

Doorway Papers by Arthur C. Custance

Part III: The Rise of Science: The Relationship Between Language and World View

[Abstract](#)

[Table of Contents](#)

[Introduction](#)

Part I

[Chapter 1](#)

[Chapter 2](#)

[Chapter 3](#)

[Chapter 4](#)

Part II

[Chapter 5](#)

[Chapter 6](#)

Part III

[Chapter 7](#)

[Chapter 8](#)

Part IV

[Chapter 9](#)

[Chapter 10](#)

CHAPTER 7



HOW WE LOOK AT THINGS: THE INFLUENCES OF DIFFERING WORLD-VIEWS

Perhaps this essay thus far will have served to indicate the contributions made by non-Indo-Europeans and Indo-Europeans, and to show the importance of interaction between them. Each in its own way has played a part, Technology being developed considerably earlier in human history than Philosophy, thus supplying the pabulum out of which men who were motivated internally by curiosity developed the edifice of Modern Science, and thereby carried Technology much further along its way.

When philosophy and technology interact

A useful illustration of this process of interaction is to be found in the story of the Fire-piston. This is a device known over a wide area of Oceania, in a variety of forms which nevertheless all operate on the same principle.

This little gadget is used by natives to produce a light, and they do it as quickly as a man can strike a match. It is a small cylinder of bone or bamboo as a rule, about 2" or 3" long, and 3/4" in diameter, open at one end and closed at the other. Into the open end a small piston or plunger is fitted, also of bone or bamboo. It is fastened on one end of a rod, at the other end of which is a knob. On the plunger end is a small piece of dried tinder. The plunger is inserted, the knob struck sharply to drive the piston down in, and the piston assembly then quickly withdrawn and the tinder will be found to have lighted. It may need to be blown very gently to fan the glowing tinder into a flame.

 pg.1 of 15 

I tried to make one. Using the best (?) available material substitutes, and obtaining a close enough fit between the cylinder and the piston so that I actually exploded one model in which boiler glass was substituted for bamboo for the cylinder, I was totally unsuccessful in getting any signs of light at all. Then I discovered that the natives drill a small hole in the closed end the cylinder over which they place a finger in the down stroke, removing it before withdrawing the plunger. This allows fresh oxygen to enter as the piston assembly is withdrawn; thus the flame is not starved of oxygen and extinguished. But still I could not get one to work - and never have!

Reports on these things have been received in Europe for years. The fire-piston the natives make always seem to work easily. This is curious, because they have no idea why they get a light, they only know that they can. Whereas I can explain why

the light occurs - but I can never get one!

These pistons were introduced into Europe, especially into France, in the 18th century, having been brought in by 'astonished travellers' as Henry Balfour says in his Paper on the subject. ¹ They came from Malay, Sumatra, Java, Borneo, and the Islands of Luzon and Mindanao. He speaks of how the natives "nonchalantly take out a small piston, use it in an instant to light a cigarette, and replace it in their pocket."

The cylinder of these samples received in Europe was often wound with cord to stand the sudden compression, much as cannons were with wire. Subsequently copies were made and used in laboratories in Europe to obtain a light, or for fun. Balfour does not believe it possible, judging by their extensive distribution in the Far East, that the natives borrowed the idea from Europeans. But in the meantime, interest had been aroused as to the cause of the ignition, and in due course, after some years, and stimulated further by some observations of related phenomena, Diesel and Robinson independently sought to design an internal combustion engine in which the compressed gas in the cylinder would be ignited by the same method, without the aid of any supplied electric spark. In reading the historical background of Diesel engines, one is seldom made aware of this anticipation by primitive people of the principle involved. In some cases, the story is told in such a way that the possibility of any such influence is not merely ignored - but actually denied.

1. Balfour, Henry, "The Fire-Piston," in *Anthropological Essays, Presented to Edward B. Tylor*, Oxford, UK, Oxford University Press 1907, pp.17-49, especially pp.17-19 and 37.

Lord Raglan feels this is unwarranted. And he says: ²

This device has a wide distribution in South-eastern Asia, and must one would think have often been seen by European sailors and traders in those parts. Yet we are asked to believe that no European had ever seen or heard of it before it was "invented" by a Frenchman at the beginning of the nineteenth century.

The truth of the matter remains to be determined by further research. For the present it serves as a beautiful illustration of the motivating force in Europe as opposed to the native view of what is worth spending time on. Our curiosity enabled us, with technical support, to carry the invention to a level of usefulness of which the native never dreamed. One wonders whether we would have thought up the idea of an internal combustion engine with no supplied ignition system if we had never been shown a Fire-piston.

Another somewhat analogous case is that of porcelain. In this connection A. L. Kroeber says this: ³

It was the desire to avoid the expense of importation that led to the experimentation that finally produced the desired product [in Europe]. The consequence is that we have here what from one angle is nothing less than an invention. Superficially it is a "parallel" in the technical language of ethnology. However, it is equally significant that the

invention, although original so far as Europeans were concerned, was not really independent. A goal or objective was set by something previously existing in another culture: the originality was limited to achieving the mechanisms by which this goal could be attained. If it were not for the pre-existence of Chinese porcelain, and the fact of its having reached Europe there is no reason to believe that Europeans would have invented porcelain in the 18th century, and perhaps not until much later, if at all.

The need to understand: an Indo-European trait

But it seems that quite apart from such practical research, there exists in a surprisingly large proportion of Indo-Europeans a desire for understanding for its own sake. In fact, this feeling goes back a long way and

2. Raglan, Lord, *How Caine Civilization?* London, UK, Methuen, 1939, p.15.

3. Kroeber. A.L., "Stimulus Diffusion," in *American Anthropologist*, vol.42, Jan., 1940, p.1, 2.



actually accounts for the halting of further technological advances at one critical point in history. Farrington says: ⁴

There is room for doubt that the Ptolemies who financed the great scientific effort of Alexandria were interested in the practical application of its result... But a feeling was prevalent among the Greeks that Science ought to be useless.

Plutarch, writing about 100 A. D., in spite of some expressed regrets that mechanics was being expelled from the company of the liberal arts, yet goes on to praise Archimedes for his lofty contempt (even to the extent of refusing to demonstrate certain theorems with diagrams) for practical achievement and for anything requiring manual labour. Although his engineering feats had won him a reputation for superhuman ingenuity, Plutarch tells how he still refused to leave behind him any treatise on mechanics or any art whatsoever that touched on the practical.

The balance between practice and theory is a sensitive one, and it is hard to know at what point further theorizing should be discouraged and practice should begin. It is a current problem in the education of science for while it seems such a waste of time to let a man live in a kind of Ivory Tower, yet it so frequently happens that out of such an atmosphere where reflection in isolation is possible and where such mulling over of things as prompted entirely by a curious mind is given freedom, there accrues to the world at large some unexpected practical gain. There are some courses in the University of Toronto in which the Professor will actually refuse to give an answer to a practical question! This happened during the War, when many practical problems required urgent attention -- yet true to his convictions, the Professor held that such questions were premature at that stage of our course. Yet the answer was needed then - not some months later. But in principle I think he was

perfectly right, though it was my own question he refused!

Henri Poincare says: ⁵

One has only to open one's eyes to see that the triumphs of Industry, which have enriched so many practical men, would never have seen the light of day if only these practical men had existed, and if they had not been preceded by disinterested fools who died poor, who never thought of the useful, and who were not guided by caprice.

4. Farrington, Benjamin, *Science in Antiquity*, Oxford, UK, Home University Library, 1947, p.190.

5. Poincare, Henri, *Science and Method*, translated by Francis Maitland, New York, NY, Dover Publications, p.16.

Experiment: two differing views

But Technology is still essential -- and prior. The Greek venture as Farrington put it, "was not killed -- it died": ⁶ it had reached the limit of possible expansion within the mold in which it was cast. No further progress could be made without experiment, and without the technical aids for measurement and observation. Because these were missing, development came to an end.

A slave class, which did all the manual labor, rendered such activities quite improper for a gentleman and a scholar. Experiment was discouraged because it was socially incorrect to use one's hands. It was not until very much later in history that trade gave rise to a technically proficient and prosperous Middle Class, thus changing the situation so that skilled labour became an honorable occupation. Then men began to feel that perhaps after all a gentleman could tinker a little - provided of course it was not for money but was only for the advancement of pure learning or for the amusement of the less well-born! ⁷

But now the fine instrumentation required for exact measurement was now possible -- which it had not been before. Such was the background of the founding of the Royal Society. As a matter of fact, the Society was pre-eminently an association not of scholars and learned men so much as of curious amateurs interested in experimenting for the fun of it and anxious to get their hands on the few pieces of experimental equipment then available for the first time. Yet it must also be said that many of its charter members were also deeply interested in problems of industry and commerce. ⁸

Moreover it is clear that mere experiment for fun would hardly be likely to yield many useful results. As Iago Galdston put it: ⁹

6. Farrington B., *Science in Antiquity*, Oxford, UK, Home University Library, 1947, p.193.

7. Dircks, Henry, *The Times, and Scientific Labours of the Second Marquis of Worcester*, London, UK, Quaritch, 1865, p.452.

8. Galdston, Iago, "The Dawn of Experimental Science," *Ciba Symposia*, vol.8, June-July, 1946. p.350.

9. Galdston, Iago, "The Rise of Modern Research," *Ciba Symposia*, vol.8, June-July, 1946, p.354, 355.

Endless accumulation of observations leads nowhere. It is only when these observations are integrated by ideas yielding scientific

generalizations and principles that they effectively advance Science

It involves more than the extraction of a general principle by the process of summing so many old and newly acquired facts. It involves rather the formulation of questions to be answered by the process of experimentation. But the questions are not of an elementary character, and the experiment involves patterns not ordinarily found in Nature. Research then aims not so much at uncovering the ways of Nature *as to force nature to yield up her secrets*.

Now this is something that other peoples have been loath to do. They do not dare, or care, to tamper with Nature because it is personal, any more than we do with people so long as we believe that people are persons and not merely things. One enters into communion with an individual if one is concerned with understanding his motivations, and in the same spirit all non-Indo-Europeans seem to have sought to enter into communion with Nature in order to understand her 'motivations.' Only by such methods did they believe it possible to gain some measure of security - and (by the persuasion of magic) a small controlling interest. To them, Nature was *un*-predictable as people are unpredictable.

Magic vs science; the part played by logic and premises

There has always been disagreement as to whether Magic is Science in the making. Some authorities hold that it is -- usually because they have found to their surprise that the native is quite logical in his use of it, granted his initial beliefs. No native would waste good magic on poor soil, and often there are very exact rules surrounding the application of it which suggest that there is a rationale to it all in the minds of its practitioners. This is not always true, but it very often is. Besides, there was a certain element of good sound common sense in many cases. Samuel Kramer points out that the Sumerians believed firmly in the magic of incantation - but also advised one to do what one could to help. The Sumerian farmer, for example, was recommended to pray appropriately to the gods of the soil to prosper the newly planted seeds - but he should also scare the birds away! ¹⁰

10. Kramer, Samuel N., *From the Tablets of Sumer*, Indian Hills, CO, Falcon's Wing Press, 1956, p.63.

As Cassirer says: ¹¹

What is characteristic of primitive life is not its logic but its general sentiment of life. . . . He does not ascribe to himself a unique and privileged place **in** nature.

This is what distinguishes Magic from Science, and sets the two virtually in opposition To achieve the second, one must abandon the first entirely: and this means more than merely saying one does not believe in Magic any more - it means an entirely new view of Nature-Man relationships. The *I-thou* of Magic must give place to the *me-it* of Science. But granted this sense of kinship towards the world

around, a kinship which is largely the basis of all forms of Totemism, the native then works as logically with his Magic as a man would who sought to persuade an acquaintance (whose friendliness is not completely established yet) to "change his mind."

In reviewing a book *African Worlds: Studies in the Cosmological Ideas and Social Values of African People*, edited by Daryll Ford, the reviewer John Middleton points out: ¹²

What may at first seem a jumble of superstition is . . . seen to form a coherent set of beliefs. Once certain premises are accepted -- including some denied by Western Scientific theory, then the entire structure built upon them is logical and reasonable.

I doubt whether there is any dissent among modern Anthropologists on this point, though there may be occasionally two mutually contradictory premises in some particular native thought system which introduce confusion (to our way of thinking) into the line of reasoning. There is evidence, as Levy-Bruhl showed clearly enough, that the "law of contradiction" is not always observed by primitive people. Yet they can rationalize their contradictory beliefs very often when pressed to do so. It is very essential to stress this point, because it is not a question of intelligence at all.

11. Cassirer, Ernst, *Essay on Man*, New Haven, CT, Yale University Press, 1944, p.82.

12. Middleton, John, reviewing Daryll Ford, Editor *African Worlds: Studies in the Cosmological Ideas and Social Values of African People*, (*Nature*. Oct. 16, 1954, p.715.)

Languages: influence on view of reality

There are several reasons for the absence of Science (and Philosophy) among non-Indo-Europeans, but none of them as far as I can discover, has anything to do with the absence of the power to think logically.

As we have seen, two reasons in particular, which may possibly be related, are worthy of further consideration. The first is this all-pervasive sense of kinship with Nature, a world-view in which things do not have characteristics but *characters*. This will be dealt with in the next Chapter.

The second reason is a language which is so specific that it does not permit the abstraction of generalities. Let me explain this a little more fully first. I think I can do this most readily by using two quotations and then commenting on them.

E. B. Tylor, one of the founding fathers of Anthropology, says this:¹³

Abstraction is noticing what several thoughts (or situations) have in common *and neglecting their* differences; thus a general idea is obtained by *not attending too closely to particulars*. [Emphasis mine]

And Max Muller, one of the founding fathers of Linguistics says this: ¹⁴

An empirical acquaintance with the facts rises to a scientific knowledge of the facts as soon as the mind discovers beneath

multiplicity of single productions, the unity of an organic system.

And then an illustration: Newton discovered the concept of gravitation and its laws by taking into account three groups of phenomena which are entirely unrelated to the merely perceptive observer: freely falling objects, the movements of the planets, and the alternation of the tides.

Now in a sense non-Indo-Europeans *do* see the "unity of an organic system" of which Muller speaks, but it is not through observation of the common elements achieved by neglect of the particulars, but rather by a transfer of ideas, in which the social life of man is attributed to Nature, and the whole Universe becomes a

13. Tylor, Edward B., *Anthropology*, New York, NY, Hill, New Science Library, 1904, p.41.

14. Muller, Max, quoted by C. G. Jung, *Psychology of the Unconscious*, translated by Beatrice M. Hinkle, London, UK, Dodd and Mead, 1947, p.ix.

single integrated Society -- a Giant State -- in which man is a very little frog. Because human nature is so unpredictable, they tended to note changes in human activity and to ignore the uniformities, and accordingly to notice the exceptions in Nature also, and to forget -- or ignore -- the regularities, at least to take little interest in them. Regularities of behaviour are safe, and one does not need to worry too much about them. It is the irregularities that one must take steps to insure against. One has to do this, if one's life is not too secure. "The Boss is in a good mood today" brings as much comfort to the office gang as favourable weather did to the non-Indo-European and noting the fact was important for everyone's well being. As soon as the exceptional occurred it had to be evaluated. Frequently it was frightening. Usually appropriate action had to be taken to deal with it.

What to us is an interesting phenomenon, to them was a dangerous Omen. The secret was to cajole or persuade or scare or even cheat Mother Nature to change her mood and behave normally again, i.e., peaceably. You can fool people, so you can fool Nature too, if you know how. Thus arises Magic. It is a gentle or forceful reminder to Nature to fulfill her obligations. It may seem silly to us. But it is not unusual to find oneself kicking a chair that has 'got in the way, or getting angry with a motor that 'refuses' to start. The extent to which this animistic spirit is found even among College Students today is quite surprising. It has been reported upon recently.¹⁵

But to return to the observation of what is common rather than what is exceptional, it is in this capacity that man becomes a 'species maker', and begins the formation of classes of things. Such classifications are the first step towards the creation of abstract concepts. But non-Indo-Europeans have not tended to form them, either because their languages do not have terms for classes of things and they thus lack words to convey or inspire thoughts of this nature, or because for some reason their minds do not tend to observe these relationships. In the latter instance, they would not invent words for classes of things. In either case, their language should reflect the absence of categorizing tendencies, and this appears to be so.

Moreover, to observe what is common in several situations when only one

situation is present to the observer at the moment, requires a certain kind of total awareness, an escape from the present and a

15. Dennis, Wayne, "Animistic Thinking Among College and University Students" *Scientific Monthly*, Apr., 1953, p.247-249.



consciousness of other events not now related to the immediate situation. Only thus can general laws be recognized. For example, a bullet fired horizontally, no matter what the muzzle velocity of the gun may be, will theoretically reach the ground at exactly the same time that a bullet merely dropped from the muzzle does. This law is an ideal one, and is seldom if ever realized in fact due to other considerations. But the points that only a special kind of mind would even think about it, let alone anticipate the fact. Certainly it is not obvious in the sense that one could assume it without giving much thought to the matter. The fact is there, but it is not obvious, and it could probably never be 'observed' in actuality.

Theorizing depends on telling "lies"

William Whewell, in a classic work on the inductive nature of Science, seeks to make it very clear that there is more to the discovery of scientific laws than merely the recognition of existing facts. The relationships are what count, and in a sense these relationships do not exist. They are mental creations, although when once discovered they thenceforth may appear to be self-evident. Whewell says:¹⁶

Induction is familiarly spoken of as the process by which we collect a general proposition from a number of particular cases; and it appears to be frequently imagined that the general proposition results from a mere juxtaposition of the cases, or at most, from merely conjoining and extending them. But if we consider the process more closely, we shall perceive that this is an inadequate account of the matter.

The particular facts are not merely brought together, but there is a new element added to the combination by the very act of thought by which they are combined. There is a conception of the mind introduced in the general proposition, which did not exist in any of the observed facts. When the Greeks, after long observation of the motions of the planets saw that these motions might be rightly considered as produced by the motion of one wheel revolving inside of another wheel, these wheels were creations of their minds, added to the facts which they perceived by sense. And even if the wheels were no longer supposed to be material, and were reduced to mere geometrical spheres and circles, they were not the less products of the mind alone -- something additional to the facts observed. The facts are known, but they are insulated and unconnected, till the discoverer supplies from his own stores a principle of connection. The pearls are there, but they will not hang together till someone provides the string.

And speaking subsequently of the relationships between Technology (which he, like older writers, terms Art) and Science, Whewell says:

Thus Art in its earlier stages at least, is widely different from Science, independent of it, and anterior to it. At a later period, no doubt, Art may borrow aid from Science; and the discoveries of the philosopher may be of great value to the manufacturer or the artizan. But even then, this application forms no essential part of Science; the interest which belongs to it is not an intellectual interest.

The one activity is a search for solutions to practical problems, the other for solutions to intellectual ones. The first result in the invention of devices and techniques, the second in the invention of theories. Theories are related to the ideal, while techniques are tied to the actual. The former are often contrary to experienced fact, and in this sense are deceptions. The idealized theories of little boys are called 'lies,' but of men, they are the stuff of science. Curiously enough it is more characteristic of the Indo-European to tell lies than it is of the non-Indo-European, in spite of popular opinion to the contrary. In fact, A. Irving Hallowell says that the American Indians did not even have a 'category of fiction' as he calls it.¹⁷ They had stories that we believe are contrary to fact, and therefore in this sense 'fictional,' but they believe them to be history -- or they believed that they were *essentially* true. They did not invent stories to amuse their listeners. And this is equally true apparently of the people of the early Middle Eastern Cultures. As Frankfort says in his Introduction to *The Intellectual Adventure of Ancient Man*:¹⁸

In telling such myths (as the Sumerians, Babylonians and Egyptians had) the ancients did not intend to provide entertainment. Neither did they seek, in a detached way and without ulterior motives, for intelligible explanations of the natural phenomena. They were recounting events in which they were involved to the very extent of their existence.

This is an important point, for it is their involvement with the situation which excludes objectivity and makes it virtually impossible for the non-Indo-European (unless influenced by Western Culture) to stand aside and see the relation which exists between what is present and what is not.

17. Hallowell, A. J., "Myth, Culture and Personality,' *American Anthropologist*, Dec., 1947, p.547.

18. Frankfort, H., H. A. Frankfort, *The Intellectual Adventure of Ancient Man*, Chicago, IL, University of Chicago Press, 1946, p.7.

Harry Hoijer points out that the Hopi, a pueblo people of the south-west, cannot tell certain kinds of lies', their language simply does not permit it. Thus they may

speak of 10 men but not of 10 days, because you can have 10 men at one time, but only ONE day at a time.¹⁹ They may speak therefore of a time 'after the tenth day' if necessary, and so forth, but not often days. There are other reasons why they do not speak of 10 days, one of which is that strictly speaking they do not speak of one day either -- in the sense that we do. Intervals of time do not exist in the kind of discrete way they do for us.

Such a view of time becomes complicated, for living entirely in the 'now' all the time eliminates the future tense also. Thus a man has either done something or is doing it -- he cannot, strictly speaking, say that he *will* be doing it in the future. If he has planned it sufficiently to be able to say this, he has already begun to do it now. So the future becomes the present; what he will be doing becomes what he is doing now. In fact, even in English we may speak in the same manner, as for example when we say "I am going shopping tomorrow with a friend," where we should perhaps more properly say "I shall be going shopping tomorrow, etc."

There is a wonderful illustration of this way of looking at time, in a story told by Melvin Kyle:²⁰

A desert traveller went with a missionary friend to visit one of the 10,000 mud villages in the Nile Valley. The night was not a restful one in a native home. The next morning the traveller wished to return as soon as possible to the boat on the Nile. The missionary however, knowing the demands of courtesy, insisted that they must not go until after breakfast, but expressed the hope that breakfast might be expedited. "Oh", said the host, "breakfast is just ready."

One hour and an half after that time by the traveller's watch, a match was struck to kindle the fire to cook the breakfast. And some time later still, a cow was driven into the court of the house to be milked to provide the milk to cook the rice to make breakfast.

Was the host untruthful? Not at all; he did not reckon by time but by events. He had no way of determining the passage of time. When he said 'Breakfast is just ready,' he meant it was the next thing in the

19. Hoijer, Harry, "The Relation of Language to Culture" in *Anthropology Today*, edited by A. L. Kroeber, University of Chicago Press, 1953, p.562.

20. Melvin Kyle, quoted by Chester K Lehman, "Biblicism and Science," *Journal of The American Scientific Affiliation*, vol.6, Dec., 1954, p.4.

household economy, that they would do nothing else until that thing was done, and that everything done was to that end. He reckoned only by events.

Benjamin Lee Whorf states that the same is exactly true of Hopi thinking. The native who is planning to hoe his garden tomorrow is doing it today - by having planned it. Today and tomorrow are the same thing, in intent.

Hebrew has no distinct future form either. The tense of all verbs is either present or past (perfect), a thing either being done already, or being done now. For human activity the Present Tense is made to take the place of the Future, as though it was not possible to think of action as actually being done in the future..., it is in fact a fiction. But not so with Divine Activity. Future action is so certain where God is the

Doer, that it can safely be said to have now been done, and so the Perfect Tense is used. Hebraists refer to this as the Prophetic Perfect.

World view: influence of grammar on view of reality

Thus the grammar of language in such instances determines the patterns of thought for the growing child. To some extent he does not 'think' lies of this kind, and cannot deliberately tell them. Yet as we have seen, speaking of what is contrary to fact is basic to all forms of theorizing. Negative numbers are completely fictional - though being in debt is real enough! Practically every scientific law involves some fictional element since it is always stated as true 'ideally', or 'in a perfect vacuum', and so forth. As Else Frenkel-Brunswik put it, "It is precisely the fictitious concepts rather than those fully definable by observables that enable science to proceed to explanation and prediction."²¹

Our own language structures our thoughts also: and although we assume it is expressing for us an actual and objective view of reality, the assumption might not be true. It seems as though it must be, since it has given us such wonderful powers of prediction. Yet there are people of other languages, and men of learning, who suggest the need for caution here.

Benjamin L. Whorf has made this observation:²²

21. Frenkel-Brunswik, Else, "Meaning of Psychoanalytic Concepts and Confirmation of Psychoanalytic Theories," *Scientific Monthly*, Nov., 1954, p.293.

22. Whorf, B.L., "Language, and Logic" in *The Technology Review*, (vol.43, no.6, April, 1941), republished with several other papers under the title *Collected Papers on Metalinguistics*, Foreign Service Institute, Department of State, Washington, DC, 1952, p.21.



We cut up and organize the spread and flow of events as we do, largely because, through our mother tongue, we are parties to an agreement to do so, not because nature itself is segmented in exactly that way for all to see. Languages differ not only in how they build their sentences but in how they break down nature to secure the elements to put in these sentences. . . . As goes our segmentation of the face of nature, so goes our physics of the cosmos.

On the other hand there are Chinese scholars, well acquainted with the Western tradition, who hold that it is a mistake to suppose this is any more than a provisional analysis of reality. It needs correctives, the kind of correctives which may be supplied by the world-view in terms of other types of language. One supposes that if Chinese were to become the universal language, a very real possibility considering their population growth (though we tend to assume meanwhile that English will be!), we would in time accept a quite different world-view.

The efforts made by some groups to produce an inter-lingua might in the end, if they were extremely successful, impoverish the world beyond measure. In an article touching on this particular question, Alexander Gode quotes Benjamin Whorf as having said:²³

I believe that those who envision a future world speaking only one tongue, whether English, German, Russian, or any other, hold a misguided ideal and would do the evolution of the human mind a great disservice. Western Culture has made, through language, a provisional analysis of reality and, without correctives, holds resolutely to that analysis as final. The only correctives lie in all these other tongues which by aeons of independent evolution have arrived at different, but equally logical, provisional analysis.

And in a recent book which collects a number of miscellaneous Papers by the same writer, there is this statement which is relevant here: ²⁴

23. Whorf, B.L.: quoted by Alexander Gode, "The Case for Interlingua," *Scientific Monthly*, Aug., 1953, p.90.

24. Whorf, B.L., *Language, Thought, and Reality, Selected Writings of Benjamin Lee Whorf*, edited by John B. Carrol, Boston, MA, Massachusetts Institute of Technology Press, 1956, p.252.



pg.14 of 15



Actually, thinking is most mysterious, and by far the greatest light upon it that we have is through the study of language. The study shows that the forms of a person's thought are controlled by inexorable laws of pattern of which he is unconscious. These patterns are the unperceived intricate systematizations of his own language. . . . His thinking itself is in a language, in English, in Sanskrit, in Chinese. And every language is a vast pattern-system, different from others, in which are culturally ordained the forms and categories by which the person not only communicates but also analyzes nature, notices or neglects types of relationship and phenomena, channels his reasoning, and builds the house of his consciousness.

But as Whorf says -- "thinking in a language" does not necessarily mean the use of spoken words. That is to say, one need not give *vocal* expression yet the thought is carried nevertheless in terms of language. This is clearly seen for instance in the case of Helen Keller who will walk up and down in times of stress (such as in the preparation of a 'speech') talking to herself with her fingers! Helen Keller's teacher, Miss Anne Sullivan, makes a strong point of this. She says, "The ordinary man will never rid himself of the fallacy that words obey thought, that one thinks and phrases afterwards." ²⁵

25. Helen Keller, *The Story of My Life*, New York, NY, Grosset and Dunlap, 1905, p.419 (as stated by her teacher, Miss Anne Sullivan, in the section written by her),



pg.15 of 15



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