

SOCIO-ENGINEERING PROBLEMS

HISTORICAL AND FUTURE PERSPECTIVE

How can one develop a kind of historical perspective that combines mankind's history, present, and future potentials in one shorthand chart? Let us first examine the role of the engineer in our civilization. The Engineers' Council for Professional Development has stated, "The engineer may be regarded, therefore, as an interpreter of science in terms of human needs and a manager of men, money, and materials in satisfying these needs." To include a perspective of "human needs" specified in the above definition requires some broadening of the subject matter compared to the usual physical science or engineering paper. The broadening required for such a socio-engineering analysis is roughly indicated in Figure 1.

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Frederick B. Wood, P.E.

P. O. Box 1061
Campbell, California, U.S.A.

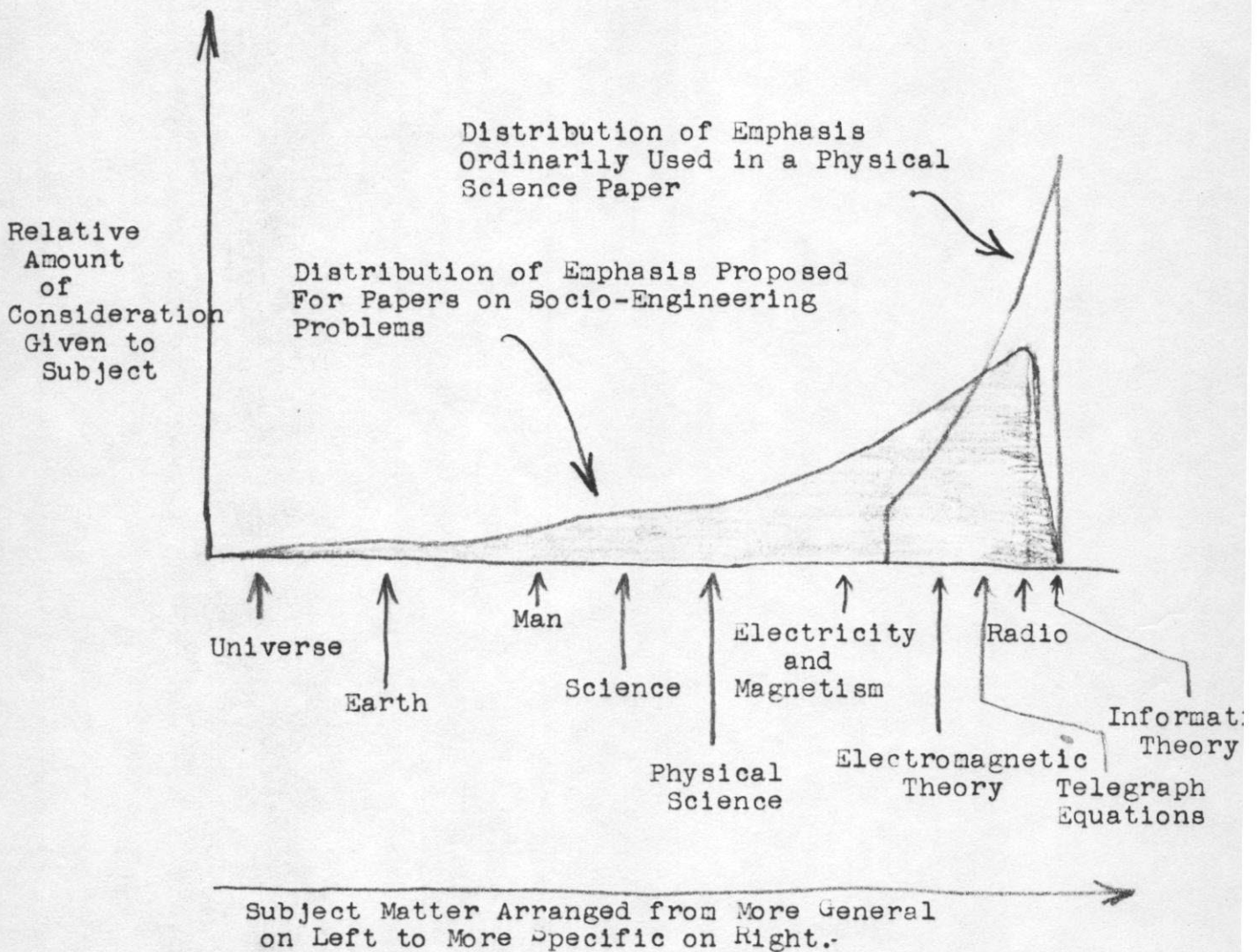


Fig. 1 - Comparison of Distribution of Emphasis in Physical Science and Socio-Engineering Papers.*

*Adapted from Fig. 1 of "The History of Electromagnetic Theory," unpublished seminar paper, University of California, by Frederick B. Wood, January 10, 1947.

How can the past and the future be visualized graphically? Figure 2 illustrates a set of three charts using linear time scales. These charts of Figure 2 were developed by G. Gamov.⁽¹⁾ The left scale represents the life cycle of our planet, Earth. The two scales on the right represent magnification of 1,000 X and 50,000 X respectively of the time region around "today".

How can this historical perspective be visualized in a way which amplifies the present? The semi-logarithmic scales used in the HISTOMAP series is a useful way.

Figure 3 shows how these stages of historical perspective appear when plotted on semi-logarithmic paper. There appear to be some gaps, namely stages X2 and X4 are missing. Perhaps some social scientist can fill in the gaps or specify a better division of stages.

(1) George Gamov, The Biography of the Earth

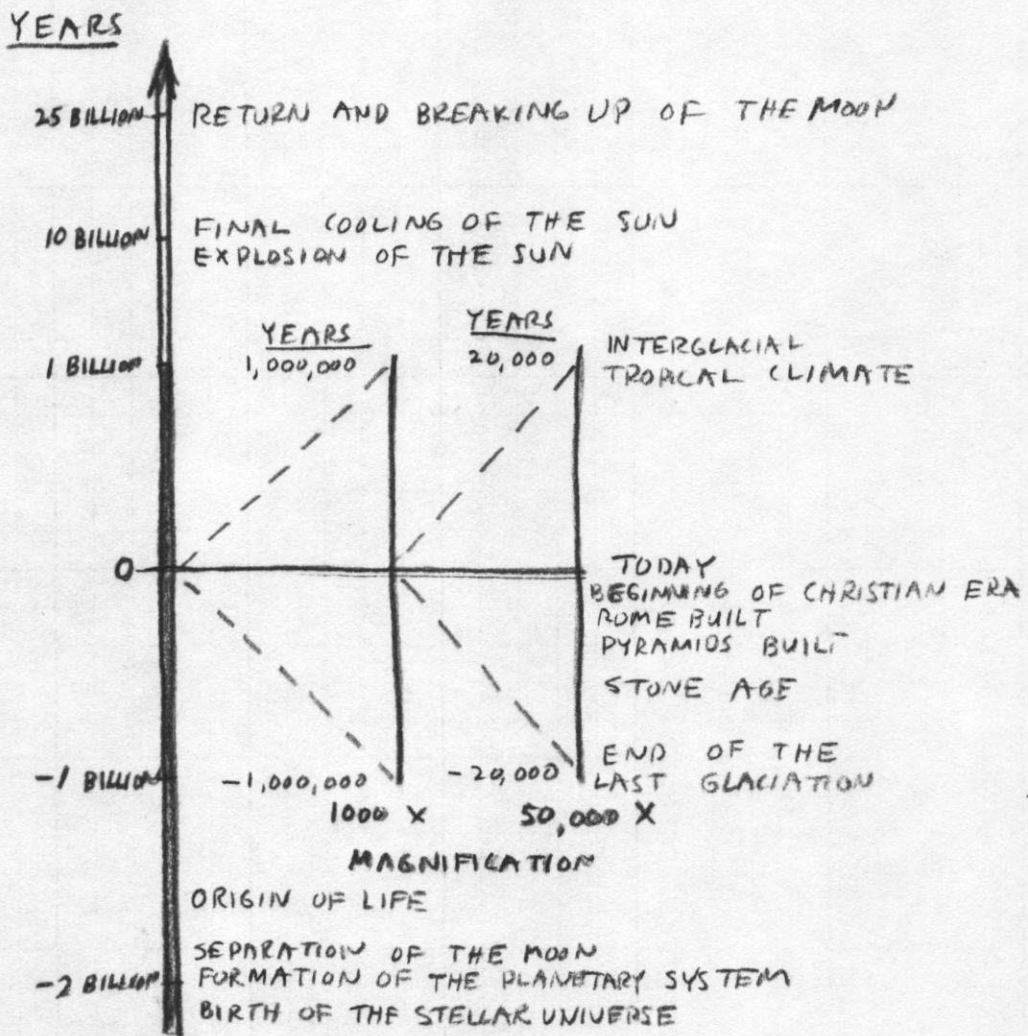


Fig. 2

X₁, X₃, X₅, X₆ from Selden Smyser, "Logics: Subverbal, and Superverbal," in Papers from First American Congress for General Semantics, March 1935. Arrow Editions, N.Y., 1940.

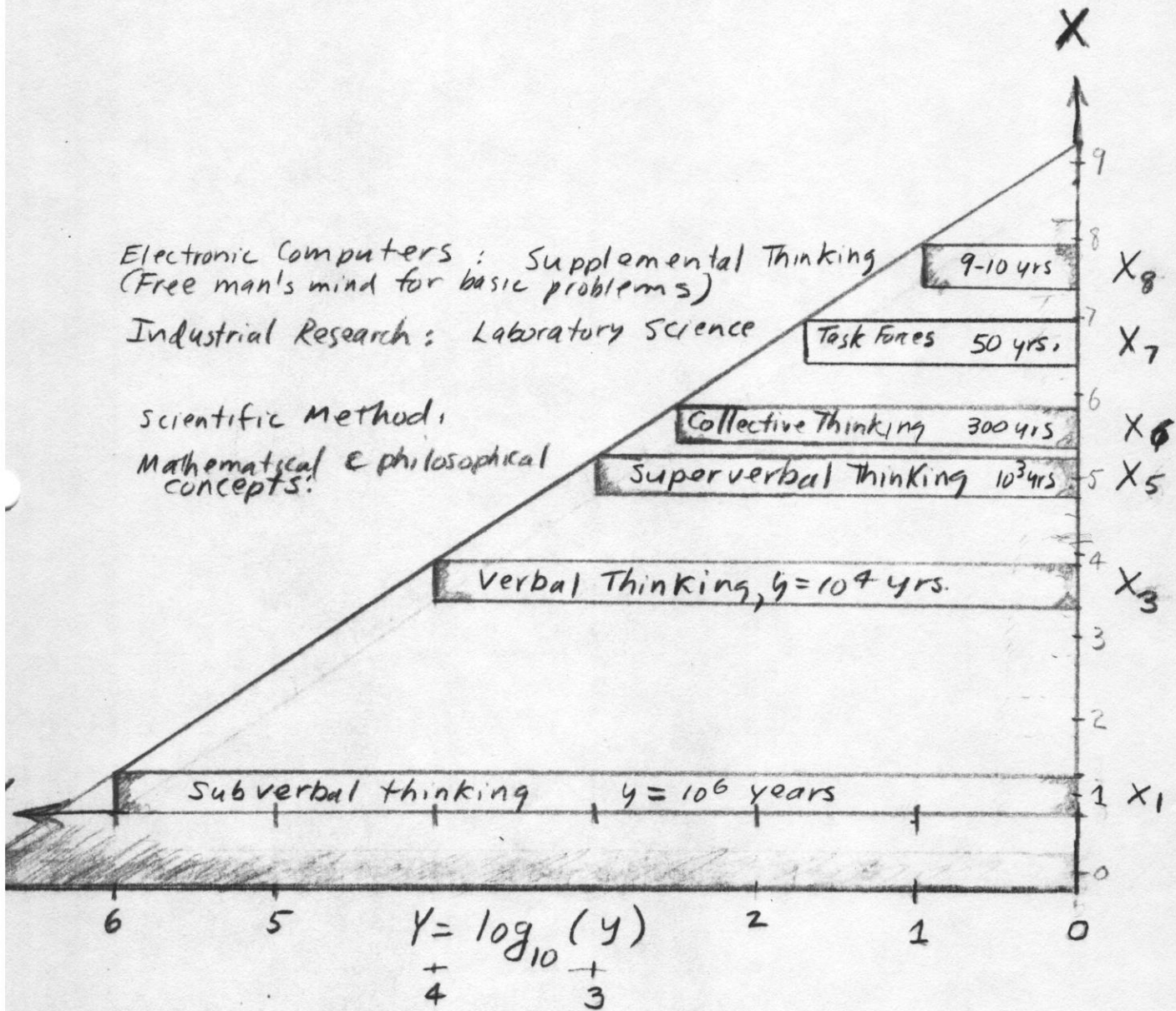


Figure 3.

In spite of serious difficulties in our civilization, there are aspects which are slowly improving. The necessity of maintaining existing institutions in order to insure progress is stated by Rosenstock-Huessy as follows:

"The paradoxical truth about progress, then, is that it wholly depends on the survival of massive institutions which prevent a relapse from a stage which has once been reached. In general, this is the last thing a progressive is concerned about. He must make a real voite-face and learn to revere our millennium of progress and invention as a whole. On the other hand, the list is an important lesson for the conservative as well...

The ladder of potentialities for progress and emancipation is shown in the following list.

CENTURY	LIBERTIES	PROTECTING PRINCIPLE	CORRESPONDING INSTITUTION
20TH	Freedom for growth, health	Public character of labor	(? Perhaps: adult education, decentralization of industry?)
19TH	Freedom for talent, thought, genuie, speech, creativeness to compete	Public character of private ideas	Copyright, patents, a written constitution
17TH	Freedom of endowment	Public character of wills	An independent judiciary
16TH	Free choice of profession, no vows for children	Public character of education	Public schools
13TH	Freedom of competition between teachers	Public character of the sciences	Universities
11TH	Freedom of movement for men in the professions	Public character of civil life (truce of God)	Judges of the peace, public prosecution of crime

Then these are the stakes of our present struggles." (2)

(2) Eugen Rosenstock-Huessy, "Out of Revolution," pp 31-32 (1938).

Rosenstock-Huessy gives an indication of his reaction toward science in the present crisis of our civilization:

"A pupil of the World War (1) sees a new future and a new past. He discovers a new political biology of the human race, filling in the gap between Planckism in physics, Darwinism in zoology, Marxism in economy, and liberalism in theology and political history.

"The year of Harvard's Tercentenary, 1936-1937, was also the tercentenary of a great intellectual event..... the rational foundations of modern science were established... Descartes' "Cogito ergo sum" opened the way to three hundred years of incredible scientific progress.

"Truth is divine and has been divinely revealed -- Credo ut intelligam (Anselm). Truth is pure and can be scientifically stated -- Cogito ergo sum (Descartes). Truth is vital and must be socially represented -- Respondet etsi mutabor (Rosenstock-Huessy).

"Our attack on Cartesianism is inevitable since "pure" thought encroaches everywhere on the field of social studies. Historians and economists and psychologists cannot stand the idea of not being "pure" thinkers, real scientists. What a frustration!

"I am an impure thinker. I am hurt, swayed, shaken, elated, disillusioned, shocked, comforted, and I have to transmit my mental experiences lest I die....

"Science, and history in its positivist stage, underrated the biological element in both nature and society....By beginning with abstract figures in physics, or general ideas in metaphysics, they never did justice to the central point in our existence. For neither physics nor metaphysics can offer us any practical base from which to enter the fields of biology or sociology. Neither from the laws of gravity nor from the ideas of logic or ethics is there any bridge to lead into the realms of life, be it the life of plants and animals or of human society. Dead things are forever divided from the living; figures and ideas belong to the limbo of unreality.

"However, finally Credo ut intelligam led to the Inquisition and Cogito ergo sum into an ammunition factory." (3)

(3) Rosenstock-Huessy, op. cit., p. 7.

The chart of Figure 3 shows the stages in the development of man's intellectual abilities and communication facilities.

A table of the principal achievements of mankind in regard to "liberties," "protecting principle," and "corresponding social institution" as developed by Rosenstock-Huessy is included in the preceding pages, together with Rosenstock-Huessy's classification of the recent stages of civilization into the three slogans:

"Credo ut intelligam" (Anselm)
"Cogito ergo sum" (Descartes)
"Respondeo etsi mutabor" (Rosenstock-Huessy)

Our next step in developing a perspective is to see if these different approaches can be integrated into one chart.

Consider some time scale that would include both past and present. Although there is no formal justification for using a gaussian probability distribution as a time scale, it nevertheless provides a scale for displaying past, present, and future in a way similar to the logarithmic scale, the HISTOMAP (past only). For example; one could take the extreme value probability paper of the Codex Book Co. (except use a linear abscissa and use the extreme values in both directions) and put "now" at the 50% probability point. The chart of Figure 4 was drawn by using the table of "Odds Against - to - 1" from the Handbook of Chemistry and Physics. As used in Figure 4, the scale is based on twice the "Odds Against -to-1" being equated to "years past" and "years ahead".

The gaussian probability scale of Figure 4 permits the distant events to be plotted on an almost logarithmic scale, while nearby events are plotted on a magnified scale.

A possible use of such a perspective would be to help people

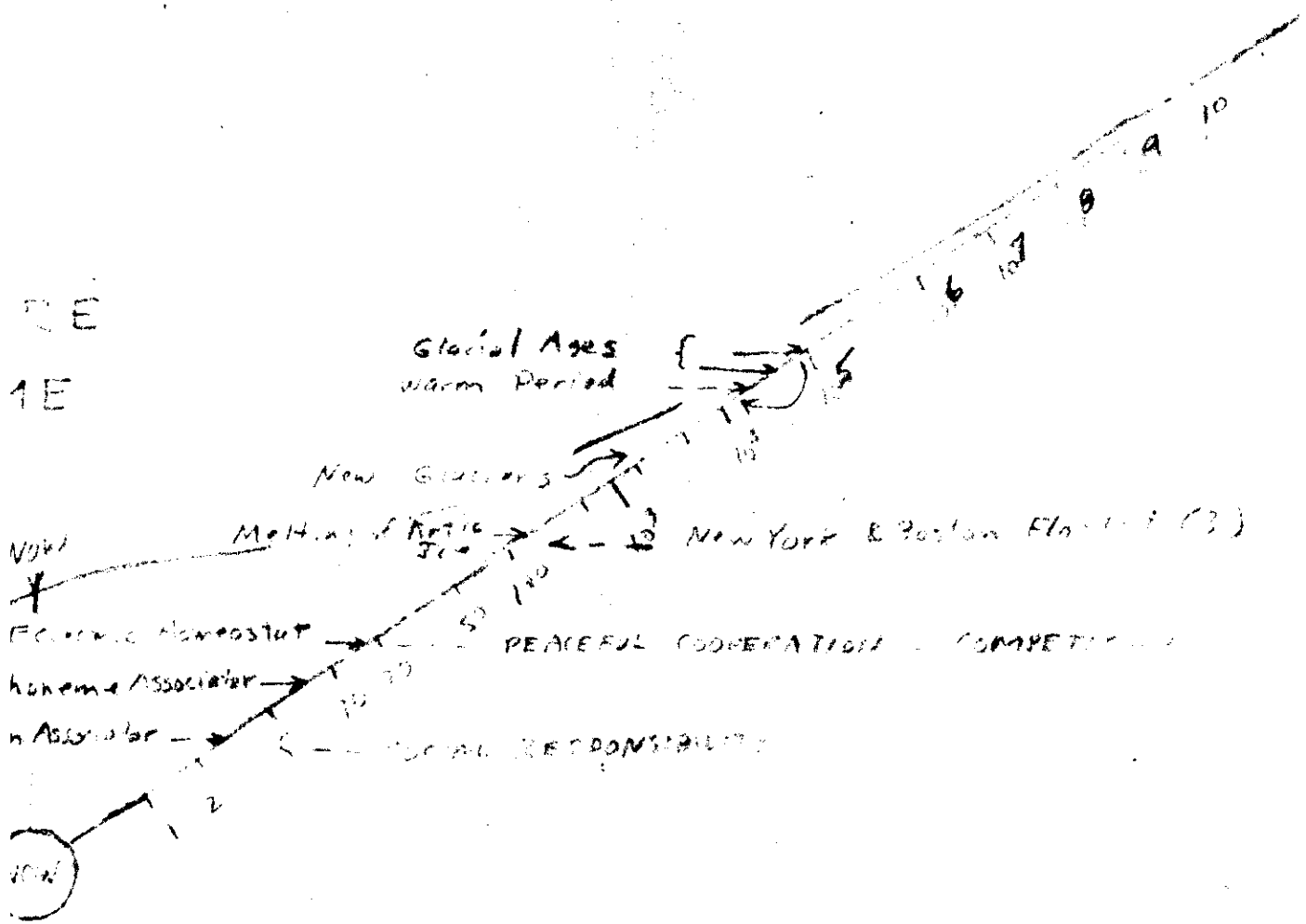
focus their attention on future problems that will require the cooperation of all countries of the world for survival, instead of thinking in terms of conflict between nations. Future events such as the melting of the arctic ice in the future would require (a) large human migration, (b) extensive engineering projects to permit man to remain in existence, or, (c) vast weather modification projects like changing ocean currents with controlled hydrogen fusion, as an explosion to modify the Behring straits.

The term "Nöosphere" in Figure 4 refers to the era in the development of the biosphere when mankind has the power to make geologically significant changes. "Nöos" is from the Greek for "mind".

The notes and diagram in the lower right-hand corner of Figure 4 consist of an overlap of a diagram of the levels of the unconscious (UCS) and conscious (CS) levels of the human brain on the time scale.

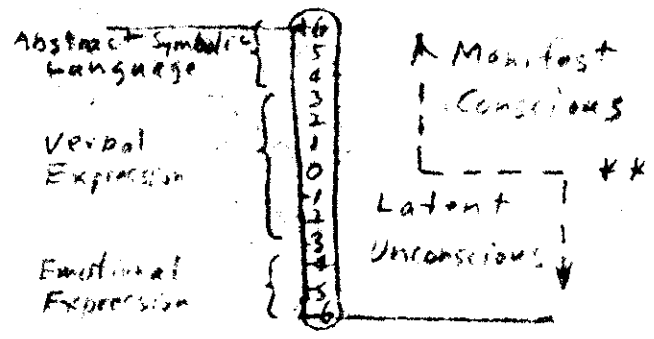
The zero or base line corresponds to the level of usual every-day conversation, and to demarcate roughly the frontier between what is normally conscious and what is normally unconscious. Above this line are all the modes of communication which are used manifestly under normal circumstances.

Note that the chart of conscious and unconscious levels by itself is described by Foulkes and Anthony in a chapter titled, "Meta-Theory: Speculation and Theoretical and Practical Development". Since I am an engineer, and neither a biologist nor an anthropologist, I cannot say whether aligning up this chart on the human brain with the time scale has any basic significance. However, it does line up fairly well with "sub-verbal thinking" -- lining up with level (-6) and "verbal thinking" lining up with level (0) and "integrated collective thinking" lining up with "abstract symbolic language" (+5).



Fusion
 of
 mind
 with
 spirit
 character
 social
 research
 teams
 to
 experiment
 concept
 Independence
 LECTIVE THINKING
 and
 THINKING
 (AS THYSELF (JESUS))

↑ NOOSPHERE



DEVELOPMENT OF HUMAN BRAIN (Meta-Theory)

** Adapted from S.H. Foulkes and E.J. Anthony Group Psychotherapy, The Psycho-Analytical Approach London (1957) p. 246.

Sole = 2800ds Against to L, HCP (3100ds) p. 210