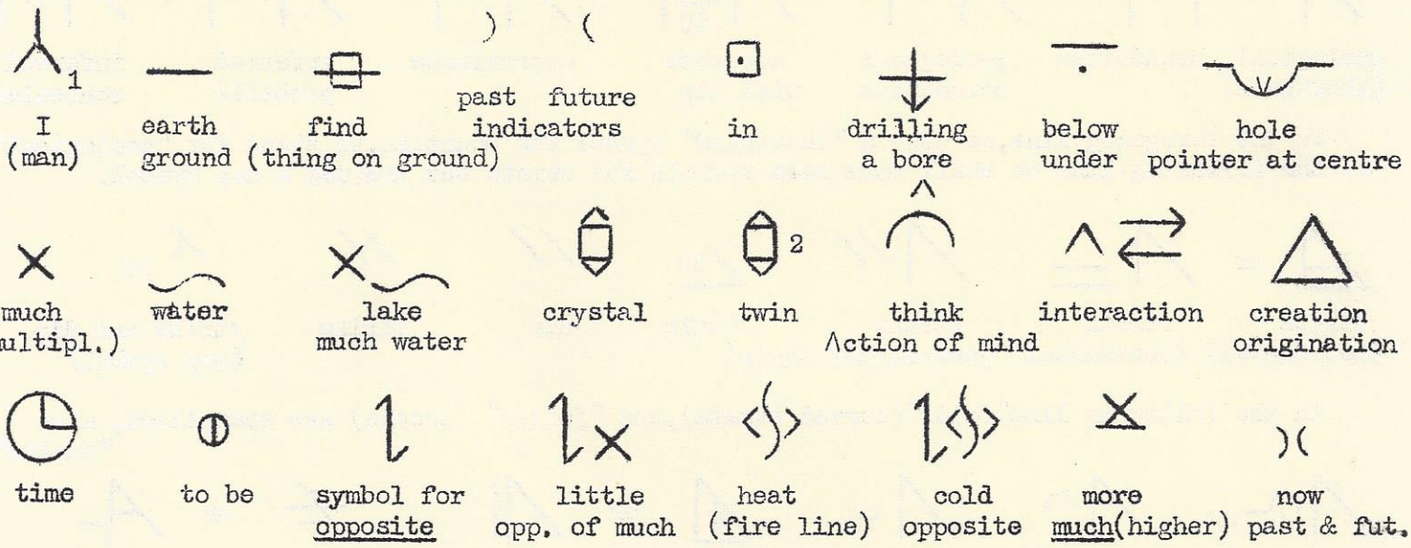
SODIUM BICARBONATE FROM SEARLES LAKE, CALIFORNIA

Sodium bicarbonate was found in large quantities in a well core drilled below the central crust of Searles lake. It occurs in monoclinic crystals and twins, chiefly in a gay-lussite marl. It is suggested that it owes its origin to the interaction of trona and calcium bicarbonate solution, or formed perhaps during a period when Searles Lake was slightly colder than it is now.

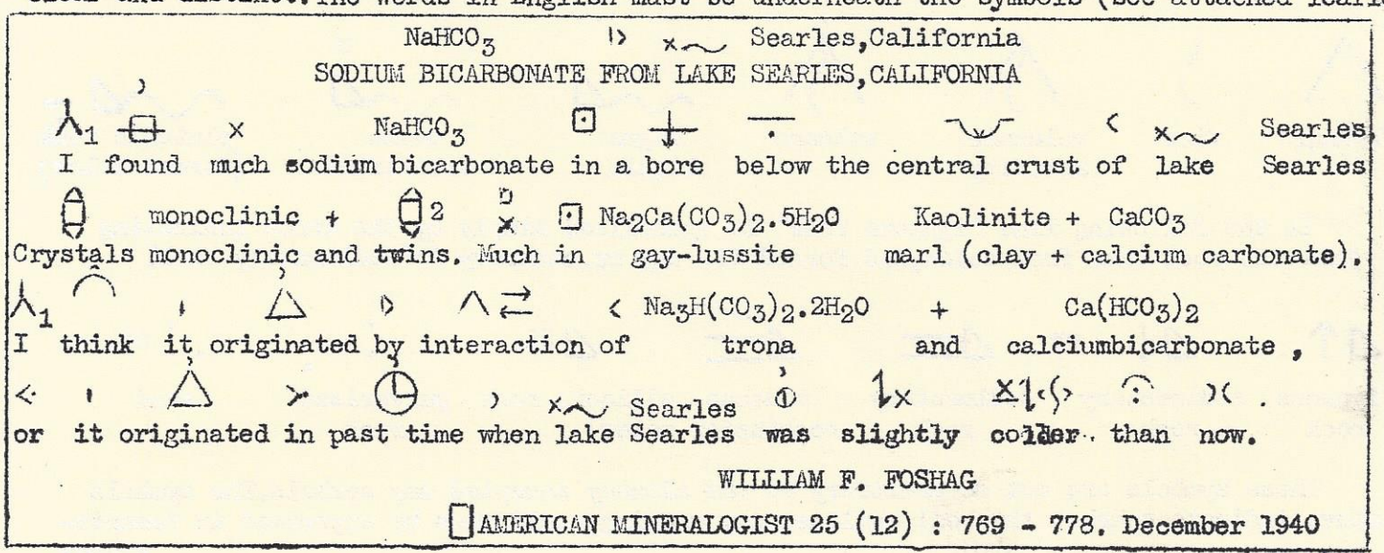
This abstract could be further simplified by applying the simple grammar of Semantography. The reader should understand that this is an attempt only, and that I myself am not a geologist. Disputed symbols could be altered. The simplified text would read:

I found much sodium bicarbonate in a bore below the central crust of Searles Lake. Monoclinic crystals and twins. Much in gay-lussite marl. I think it originated by interaction of trona and calcium bicarbonate or it originated in past time when Searles Lake was slightly colder than now.

In the following lines, I shall show some of the symbols to be used in the abstract. I cannot show all the symbols and how they are derived, but I hope you will realise that a study of the symbols in my book will convince you of their practicability.



Herebelow is then the abstract. Small symbols are a bit difficult to draw on this wax-stencil, but typed on the semantographic typewriter, the symbols would be even smaller, yet clear and distinct. The words in English must be underneath the symbols (see attached leaflet)



WILLIAM F. FOSHAG

AMERICAN MINERALOGIST 25 (12) : 769 - 778. December 1940

The End