

group of languages because of a train of historical events that stimulated commerce, measurement, manufacture, and technical invention in a quarter of the world where these languages were dominant.

The participants in a given world view are not aware of the idiomatic nature of the channels in which their talking and thinking run, and are perfectly satisfied with them, regarding them as logical inevitables. But take an outsider, a person accustomed to widely different language and culture, or even a scientist of a later era using somewhat different language of the same basic type, and not all that seems logical and inevitable to the participants in the given world view seems so to him. The reasons that officially pass current may strike him as consisting chiefly of highly idiomatic "façons de parler." Consider the answers that were at one time given even by learned men to questions about nature: Why does water rise in a pump? Because nature abhors a vacuum. Why does water quench fire? Because water is wet or because the fiery principle and the watery principle are antithetical. Why do flames rise? Because of the lightness of the element fire. Why can one lift a stone with a leather sucker? Because the suction draws the stone up. Why does a moth fly toward a light? Because the moth is curious or because light attracts it. If once these sentences seemed satisfying logic, but today seem idiosyncrasies of a peculiar jargon, the change did not come about because science has discovered new facts. Science has adopted new linguistic formulations of the old facts, and, now that we have become at home in the new dialect, certain traits of the old one are no longer binding upon us.

We moderns are not yet in a position to poke fun at the wisecracks of old who explained various properties of water by its wetness. The terminology which we apply to language and cultural phenomena is often of a piece with the wetness of water and nature's abhorrence of a vacuum. The researches of linguists into the ways of languages many and diverse are needed if we are to think straight and escape the errors which unconscious acceptance of our language background otherwise engenders. An increasing contribution from linguistics to the general philosophy of science is demanded by the new ways of thinking implied by those new realms of science cited at the beginning of this essay. It is needed for science's next great march into the unknown.

The situation is not likely to be aided by the philosophical and mathematical analyst who may try to exploit the field of higher linguistic

from Benjamin Lee WHORF: *Language, Thought and Reality*. Ed. J.B. Carroll. Cambridge (MASS): M.I.T., 1956

symbolism with little knowledge of linguistics itself. Unfortunately the essays of most modern writers in this field suffer from this lack of apprenticeship training. To strive at higher mathematical formulas for linguistic meaning while knowing nothing correctly of the shirt-sleeve rudiments of language is to court disaster. Physics does not begin with atomic structures and cosmic rays, but with motions of ordinary gross physical objects and symbolic (mathematical) expressions for these movements. Linguistics likewise does not begin with meaning nor with the

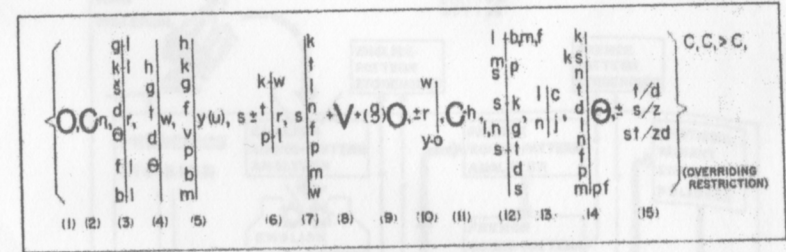


Figure 12. Structural formula of the monosyllabic word in English (standard mid-western American). The formula can be simplified by special symbols for certain groups of letters, but this simplification would make it harder to explain. The simplest possible formula for a monosyllabic word is C + V, and some languages actually conform to this. Polynesian has the next most simple formula, O, C + V. Contrast this with the intricacy of English word structure, as shown above.

structure of logical propositions, but with the obligatory patterns made by the gross audible sounds of a given language and with certain symbolic expressions of its own for these patterns. Out of these relatively simple terms dealing with gross sound patterning are evolved the higher analytical procedures of the science, just as out of the simple experiments and mathematics concerning falling and sliding blocks of wood is evolved all the higher mathematics of physics up into quantum theory. Even the facts of sound patterning are none too simple. But they illustrate the unconscious, obligatory, background phenomena of talking as nothing else can.

For instance, the structural formula for words of one syllable in the English language (Fig. 12) looks rather complicated; yet for a linguistic pattern it is rather simple. In the English-speaking world, every child between the ages of two and five is engaged in learning the pattern expressed by this formula, among many other formulas. By the time the child is six, the formula has become ingrained and automatic; even

the little nonsense words the child makes up conform to it, exploring its possibilities but venturing not a jot beyond them. At an early age the formula becomes for the child what it is for the adult; no sequence of sounds that deviates from it can even be articulated without the greatest difficulty. New words like "blurb," nonsense words like Lewis

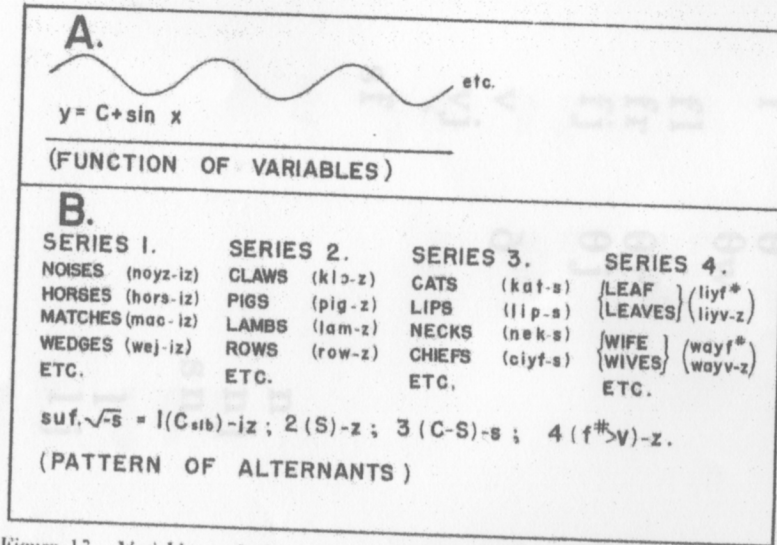


Figure 13. Variables and alternants: A shows by graph and by mathematical formula (equation) an interrelation of variables. B illustrates by extensible examples and by a pattern formula an interrelation of alternants. The formula means that the English suffix which is theoretically ("by root,"  $\sqrt{\quad}$ ) a final 's' is actualized in any given case by one of four alternants: after a sibilant-ending consonant, by '-iz'; after any sonant (vowel or consonant), by '-z,' after any voiceless (nonsonant) consonant by '-s'; except that, after the special alternant 'f#,' it is actualized by '-z,' the 'f#' alternating to 'v.'

Carroll's "mome raths," combinations intended to suggest languages of savages or animal cries, like "glub" and "squonk"—all come out of the mold of this formula. When the youth begins to learn a foreign language, he unconsciously tries to construct the syllables according to this formula. Of course it won't work; the foreign words are built to a formula of their own. Usually the student has a terrible time. Not even knowing that a formula is back of all the trouble, he thinks his difficulty is his own fault. The frustrations and inhibitions thus set up at the start constantly block his attempts to use foreign tongues. Or

else he even HEARS by the formula, so that the English combinations that he makes sound to him like real French, for instance. Then he suffers less inhibition and may become what is called a "fluent" speaker of French—bad French!

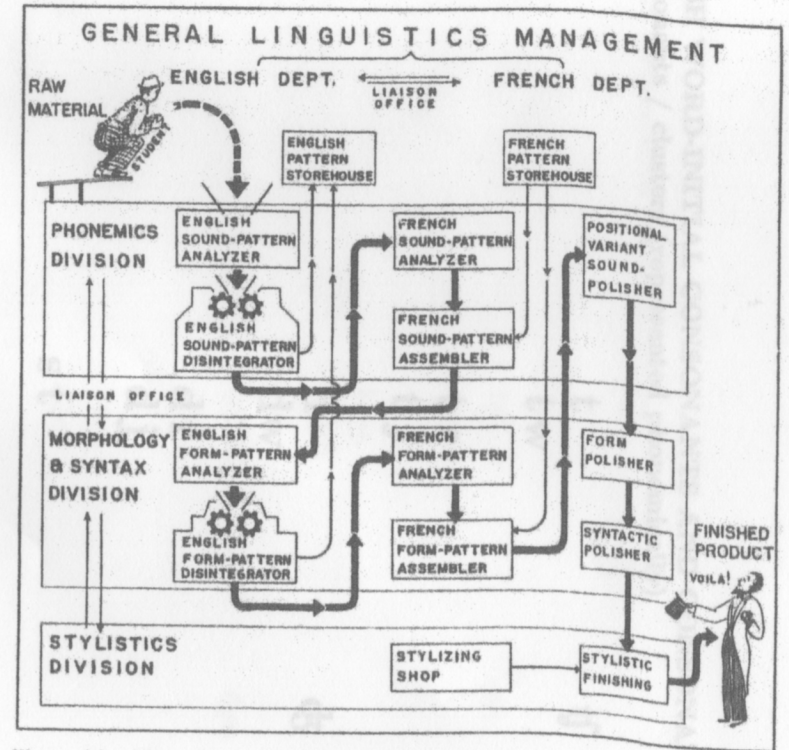


Figure 14. Flow sheet of improved process for learning French without tears. Guaranteed: no bottlenecks in production.

If, however, he is so fortunate as to have his elementary French taught by a theoretic linguist, he first has the patterns of the English formula explained in such a way that they become semiconscious, with the result that they lose the binding power over him which custom has given them, though they remain automatic as far as English is concerned. Then he acquires the French patterns without inner opposition, and the time for attaining command of the language is cut to a fraction (see Fig. 14).