THE USE OF LANGUAGE TYPOLOGY IN DIACHRONIC LINGUISTICS

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Abstract

In this article language typology and its immediate impact on diachronic linguistics is investigated. This article is about the evolution of typological techniques. The attitudes of the advocates of both old and modern linguistics towards language typology are studied. The methods used in language typology and the categories recognized in this branch of human knowledge are dealth with. Different techniques and technical terminology employed in language typology are defined and explained. This article is an attempt to evaluate the possible typolgical analyses for diachronic linguistics.

Introduction:

Until very recently, typological investigation has not stood very high in the esteem of most linguists. Typology was distrusted by the neo–grammarians, since any typological studies implied the descriptive technicque, and any descriptive approach was banned as unscientific by neo–grammarians. It seemed to them that the assumption of genetic relationships based exclusively on typological similarities could not be sustained (Greenberg: 1974:59).

It is quite natural that Sapir as one of the first promoters of descriptive linguistics advocated an inquiry into the types of linguistic structure. Yet the elaboration of a technique for the comprehensive description of separate languages absorbed most of the workers in the new field; any comparison was suspected of distorting the intrinsic criteria of uni–lingual monographs. It took time to realize that a description of systems without their taxonomy, as well as taxonomy without descriptin of single systems, is a flat contradiction in terms: both imply each other.

The scornful attitude towards typology also arose as a result of the shortcomings of typology itself. Nowadays, substantial changes are taking place in this respect. Typology has abandoned its classificatory tendency and conceives of language as a whole consisting of interrelated elements and features.

The question of "Menzerath", one of the ingenious pioneers in typology, whether a given level of language "is merely a summative multitude or is bound by some structures," is obtained an unambigious answer in modern linguistics. We speak about the grammatical and phonological systems of language, about the laws of its structure, the interdependence of its parts, and of the parts and the whole. To comprehend this system, a mere listing of its components is insufficient. The modern typological comparison of various systems must take into account the hierarchies present in language.

An important contribution to the development of morphological typology was made by J. Greenberg (1960: 178–194), in which he introduced quantitative methods into the field of morphological typology. Reference will be fre

quently, made to this epoch–making work throughout the present article.

The present article is about language typology. It seeks to evaluate the possible uses of typological analyses for diachronic linguistics. In Chapter I the traditional morphological typology as it was employed in the 19th century is discussed. Chapter II provides the modern theories of language typology. And finally Chapter III will study the relevance of language typology to diachronic linguistics.

CHAPTER I
MORPHOLOGICAL TYPOLOGY

In numerous books on the science of language we find the following morphological classificatin of all the languages spoken on the earth:

I. Isolating languages, in which each word is a monosyllable incapable of receiving any formative affix or of undergoing any internal change for grammatical purposes.

II. Agglutinating languages, in which words that are in themselves immutable are capable of receiving formative affixes; the roots and the grammatical affixes are, as it were, glued together, hence the name.

III. Flexional languages, in which the fusion of root and grammatical element is much more complete, the root itself being now also capable of undergoing internal changes.

As typical examples of these three classes are generally given: I. Chinese, II. Finnish and Turkish, III. languages belonging to our own family of languages Sanskrit, Greek, German etc.

Most of the books giving this division of languages also recognize in the three classes three successive stages in the history of languages: these were originally everywhere isolating, and Chinese and some other languages have remained at this "primitive" stage, while many more have progressed to the second or agglutinative stage; through this finally a few favored languages have succeeded in reaching the third of flexional stage, which thus ranks highest in the development of language.

It may be of some interest to trace the way in which this classification of languages gradually developed during the first half of the 19th. century until it was accepted by nearly everybody.

The first name we here meet with is that of Friedrich Von Schlegel (1808) who animated linguistic theory of the entire 19th century. A two–fold typology was set by him, recognizing *agglutinativeness* as one linguistic feature, and *inflectiveness* as another. He has the great merit of being the first in Germany to call attention to the importance of the Sanskrit language and of Indian literature and of seeing the affinity of Sanskrit with the best known European languages. He divides the languages into two classes, one comprising Sanskrit and its congeners only, and the second all other languages.

Jespersen (1920:694) has noted that this bi–partition of all languages carries in it the germ of tri–partition. On the lowest stage of his second class, Schlegel places Chinese, in which, as he acknowledges, the particles denoting secondary sense modifications of the word itself. Chinese thus really, though Schlegel himself does not say so, falls outside his affix languages and forms a class by itself. On the other hand, his arguments for reckoning Semitic languages among affix languages are very weak, and he seems also somewhat inclined to say that much in their structure resembles real flexion. If we introduce these two changes into his system, we arrive at the three–fold division mentioned above.

This three–fold classification was developed by Friedrich's brother, August Von Schelegel. He outlines three classes of languages: "(I) languages without grammatical structure, (2) affixing languages, and (3) inflectional languages" (1818:559). With this three–fold division in which "without grammatical structure" corresponds to the later term "isolating" and "affixing" "agglutinative", A. Von Schlegel stated the theory in what was to be its most persistent and enduring form.

August Von Schlegel does add an additional classificatory tool by further subdividing flexional languages into two subclasses, *synthetic* and *analytic*. He means by analytic languages those which are obliged to use an article before noun, personal pronouns before verbs, which resort to auxiliary verbs in conjugation, which make up by prepositions those case endings which they lack, which express comparative degrees of adjectives by adverbs, and so forth. The synthetic languages are those which dispense with all these means of circumlocution.

For A. Schlengel this analytic/synthetic division serves largely to differentiate the classical languages and their modern successors. Greek, Latin and Sanskrit are held to be synthetic, in that they express the relationship of one word to another by the forms of the words themselves, e.g. Latin "casa viri": 'the man's house'. The Romance languages, on the other hand, are analytic in that they express these same relationships by means of other words and by word position, e.g. Spanish "La casa del hombre" "The man's house". Now we will study another author.

From the outset, A. Schleicher stood under the twin influences of Hegel and Darwin. He was an adherent of

Hegel's philosophy in that Hegel everywhere moves in trilogies. And this explains why Schleicher is inclined to deduce philosophycally the tri–partition.

Perhaps we may come closer to the essential ideas underlying August Schleicher's evolutionary approaches by considering that in every case we have to do with the explanation of how a variety of forms, whether biological species, languages, or cultural systems came to be. Two general types of explanation exist which we may call the "creationist" and "transformist". The former held the field until the turn of the 19th century. In its purest version it assumes that all kinds are unchangeable. Such was the accepted view regarding biological species before Darwin, and such likewise was the traditional Tower of Babel explanation of the origin of language diversity.

The oppositive view, the *transformist*, is that all existing forms are historically connected by a dynamic process of growth. In the sense of transformism, evolution was an accepted theory in linguistics earlier than biology. The recognition that the resemblance of certain languages to one another is to be explained by common descent is the fundamental hypothesis underlying the concept of genetic relationship among languages. The recognition of the Indo–European family at the turn of the 19th century is the single event which marks most clearly the birth of modern linguistic science.

The essential likeness between genetic theories in language and the evolutionary hypothesis in biology was explicitly recognized by A. Schleicher's (1863). He treats evolutionary theory in biology as, in principle, the equivalent of the genetic model of linguistic relationship. In this, the transformationist sense then, language may be said to evolve: Before a language can become *flexional* it must have passed through an *isolating* and an *agglutinating* period. Beyond the flexional stage no language can attain.

It remained for that profound thinker Wilhelm von Humboldt (1825; 1836) to add a fourth class and to establish the morphological typology that would dominate the linguistic scene for the next one hundred years. He called this fourth type *"incorporating"* on the basis of his wide acquaintance with American Indian languages. The most typical aspect of the phenomenon of incorporation is that the verb object is found in the same word as the verb root. To Humboldt these were languages with "sentence words". Characteristic of incorporation is the fact that affixes are used to indicate what in other languages would be separate forms, dependent on a verbal predicate. Instead, the incorporating languages combine in a single word a verb, subject, object, and various modifiers. Incorporating languages are exemplified by American–Indian languages, as it was mentioned above. Humboldt was also the first to use "agglutinative" in place of the earlier term "affixing".

Humboldt says that besides Chinese, which has no grammatical form, there are three possible forms of languages, the *flexional*, the agglutinative, and the *incorporating*, but he has the very important addition that all languages contain one or more of these forms; he therefore tends to deny the existence of any exclusively agglutinative or exclusively flexional language, as both principles are generally mixed together.

Between Sanskrit and Chinese as the two opposite poles, Humboldt places all the rest of languages, but the languages reckoned as *agglutinative* have really nothing in common except just that negative trait that they are neither *isolating* nor *flexional* while otherwise they are widely different. The final conclusion drawn by Humboldt, therefore, is that the structural diversities of human languages are so great that they make one despair of a fully comprehensive is that the structural diversities of human languages are so great that they make one despair of a fully comprehensive classification.

Humboldt (1925:317–318) rejects August von Schlegel's subdivision of *inflexional* languages as *analytic* and *synthetic*. The argument he employs is that synthesis is supposed to indicate a fusion of different parts into a single entity, and therefore synthesis presupposes a plurality which is combined. Humboldt can not find such a plurality in a form like the German "band" 'bound' (from "bind–), but only a change in sound. Further, this inner fusion of two or more parts can be distinguished only partially. One can never say that fusion is present or absent; to some extent fusion is always there.

Von Humboldt's importance, however, goes far beyond innovations such as the feature "incorporating". His morphological typology was an integral part of an overall philosophy of language which expressed in the most comprehensive terms assumptions about the nature of language found earlier in the work of the von Schlegels and characteristic of German Romanticism (Fiesel 1929). As set forth particularly in his essay (1936), each language is a distinct revelation of the spirit (Geist). Such self–revelation, while each a valid expression in its own right, exhibits lesser or greater degrees of perfection. All languages are complete but not all languages are perfect. Perfection of form is an ideal goal, never actually attained but most closely approached, not surprisingly, by the *inflectional* languages. Von Humboldt is explicit in rejecting any historical evolution (transformation) in which higher types evolve out of

lower types; his types are rather different degrees of the realization of the Geist.

Humboldt's quadri–partite classification was not accepted by all, however. Franz Bopp (1862: 102–103) returned to a tri–partite classification, in which he carefully avoided both the terms *flexion* and *agglutination*, and instead based his class on *root forms*:

(1) Languages with *monosyllabic roots*, without the capability of composition and hence without organism, without grammar, e.g. Chinese;

(2) Languages with roots capable of composition and acquiring their grammar almost exclusively in this manner, e.g. the Indo–European languages and all others not in classes (1) or (2);

(3) Languages with *disyllabic roots* and three necessary consonants as sole bearers of the meaning of the word, e.g. the Semitic languages.

Where Bopp had approached language classification according to the structure of roots, Heymann Steinthal (1860) devised a structural classification which depends upon the different types of affixing and of inner flexion.

A key principle for Steinthal's typology is that he considers "form" to mean not morphology, but syntax, that is, the relatonship between words. Thus Chinese, which for other typologists is "grammarless" or "formless" due to the invariant nature of its roots, is a form language for Steinthal, since grammatical relationships are expressed by the collocation of discrete words. Indo–Chinese, however, is formless for Steinthal, since its grammatical relatinships are not expressed directly by the collocated elements, but must be deduced therefrom. Incorporating languages, whose sentence–words stand alone, are similarly formless.

We should emphasize at this point that August Schleicher's veresion of the theory had already won wide acceptance and provide the basis for the exposition by those two great popularizers of linguistic science, Max Mueller in Europe and Dwight Whitney in the United States. Later versions such as Steinthal, studied above, which added to the complications of the scheme without any compensating advantages, never became as popular as A. Schleicher's, which thus established itself as the basic form of the theory.

CHAPTER II
MODERN THEORIES OF LANGUAGE TYPOLOGY

During this whole period, criticism of the *ethnocentrism* and vagueness of the typologies studied in the previous chapter was by no means lacking. To cite but one instance, Whitney, who was by no means as enthusiastic about the Schleicherian typology as his European contemporary, Max Mueller, declares "LOVED from LOVE is as good a preterite as LED from LEAD or SANG from SING" (1876:362). LOVED is, of course, an example of *agglutinative* technique, while LED and SANG are *inflective*.

The first break with traditional typology came when Edward Sapir published his book **LANGUAGE** in 1921. Sapir's treatment of the topic in his book marks an epoch. He firmly rejects the valuative and evolutionary aspects of the theory. There is no real reason to suppose that Chinese or Hungarian is not as effective an instrument of thought as Latin or English. Man must have had language for at least 500,000 years; hence, if there is indeed a line of development –*isolating*, *agglutinative*, *inflective* – present day *isolating* languages cannot possibly represent the primitive stage. Indeed, the evidence of human paleontology had made this assumption long since untenable. Chinese, the classic instance of an *isolating* language, was known by Sapir's time to have formerly possessed a more complex morphological system, both from earlier records of the language and comparison with Tibetan and other related languages.

Perhaps more significant than these no longer tenable assumptions were other logical defects which had been pointed out from time to time. The distinctive criteria of the various types had never been either defined with clarity or applied with objectivity. The definitions were not only vague but partly referred to quite different things, so that a language might well belong to several of the supposedly mutually exclusive classes simultaneously. For example, *agglutination* was usually taken as referring to a technique of mechanical affixation, so that, in Max Mueller's words, "The difference between an Aryan and Turanian is somewhat the same as between good and bad mosaic. The Aryan words seem made of one piece, the Turanian words clearly show the sutures and fissures where the small stones are cemented together" (1890:292). The contrary term should be "inflection". But the term "inflection" was also used to indicate the presence of affixes without concrete meaning to denote relations among words of the sentence; e.g., by case ending in the noun or person–number terminations in the verb. On this basis, Turkish is both *agglutinational* (on the basis of technique) and *inflectional* (because of its case and verb conjugational systems).

The tripartion has been considered to represent three successive stages in the development of such languages as our own. It is true that in some instances history shows us something like the three stages *collocation*, *agglutination*,

and *integration* (to use Whitney's expressions) through which originally independent words have become flectional endings; but these instances are far too few for us to infer from them that the direction of development has been always and everywhere the same; many of the lexplanations through *agglutination* given by Bopp and believed in by his immediate successors have proved fanciful and have been given up by the younger generation of students of language.

A further defect, as was pointed out by some critics, and as was alluded to above, was that a language had to be assigned to a single category, although the features employed might be present to a great or less degree. A term like *agglutinative* applies to a single construction. A language may well and indeed usually does contain some agglutinational as well as some non–agglutinational constructions. In other words, it is a matter of over–all tendency rather than absolute presence or absence of the diagnostic traits.

Sapir, by distinguishing among the various criteria which were unconsciously being employed in a confused way in the classical theory presented in the previous chapter, constructs a more complex system in which languages are classified by a number of independent criteria and in which the traditional terms are retained, but in well–defined uses which are often on different axes so that they are no longer mutually exclusive.

Sapir (1921) excluded all extra–linguistic considerations in his typology. He did not observe the evolutionary and ranking interests of his predecessors, but otherwise followed the main logic of whole language typology — a logic of metonymy in which a few parts (i.e., a low number of morphosyntactic features) represent the whole. Like the 19th century typologists, Sapir cited features for a given language as though the language in question were fully described. He has selected certain relevant features for purposes of typologizing. Sapir's classification of languages combines three component classificatons that are factually, and therefore also logically independent of each other. Three sets of distinctions interrelate in his classification: *Grammatical Concepts, Grammatical processes,* and *Firmness of Affixation.*

(a) Grammatical Concepts:

The first of these sets of distinctions involves grammatical concepts, or the relation of one word in the sentence to another. Sapir distinguishes four classes of such concepts:

I. Basic or concrete concepts, which involves no relations as such e.g. 'farm'.

II. Derivational concepts, which give an added or altered meaning to the root, without involving the rest of the sentence, e.g. 'farmer'.

III. Concrete relational concepts, which indicate or imply relations transcending the word to which they are applied, e.g. 1farmers'.

IV. Pure relational concepts, which are purely abstract and relate the concrete elements to each other, indicating syntactic form, e.g. the order in "See the farmers", as opposed to "The farmers see.".

Sapir considers classes I and IV as being essential to and present in all languages (despite this statement on page IOI of **LANGUAGE** 1921, Sapir indicates a blank under column IV in is table on page 143). Classes II and III, on the other hand, exist (in conjunction with I and IV) either separately, together, or not iat all. There are then necessarily fou major language types according to the manner in which Grammatical Concepts are expressed (1921: 138):

(A)	I IV	Simple pure–relational
(B)	I IV II	Complex pure–relational
(C)	I IV III	Simple mixed–relational
(D)	I IV II III	Complex mixed–relational

This conceptual classification by itself does not take into account the technical aspects of morphological structure, but it does make two important distinctions: It differentiates, first, those languages which keep their roots pure (Types A and C) from those which build up inseparable elements (Types B and D); and, second, those languages which keep their relational concepts free of concrete elements (Types A and B) from those which do not (Types C and D).

(b) Grammatical Processes

The second set of distinctions which Sapir (1921 page 61 and page 126) makes addresses itself to these technical aspects, i.e., the *Grammatical Processes.* Here Sapir identifies "isolating" languges as those which always identify the word with the root; "affixing" languages as those which affix to the root modifying elements such as prefixes, suffixes, and infixes; and "symbolic" i.e. inflective, languages as those which employ internal modification of vowels and/or consonants, reduplication, or accentual differences of stress and pitch.

Affixing in turn can be further broken down into two processes: "fusing", and "juxtaposing" or "agglutination". *Agglutination* is considered to be the mechanical juxtaposition of two or more unchanging elements. *Fusion*, on the other hand, implies more of a "psychological uncertainty" (1921:132) as to where the juncture lies. Thus the construction 'book–s' demonstrates not *agglutination*, but *fusion*;

for there are other possible plural affixes, such as in 'ox–en'. Where fusion involves no change in the root, it is regular; where the addition of an affix involves a change in the root, it is irregular. In contrast, where there is internal change without affixation, the process is one of *symbolism*.

The subdivision of infixing into two parts results in the following four–way division of *Grammatical Processes* (1921:140):

(a) isolating
(b) agglutinative
(c) fusional
(d).symbolic.

This division by itself is of limited value, but when taken conjunction with the expression of *relational concepts*, is much greater usefulness. Each of the four language pes, A, B, C, and D, which are identified by their manner expressing *Grammatical Concepts*, then may be shown have sub–types according to the grammatical processes ey employ. Significant here is the fact that each of the mponent groups II, III, and IV of a language type may se a different grammatical process to express relation, Group I, of course, does not express any relation at all).

(2) Firmness of Affixation

The third set of distinctions which Sapir applies is based the "relative firmness with which the affixed elements e united with the core of the word" (1921:127). Sapir recognizes three such degrees of affixation:

(1) Analytic: does not combine concepts with single ords, e.g. Chinese;

(2) Synthetic: Combines concepts but with restraint, g. Latin, Arabic;

(3) Polysynthetic: Combines concepts with extreme aboration, e.g. Nootka.

Sapir (1921:128) emphasizes that these three terms are rely quantitative and are more useful in defining a tendency towards a certain type than they are as absolute counters. He further points out (1921:140) that languages of Type A are necessarily *analytic*; those of Type C are predominantly *analytic*, sometimes *synthetic*, but not likely to be *polysynthetic*; and those of Type B and D can be any one of the three. Applying this third set of distinctions to the first two offers the possibility of 2,640 to 2,870 language types even without resorting to Sapir's qualifying notations of "mildly", "weakly", or "strongly" before the degree of *synthesis*.

Sapir (1921:126) contends that there are two serious difficulties with the four–fold classification *(isolating, agglutinative, fusional, symbolic)*. In the first place, most languages fall into more than one of these groups. The Semitic languages, for instance, are *agglutinative, fusional*, and *symbolic* at one and the same time. In the second place, the classification in its bare form is superficial. There is clearly a world of difference between an *agglutinative* language like Cambodigian, which limits itself, so far as its prefixes are concerned, to the expression of derivational concepts, and the Bantu languages, in which the prefixed elements have a far–reaching significance as symbols of syntactic relations.

Sapir (1921:127–128) finds the analytic/synthetic/polysynthetic distinction of scientific interest. An *analytic* language, according to him, is one that either does not combine concepts into single words at all (Chinese) or does so economically (English, French). In an *analytic* language, Sapir says, the sentence is always of prime importance, the word is of minor interest. In a *synthetic* language (Latin, Arabic, Finnish) the concepts cluster more quickly, the words are more richly chambered. A *polysynthetic* language is more than ordinary *synthetic*. The elaboration of word is extreme. The three terms are purely quantitative - and relative, that is, a language may be *analytic* from one standpoint, *synthetic* from another.

In this way Sapir made a gallant attempt to evolve a sounder and richer typology than his predecessors, and certainly succeeded. Yet in spite of occasional interest by some linguists, the linguistic profession has essentially ignored Sapir's classification. Perhaps this was why he himself never returned seriously to it.

Now, nearly thirty years after Sapir, Greenberg has picked up where Sapir left off, using Sapir's ideas — with one important difference. Sapir still classified languages as unit wholes (hence the term *"whole language typology"*), according to the degree in which certain structural categories were manifest in them. Greenberg's originality lies in comparing the features or categories instead of the whole languages.

A digression is in order here. This use of componential analysis referred to in the previous paragraph, which employs features is of great significance to linguists, psychologists, and anthropologists. *Feature analysis* was first proposed, not by linguists, but by anthropologists as a technique for describing and comparing the vocabularly of kinship in various languages. (Cf. Goodenough 1956; Lounsbury 1964; Wallace and Atkins 1960). Only some years later was it taken up and generalized by such eminent linguists as Lamb (1964); Nida (1964;1975) and Weinreich (1966) as well as by Katz and Fodor (1963) and Mc Cawley (1968; 1971) and many others.

As was pointed out above, Greenberg's originality lies in comparing the features instead of the whole language. This has enabled him to develop a scale for measuring or expressing the degree of development of each feature by a numerical index. The composite typological index is thus an assemblage of indices for ten features which are presented in the following Table:

(The following table is based on Greenberg 1954, Page 218):

TABLE 1

Greenberg's Typological Index Values

		Sk	AS	Per	Eng	Yak	Swa	Ann	Esk
1. Synthesis	M/W	2.59	2.12	1.52	1.68	2.17	2.55	1.06	3.75
2. Agglutination	A/J	.09	.11	.34	.30	.51	.67	–	.03
3a. Composition	R/W	1.13	1.–	1.03	1.–	1.02	1.–	1.07	1.–
3b. Derivation	D/W	.62	.20	.10	.15	.35	.07	–	1.25
3c. Gross Inflection	I/W	.84	.90	.39	.53	.82	.80	–	1.75
4a. Prefixation	P/W	.16	.06	.01	.04	–	1.16	–	–
4b. Suffixation	S/W	1.18	1.03	.49	.64	1.15	.41	–	2.72
5a. Isolation	O/N	.16	.15	.52	.75	.29	.40	1.00	.02
5b. Pure Inflection	Pi/N	.46	.47	.29	.14	.59	.10	–	.46
5c. Concord	C/N	.38	.38	.19	.11	.12	.41	–	.38

M Morpheme; W Word; A Agglutination, lack of morphophonemic change at morpheme juncture; J morpheme juncture; R Root morpheme; D Derivational morpheme; I Inflectional morpheme; P Prefixation; S Suffixation; O word Order; N Nexus, expression of word interrelations; Pi Pure inflection; C Concord.

This makes possible the expression of more numerous combinations of features, and represents a definite gain in analytic description over what Sapir could attain with his typing of language wholes. A somewhat brief explanation for the features that Greenberg has devised seems necessary here.

(1) INDEX OF SYNTHESIS = i.e. of the complexity of the morphemic structure of words = the number of morphemes per number of words: symbolized as M/W.

(2) INDEX OF AGGLUTINATION = the number of agglutinative intraword morph junctures per number of intra–word morph junctures; symbolized as A/J.

(3) COMPOSITIONAL INDEX = the number of roots per number of words: symbolized as R/W.

(4) DERIVATIONAL INDEX = the number of derivational morphemes per number of words; symbolized as D/W.

(5) INFLECTIONAL INDEX = the number of inflectional morphemes per number of words; symbolized as I/W.

(6) PREFIXAL INDEX = the number of prefixes per number of words; symbolized as P/W.

(7) SUFFIXAL INDEX = the number of suffixes per number of words; symbolized as S/W.

(8) INDEX OF CONSTRUCTIONAL ISOLATION = the number of isolating constructions per total number of grammatical nexuses; symbolized as O/N.

(9) INDEX OF CONSTRUCTIONAL INFLECTION = the number of pure inflexional constructions per total number of nexuses; symbolized as Pi/N.

(10) INDEX OF CONSTRUCTIONAL CONCORD = the number of concordial constructions per number of nexuses; symbolized as Co/N.

This set of typological indices has been applied to concrete linguistic material by Greenberg himself. The result of his application of these indices to eight languages are provided in the table on page 22 above. Cowgill (1963) has also applied these indices, as a further instance.

Greenberg's method parallels Sapir's proposals in many ways, but he sets up five bases instead of Sapir's three The most significant departure in method, however, is Greenberg's definition of each language feature in terms of a ratio of the occurence of two elements in the same stretch of text, expressed as one of ten numerical indices. These ratios are then interpreted as trends which the language shows, rather than as a single class to which it belongs.

An example for the first basis of classification, or parameter, or degree of synthesis (M/W) is given here for clarification. The English word "single–ing" consists of two morphemes in a single word, and it is as follows: **(1) INDEX OF SYNTHESIS** is therefore M/W=2/1=2.0.

The result of this quantitative approach is the claculation of ten indices which, when taken together, give an almost infinitely variable possibility of combinations. Greenberg himself finds the *synthetic* and *agglutinative indices* to be the most immediately useful in language classification, and proposes the following rule of thumb (1960: 194): A *synthetic index* of 1.00 to 1.99 indicates an *analytic* language, 2.00 to 2.99 a *synthetic*, and any value above 3.00 a *polysynthetic* language. Similarly, any language with an *agglutinative index* of over 0.50 may be called *agglutinative*.

The modern approach of Sapir and Greenberg have by no means found unanimous acceptance. Representative of the dissenters is Andre Martinet (1962:39) who terms Sapir's analysis a "nearly tragic illustration of the pitfalls of psychologism" and dismisses Greenberg's approach as one that "translates Sapir's scheme into currently fashionable jargon. "(1962: footnote page 67). But we should note that the criticism seems superficial, for there are extensive differeneces between the two in method, material, and interpretation. Another apparent drawback is the scope of the data in Greenberg's work. The Greenberg indices have to-date always been computed with a sample of IOO words. Samples this short have been questioned by Householder (I960: I97). But this criticism is not valid either. Pierce: I966) doubled the size of the sample. He concludes "this would seem to indicate that Greenberg's IOO–word sample size, arbitrary though it may have been, was large enough, i.e. nothing of significance was gained by increasing the sample size to 200–words." (1966:47).

CHAPTER III: LANGUAGE TYPOLOGY AND DIACHRONIC LINGUISTICS

As contrasted with the other two main methods of linguistic classification, the *areal* (which operates with affinity) and the *genetic* (which operates with kinship), *typological procedures* (which operate with isomorphism) have tended to an uncertain and marginal status in linguistics. A fairly complete typology, however, would have benefits both (a) for the *synchronic* and (b) for the *diachronic* linguist. It is the purpose of this chapter to evaluate the possible uses of typological analyses for the diachronic linguistics.

A system of typology will help historical linguistics if the number of languages of each type is fairly well known. First, it can affect the plausibility of reconstructions. For instance, the proposal to reconstruct Indo–Hittite with a single vowel phoneme/e/will be extremely implausible if there are few or no known languages on record with only a single vowel phoneme. Second, typology can affect the likelihood of cognation between languages. If two languages share a certain feature and it is assumed that their agreement is not due to diffusion, then the likelihood that they are cognate is greater, the rarer this feature is among the languages of the world.

In Greenberg's view, the typology of languages adds to "our predictive power since from a given synchronic system certain developments will be highly likely, others have less probability and still others may be practically excluded" (1957: 68). Schlegel, the anticipator of *comparative linguistics* and typology, described the historian as a prophet predicting backward. Our predictive power in reconstruction gains support from typological studies.

Another benefit of typology is the new horizons that are opened up for research through its application. The statistical approach to typology (Greenberg 1960) has introduced an entirely new dimension into the field of linguistics. The introduction of this approach is particularly stimulating at the present time, because until recently the computation of any sort of indices or correlation for any significant sample of languages would have been almost impossible. As a matter of fact, there was not enough known about languages of the world for comparison of this nature sixty years ago. With digital computers on most campuses, and the amount of data available at the present time, neither of the above deficiencies poses a major problem.

Greenberg's indices, when correlated with other elements of the linguistic structure may or may not prove to be useful tools (Pierce 1962), but the concept of indices of frequency as opposed to presence of linguistic elements open many new and unexpected horizons, e.g. the study of 'drift' by Cowgill (1963).

One of the most important uses of developing typologies for linguistics is the creation of models so that if the structure of a language were classified as type I (whatever type I might be), it would be obvious that any member of that class had certain features without exception and that certain other features would occur in nearly all of the languages of that type.

The simple presence or absence of a given structural feature, as it was mentioned earlier, is of little real value in typology. As an example, consider the statement that Turkish is not a *prefixing language*. Eight grammatical elements which could be considered to be prefixes, e.g. "YEMyesil", "NATamam", "GAYRIsuuri", etc, were found in slightly over 440,000 morphemes counted in over

230,000 words of running text (Pierce 1962:216). However, the significant thing about Turkish structure, so far as contrast between prefixing and suffixing is concerned, is the fact that in one sample 106 morphemes were found suffixed to stems with a total frequency of 111,991 in contrast with 4 prefixed morphemes with a total frequency of 10. It is only when figures such as these are considered that the real significance of Greenberg's contribution in introducing indices to the field of typology can be seen. If the presence or absence alone were considered, Turkish would have to be classified with many languages which have strong systems of prefixes; and this would serve no linguistic purpose whatsoever.

The establishment of typological criteria sufficiently rigorous for application has thus certain incidental usefulness, which is nevertheless of some importance for diachronic linguist, as was shown above. In effect, every descriptive scheme is typological and the very notion that the techniques of descriptive linguistics can be taught and can be employed on new and hitherto unknown languages requires the use of criteria which can be applied to any language. This is commonplace in phonology, where terms such as *stop, consonant, vowel,* etc. are employed cross–linguistically and automatically define typological criteria. In other areas of description, however, this is only partially the case. There is perhaps even the feeling that parts of speech and such units as *the morpheme* and *the word* involve different procedures for each language and are therefore not comparable. The application of typological criteria and the ultimate development of rigorous typologies in these areas has therefore the heuristic value of stimulating us to seek for cross–linguistically valid definitions and procedures: hence access to language universals.

The formulation and application of typology has a further value in that non–random distribution of languages among typological classes or in respect to quantitative attributes (features) leads to the discovery of facts of universal scope concerning language and such facts constitute linguistic data of general significance for typology, logic, physiology and perhaps other fields. For example, a typological study of subject, object, verb and word order would doubtless show a non–random membership of languages in reference to the six logically possible arrangements and constitute a fundamental datum on the psychology of human thinking. It has been suggested in tentative fashion (Osgood et al (1954)) that the apparent predominance of suffixing over prefixing can be understood in the light of certain results of learning theory in psychology. The frequency of types of vowel phonemic systems with only one low vowel and the rarity of such systems for mid and high vowels has physiological correlates. The distribution of the index of synthesis bases on text counts of morpheme–word ratios in a normal distribution about a mean of approximately 2.2 is again a fundamental though as yet unexplained datum regarding human speech behaviour (Greenberg 1960). Again in diachronic typologies the prevalence of anticipatory regular change over lag phenomena can be plausibly connected with certain well–known results of learning theory in psychology. These are but a few examples of possible results which may be obtained from the widespread application of typology.

Typology, as it was alluded to above, discloses laws of implication which underlie the phonological and apparently the morphological structure of languages: the presence of "A" implies the presence of "B". In this way we detect in the languages of the world uniformities or near–uniformities, as the anthropologists used to say. Examples of these implicational universals are the following: Of the two vowels/i/and/u/, /i/ may originate from /u/ but not /u/ from /i/ (undirectional change) (Greenberg 1966: 515); The presence of fricatives presuposes the presence of stops in the linguistic systems of the world (Jakobson 1968:51); or no language has back consonants without containing front consonants (Jakobson 1968:53); or if there is a fricative in a language, it is /s/. (Jakobson 1968:55).

Changes in a language system cannot be understood without reference to the system which undergoes them. The structural laws of the system restrict the inventory of possible transitions from one state to another. These transitions are, we repeat, a part of the total linguistic code, a dynamic component of the over–all language system. One can calculate the probability of transition, but it is hardly possible to find universal laws of these temporal laws. Greenberg's (1960) quantitative approach to the diachronic typology is a promising method for examining the relative consistency of direction and trend in change, so crucial to diachronic linguistics.

A last topic that is pointed out in the present paper is the relation between *synchronic typologies* and *diachronic universals*. Greenberg has provided a doctrine of dynamic comparison between language types, where the objects of comparison are the processes themselves. It is possible to establish the relative origin of types and this method is called Seriation of *Types* (as opposed to *quantitative classification*, and to *qualitative classification*). There are two classes of languages, for example, those that have nasal vowels and those that do not. Now, a hypothesis can be proposed about the relative origin of nasal vowels: Ferguson has

attempted such a proposal. He in his paper "Assumptions about nasals" (in Greenberg 1963) has offered two (those which he numbers 14 and 15) which are diachronic. The first of these asserts that nasal vowels "apart from borrowings and analogical formations, always result from the loss of a primary nasal consonant." The second states that nasal syllabic phonemes, apart from borrowings and analogical formations, always result from the loss of a vowel. It is the first of these which interests us here.

In Ferguson's statement regarding the origin of nasality in vowels from a primary nasal consonant, nothing is said about the position of the nasal consonant in relation to the nasal vowel which develops. The following appears to be the typical if not exclusive sequence of events: VN> VN>

Both of Ferguson's generalizations may be regarded as examples of a particular class of diachronic universals which Greenberg (1966a) calls *the Theories of Exclusive Relative Origin*. They are theories of relative origin because they indicate the manner in which nasal vowels, or syllabic nasals, have arisen again and again at different times and places. They are exclusive because they assert that the phenomenon in question arises in only one way.

Taking Ferguson's theory of the origin of nasal vowels as an example, the relation between typologies and such diachronic universals not only has inherent interest for the diachronic linguist but will help to uncover other types of diachronic universals.

The appropriate synchronic typology will evidently be one in which languages are classified by two criteria, the presence or absence of nasal vowels and the presence or absence of oral vowels (*Seriation of Types*). There will then be four logically possible typological classes of languages: (1) oral and nasal vowels both present; (2) oral vowels present but nasal vowels absent; (3)nasal vowels present but oral vowels absent; and (4) oral and nasal vowels both absent. Taken in the context of this classification, Ferguson's generalization states that languages of type I arise from languages of type 2 in a particular and specified manner.

Of the four classes just defined, classes 3 and 4 are empty. The absence of empirical exemplification of one or more logically possible classes can be, as usual, restated in terms of universals. We have the *Unrestricted Universal* that all languages have oral vowels and the *Implicational Universal* that the presence of nasal vowels in a language implies the presence of oral vowels but not vice versa.

Generalizing from a thesis like Ferguson's, we can ask, regarding any given set of typological classes generated by a synchronic typological criterion, what potential diachronic relations exist for every pair of typological classes and in either direction. Thus, given four classes, we consider the relation of class 1 to 2, class I to class 3, and so on (six pairs); and for each pair we seek to specify the various ways, if any, by which the first type of the pair can develop into the second or the second into the first.

This information can be set forth in what is called a "state–process diagram." Using the numbering assigned earlier for the language types in the classification based on presence or absence of oral and nasal vowels, and using arrows to indicate the existence of at least one known process of change in the appropriate direction, we have the situation in Figure 1:

Figer 1

According to this diagram, a language of type 2 (with oral vowels only) can change into a language of type 1 (with both nasal and oral vowels). Such a change is implied by Ferguson's universal 14 already discussed. Further, languages of type I can change into languages of type 2. This involves loss of nasal vowels but retention of oral vowels.

There is probably a single diachronic process involved here, *loss* of nasality producing *merger* with corresponding oral vowels wherever two vowels differ only in the presence and absence of nasality.

It is implicit in Figure 1 that no processes are known by which a language of type 1 or type 2 can change to the nonexistent type 3 or type 4. If the synchronic universals mentioned above are valid, this is a natural consequence. If it were not, types might come into existence which are not found in actuality. This leads to certain diachronic universals. Thus the non–occurrence of the change of type *1 ⟶ 3 means that a language with both oral and nasal vowels may lose the latter but not the former. Again, the non–occurrence of *1 ⟶ 4 excludes the possibility of losing both oral and nasal vowels and so having no vowel, of *2 ⟶ 3 that a language with oral vowels only should change them all to the corresponding nasals, and of *2 ⟶ 4 that a language with oral vowels only could lose them and thereby have no vowels. Statements of the kind just cited may be considered diachronic universals which exemplify other types than theories of relative origin.

The chain of reasoning of the previous paragraphs which draws consequences from Figure I may be considered a specific application of the general principle

described by J. Jenkins, C. Osgood and Greenberg in their work "Memorandum concerning language universals" (in Greenberg 1963) — namely, that no diachronic change gives rise to a synchronically non–existent type. The converse does not necessarily hold: it is at least conceivable that a type may exist which is not produced by any known diachronic process if a language is created anew, as possibly with Creoles or with the one or more original languages of mankind.

The diachronic universals cited by way of example in the preceding paragraphs are for the moment considered sufficient exemplification both of their existence and their typological variety.

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