

DE GRUYTER

Roman Jakobson

STUDIES ON CHILD LANGUAGE AND APHASIA

JANUA LINGUARUM. SERIES MINOR



JANUA LINGUARUM

STUDIA MEMORIAE
NICOLAI VAN WIJK DEDICATA

edenda curat

C. H. VAN SCHOONEVELD

Indiana University

Series Minor, 114

STUDIES ON CHILD LANGUAGE AND APHASIA

by

ROMAN JAKOBSON



1971
MOUTON
THE HAGUE • PARIS

© Copyright reserved.

No part of this book may be translated or reproduced in any form, by print, photoprint, microfilm, or any other means, without written permission from the author.

LIBRARY OF CONGRESS CATALOG CARD NUMBER: 71-149915

Printed in The Netherlands by Mouton & Co., Printers, The Hague.

TABLE OF CONTENTS

1. The Sound Laws of Child Language and Their Place in General Phonology	7
2. Why “Mama” and “Papa”?	21
3. Anthony’s Contribution to Linguistic Theory	31
4. Aphasia as a Linguistic Topic	37
5. Two Aspects of Language and Two Types of Aphasic Disturbances	49
6. Toward a Linguistic Typology of Aphasic Impairments .	75
7. Linguistic Types of Aphasia	95
Bibliography	127

1. THE SOUND LAWS OF CHILD LANGUAGE AND THEIR PLACE IN GENERAL PHONOLOGY

The splendid work of A. Grégoire, recently published under the title *L'Apprentissage du langage* (Liège, 1937), marks a milestone in the study of the initial stages of child language. According to this eminent Belgian linguist, the investigator ought "to have lived day by day, hour by hour, in the society of infants, and to have been constantly on the watch for the external manifestations of their behavior", and furthermore he must be extremely precise as regards the difficult transcription of linguistic phenomena and the establishment of their conditions and their functions. The microscopic analysis of A. Grégoire combines these two qualities and permits us to evaluate and to utilize advantageously also the numerous data of earlier publications. There we find on the one hand observations by qualified linguists both precise and judicious but for the most part too concise and fragmentary, and on the other hand detailed studies of psychologists and pedologists lacking, unfortunately all too often, linguistic methodology.

The wealth of our experience makes it possible to give a structural analysis of language in its making and to look for general laws, or tendencies, if one prefers a more prudent formulation. At the beginning of this century M. Grammont stated the problem with impressive accuracy: In the child's speech, he said, there is "neither incoherence nor chance occurrences. ... The child undoubtedly misses the mark, but he always deviates from it in the same fashion. ... It is the consistency of the deviations which strikes us in his language and which, at the same time, allows us to understand the nature of the MODIFICATION." What, then, is the principle of

this DEVIATION in the successive acquisition of phonemes?

Since the time of Buffon THE PRINCIPLE OF LEAST EFFORT has often been invoked: those sounds which are the easiest to articulate are acquired first. But there is one fact crucial to the linguistic development of the child which clearly contradicts this hypothesis. During the babbling period the child easily produces the widest variety of sounds (for example, clicks, palatalized, rounded or pharyngealized consonants, affricates, sibilants, etc.) almost all of which he eliminates upon passing to the "few words" stage, to use the expression of Oscar Bloch, that is, upon assigning to his sound productions their first semantic values. It is true that some of these disappearing sounds are not maintained by the child when they do not occur in the speech of those around him, but there are other sounds which suffer the same fate despite their presence in the adult speech, and the baby reacquires them only after much effort. Such is frequently the case with velars, sibilants, and liquids. The infant used to repeat these sounds while babbling; their motor image was thus familiar to him and the acoustic image should not have been lacking either. The son of the careful Serbian investigator M. Pavlović said *tata* for *kaka* while still distinguishing aurally between the two words *kaka* and *tata*. And P. Passy tells us of the case of a child who, while substituting the form *tosson* for both *garçon* and *cochon*, became very angry when his mother, imitating him, did not differentiate these two words in her pronunciation. Occurrences of this type are well known. The loss of certain sounds has been attributed to the lack of a connection between the acoustic and the motor image, but, as some observers note, the child sometimes begins by pronouncing the *K* in the first words that he reproduces, and then all of a sudden abandons the velars, replacing them obstinately with dentals.

One can only explain the selection of sounds which occurs upon passing from the babbling stage to language in the proper sense of the word by the fact of the passage itself, that is to say, by the phonemic value that the sound acquires. The infant passes little by little from spontaneous and aimless soliloquies to a semblance of conversation. Seeking to conform to those around him, he

learns to recognize the identity of the phonic phenomenon which he hears and which he emits, which he retains in his memory and which he reproduces at will. The child distinguishes this phenomenon from the other phonic phenomena he has heard, retained, and repeated, and this distinction, taking on a permanent and intersubjective value, tends toward a meaning. To the desire to communicate is now added the desire to communicate something. It is precisely these first distinctions, aiming at becoming significant, which necessitate simple, clear-cut, and stable sound oppositions, capable of being engraved in the memory and implemented at will. The PHONETIC RICHNESS of the babbling period thus gives way to a PHONOLOGICAL LIMITATION. The close connection which exists between this selection of phonemes on the one hand and the unmotivated and clearly conventional character of the linguistic sign on the other, is confirmed by the fact that exclamations and onomatopoetic expressions are not bound by such a limitation. These VOCAL GESTURES which, in adult speech as well, tend to form a distinct layer, seem to seek out expressly sounds not admissible elsewhere. It is precisely the expressive value of the unusual, rather than conformity to a model, which underlies the infant's use of rounded front vowels in his onomatopoetic expressions while he continues to replace them elsewhere by unrounded front vowels or by rounded back vowels. Thus an eleven-month old boy, cited in the well-known book by C. and W. Stern, renders by *öö* the movement of horses and cars, the young Grégoire of nineteen months uses these same vowels to reproduce the sounding of a bell, and the little fifteen-month old daughter of Marcel Cohen imitates by similar sounds the barking of a dog. When she then changes this onomatopoetic expression into the simple designation for a dog – *OO* – she adapts the vocalism to the phonemic system at her disposal.

By eliminating these particular facts and following step by step the formation of the child's phonemic system, we discern a rigid REGULARITY in the succession of his acquisitions, which constitute for the most part a strict and invariable temporal sequence. It has been nearly a century now that this regularity has impressed ob-

servers: whether it is a question of French or English children, Scandinavian or Slavic, German or Japanese, Estonian or New Mexican Indian, every careful linguistic description provides equal confirmation of the fact that the RELATIVE CHRONOLOGY of certain innovations remains always and everywhere the same. The rate of succession is nevertheless quite variable: thus, two successive events, following each other immediately in some children, may be separated by a few years in the development of others. A kind of slowmotion film, such cases of delayed phonological development are particularly instructive.

Ordinarily the vowel system originates in a wide vowel and the consonant system simultaneously in a stop with occlusion at the front of the mouth; usually the vowel is an *A* and the consonant a labial stop. The first opposition within the consonantal system is between nasal and oral, and the second between labials and dentals (*P-T*, *M-N*).

These two oppositions constitute the MINIMAL CONSONANTAL SYSTEM of all the languages of the world; they are lacking only in those where there exist extrinsic and mechanical alterations (of the vocal apparatus). Such an instance is the lack of labials in Tlingit and similar American Indian languages (and in some female dialects of Central Africa) due to the artificial mutilation of the lips, and even in these cases the class of labials tends to be represented in the phonological system by specific substitutes.

Following the appearance of these two consonantal oppositions a narrow vowel arises in opposition to the wide vowel in the child's speech, and the ensuing stage in the development of the vowel system produces either a third degree of aperture or a split within the narrow phoneme into a front and back vowel. Each of these two processes results in a system of three vowels which is the MINIMAL VOCALIC SYSTEM of all the languages of the world. This minimal vocalic system as well as the minimal consonantal system require the presence of phonemes combining two "differential elements", in Saussurian terminology. (Thus in the "triangular" vowel system *U*, *A*, *I*, the phoneme *U* is velar in contradistinction to *I* and narrow in opposition to the phoneme *A*, and in a "linear"

vowel system the mid vowel is complex: wide in contradistinction to the narrow vowel and at the same time narrow in opposition to the wide vowel).

If we consider the phonemes acquired in child language beyond the minimal systems discussed above, we observe that their order of acquisition corresponds exactly to the general laws of IRREVERSIBLE SOLIDARITY (implication) which govern the synchrony of the languages of the world.

Thus, in the child's phonemic system the acquisition of velar and palatal consonants implies that of labials and dentals, and in the languages of the world the presence of palato-velars implies the simultaneous existence of labials and dentals. This solidarity is irreversible: the presence of labials and dentals does not imply the presence of palato-velars as can be shown, for example, by the total absence of the latter in Tahitian and in the Tatar language of Kasimov, and likewise the absence of velar and palatal nasals in numerous languages.

The child's acquisition of fricatives presupposes that of stops, and similarly in the phonological systems of the world's languages the existence of the former implies that of the latter. There are no languages without stops, but on the other hand one finds many languages in Oceania, Africa, and South America without a single fricative; among the languages of the Old World one can cite, for example, Karakalpak and Tamil which both lack autonomous fricative phonemes.

The acquisition by the child of affricates in distinctive opposition to the corresponding stops presupposes the acquisition of fricatives within the same series; by the same token, in the languages of the world the distinctive opposition of an affricate to a dental, labial, or palato-velar stop implies the presence of a dental, labial, or palato-velar fricative.

No horizontal (front-back) opposition in open vowels can be acquired by the child as long as he has not acquired the same opposition in close vowels. This order of succession corresponds exactly to the general synchronic law formulated by N. S. Trubetzkoy.

The acquisition of front rounded vowels, secondary vowels in the terminology of P. Rousselot, presupposes the acquisition of primary vowels, i.e., back rounded and the corresponding front unrounded vowels. The secondary series implies the presence of primary vowels of the same degree of aperture in the languages of the world.

Oppositions which are relatively rare in the languages of the world are among the last acquired by the child. Thus a second liquid would be among the last acquisitions of the child's phonemic system. The sibilant vibrant (ř), an extremely rare phoneme in the languages of the world, usually terminates the phonological apprenticeship of Czech children; children of the various Indian tribes which make use of glottalized consonants are late in acquiring them, and nasal vowels appear in French and Polish children's speech only after all the other vocalic phonemes have already appeared.

One could easily multiply the number of concurrences between the order of development in child language and the general laws which are brought to light by the synchronic study of the languages of the world, and one would surely find still more analogous correspondences the more one could obtain precise linguistic data about children of diverse ethnic groups. But one can nevertheless draw conclusions from the very existence of the parallelism touched upon.

Every phonological system is a STRATIFIED STRUCTURE, that is to say, is formed of superimposed layers. The hierarchy of these layers is practically universal and invariable. It occurs in the synchrony of language; consequently we have to do with a PAN-CHRONIC ORDERING. If there exists a relationship of irreversible solidarity between two phonological values, the secondary value can not exist without the primary and the primary cannot be eliminated without the secondary. This ordering is to be found in any EXISTING phonological system, and it governs all its mutations; the same ordering determines, as we have just observed, the acquisition of language, a system in the process of build up; and – let us now add – it reappears in language disorders, where we have

to do with a system in the process of regression and disintegration.

As observations on language disorders by neurologists and psychiatrists teach us, nasal vowels tend to disappear first, as does the opposition between liquids, secondary vowels succumb before primary ones, fricatives and affricates change into stops, velar consonants are lost before consonants produced in the front part of the mouth, and labial consonants as well as the vowel *A* are the last phonemes to resist this process of disintegration, and it is these latter which are identical to the phonemes of the initial stage of child language. Higher layers are eliminated before lower ones. Aphasic impairments reproduce in reverse order the child's language acquisition. A phonological analysis of the different types of APHASIA (viz., disorders of a cerebral origin which involve no damage to the vocal apparatus itself) is what is called for to shed light upon the correspondences discussed, a study equally fruitful for the neurologist as for the linguist.

Certain points of contact between children's language on the one hand and certain so-called primitive languages on the other, had been noted a long time ago but these languages have been looked upon as survivals, reflecting, so to speak, the childhood of mankind. Appeals were made to the biogenetic law of Häckel, according to which the individual, in his own development, recapitulates phylogeny, the development of the species. The dearth of phonemes in a given language, however, is not necessarily a primordial deficiency; often, on the contrary, historical studies indicate that it is an impoverishment of recent date. What remains decisive in the correspondence between child language and the languages of the world is exclusively THE IDENTITY OF THE STRUCTURAL LAWS which underlie every modification of language, individual and social. It is, in other words, the same invariable superposition of values which is at the basis of every growth and decline in a phonological system.

It is not enough to emphasize the regularity of this superposition; it must be explained by demonstrating its necessity. The inadequacy of atomizing interpretations is obvious. The rules of child language cannot be separated from the corresponding facts in the

languages of the world. Some investigators have noted, for example, that labial and dental consonants appear earlier in child language than velar ones, and the motivation for this fact has been sought in the habitual movements involved in sucking; but one could scarcely find even a fervent Freudian who would want to invoke infantile recollection to explain another manifestation of this same law, namely the loss of velars in certain Tatar or Polynesian languages. Instead of viewing the totality of the phonematic oppositions successively acquired by the child, this ordered structure has been broken up and crumbled. Thus by attributing the early appearance of labials to the protrusion of the lips or to visual imitation, it was forgotten that the primary opposition, the clearest and most stable one, between merely oral and nasal labials remains completely unexplained.

The phonological sequence of stages, however, is rigorously consistent. It follows the principle of MAXIMAL CONTRAST, and it proceeds, in the ordering of oppositions, from the SIMPLE and homogeneous to the COMPLEX and differentiated. Let us limit ourselves for the moment to citing briefly some examples.

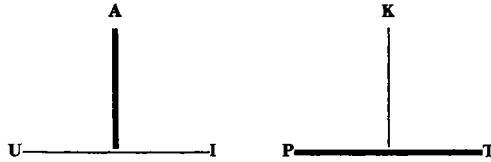
The babbling stage begins with indeterminate sounds which observers say are neither consonants nor vowels, or else, which amounts to the same thing, are both at the same time. The babbling stage ends with a clear distinction between consonant and vowel. From the motor point of view these two categories are opposed one to the other as closure to opening. It is the wide vowel *A* which affords the maximum opening, while on the other hand the stop consonants present zero opening, and among the stops it is the labials which obstruct the oral cavity completely. One might expect a priori that precisely this maximal contrast would be used at the threshold of child language to initiate the distinction between consonantal and vocalic, and experience confirms our expectation.

It is on the axis of successivity that the opposition between these two categories first arises. The labial stop forms, in combination with the vowel, the rudiment of the syllable. Opposition between phonemes on the other axis, the axis of SIMULTANEITY in the termi-

nology of F. de Saussure, does not yet exist. And yet it is this latter opposition which is the necessary premise for the distinctive function of phonemes. The phonemic framework of the syllable requires a phonemic content, framework and content being, as Viggo Brøndal has pointed out, two interdependent concepts.

Cavity without closure and cavity with closure – or, in other words, vowel and consonant – and then an innovation occurs: the FIRST OPPOSITION ON THE AXIS OF SIMULTANEITY, the opposition of oral and nasal stops. While the vowel remains characterized by the absence of closure, the consonant is split into two – one consonant characterized by a single cavity with closure and the other, adding to the first a subsidiary open cavity, and thus combining the specific features of an oral stop and of a vowel. This synthesis is a natural consequence of the opposition CONSONANT-VOWEL, whereas nasal vowels, which are opposed to oral vowels as a double open cavity is to a single open cavity, are a much more specialized phenomenon and a much less apparent contrast. This is why nasal vowels as well as consonants with a double closure appear only rarely in the languages of the world, and rather late in the acquisitions of infants learning to master these languages; whereas, on the other hand, the nearly universal opposition of nasal and oral consonants tends to be the first opposition with a distinctive value in child language.

In order to clarify the SECOND CONSONANTAL SPLIT, we might briefly survey the penetrating discoveries of W. Koehler and C. Stumpf, which linguistics has yet to utilize. To these two experts in acoustics and perception of speech is due the credit for having determined and differentiated two kinds of irreducible qualities of speech sounds. Just as with colors, those sounds are, on the one hand, either ACHROMATIC or CHROMATIC to different degrees, and, on the other hand, either LIGHT (acute) or DARK (grave). The latter opposition gains in value as the chromatism decreases. Among vowels, it is the vowel *A* which is the most chromatic and the least susceptible to the opposition light-dark, while the narrow vowels are most conducive to this latter opposition and the least chromatic. The two dimensions of the vocalic triangle, whose horizontal or



BASELINE is *U-I* and whose VERTICAL is *A*, correspond to the two psycho-physiological processes in the detailed analysis of Stumpf: the "*U-I* PROCESS" which comprises the opposition between light and dark, and the "*A* PROCESS" which determines the various degrees of chromatism. The first process¹ is fundamental, the second² is subordinate.

Stumpf realized that there are no languages with a vocalic system based solely on the fundamental process. He hesitantly suggested that such a system might have existed, but in a prelinguistic era. Yet this supposition in no way solves the problem. We know that languages with linear vowel systems do in fact exist, but it is precisely the base of the triangle which is suppressed in these cases. Thus we find the vowel system reduced to the vertical dimension (1) in several West Caucasian languages analyzed by Trubetzkoy and (2) in child language (as well as in aphasia) at the stage where no distinction is made between different vowels of the same degree of aperture (for example, between *U* and *I*), in which case either they are used as contextual or stylistic variants or else only one of them is found. These facts seem to lead to an untenable paradox: one might conclude that the fundamental process is inseparably bound to the accessory yet the accessory can still occur independently.

This apparent contradiction can, however, be resolved once one considers vocalic and consonantal systems as TWO PARTS OF A WHOLE, and once one draws the necessary conclusions from Stumpf's own lucid definition (which he himself failed to do) according to which the presence of pronounced chromatism (*ausgeprägte Färbung*) is what distinguishes, in the first place, consonants from vowels. Given that chromatism is the paramount character-

¹ The broad line in the diagram.

² The fine line in the diagram.

istic of vowel phonemes, the peak of chromatism represented by *A* thus makes this the optimal vowel, *princeps vocalium* in C. Hellwag's terminology. The vertical dimension *A* which differentiates the various degrees of chromatism is naturally the cardinal, sometimes even the only axis of vocalic systems. Consonants are phonemes without pronounced chromatism, and the opposition between light and dark, a contrast which increases as chromatism decreases, is consequently the cardinal axis of consonantal systems. Acoustic analysis demonstrates that labials oppose a dark timbre to the light timbre of dentals. Given that the dark timbre represents, according to Stumpf, the maximal degree of the process in question, labials thus represent the consonantal optimum.

In this way several different laws simultaneously receive an intrinsic explanation: to wit, the priority of labial consonants and of the vowel *A*, as well as the anteriority of the base line in oral and nasal consonants (i.e., the split into labials and dentals), the anteriority of the vertical line in the vocalic system (i.e., differentiation according to degree of aperture), and finally the order of the split within the vowels into back and front, which proceeds from narrow to wide.

In the acquisition of language the first vocalic opposition appears later than the first consonantal oppositions: hence there is a stage of development in which consonants already fulfill a distinctive function, while the lone vowel functions only as a support for the consonants and as a means of providing expressive variations. Thus we see that consonants assume phonemic value before vowels. In other words, there first appear the achromatic phonemes which divide along the horizontal axis, the axis of black and white; then arise the chromatic phonemes which divide along the vertical axis, the axis of degrees of chromatism. The ANTERIORITY OF THE FUNDAMENTAL PROCESS in relation to the accessory one is thus entirely confirmed.

Achromatic speech sounds, or more precisely sounds without pronounced chromatism, display, as Stumpf has already pointed out, diverse degrees of achromatism. Thus in the consonantal system one observes the same two dimensions as in the vocalic

system, but in the opposite hierarchical order. A linear vocalic system is vertical whereas a linear consonantal system is confined to the base line. Palato-velar (= either palatal or velar) consonants present the minimum of achromatism. Being remote, as are wide vowels, *von der Linie der blossen Helligkeiten*, to use Stumpf's expression, they show a relatively low aptitude for being split up into two distinct classes of lightness and darkness: into a class of palatals and a class of velars. Thus they form the peak of the consonantal triangle. The phonemes at the peak carry a higher degree of specific intensity than those at the base. It is noteworthy in this connection to recall that, *ceteris paribus*, wide vowels are superior to narrow ones in their degree of perceptibility, and that palato-velar consonants are superior in their respect to the corresponding front buccal consonants. As a matter of fact what is only an epiphenomenon of vocalic oppositions forms the very essence of palato-velar consonants. The acoustic filters used in Stumpf's analysis of *K*, *T*, and *P* proved that when *T* and *P* were at the point of disappearing, the velar still subsisted as a dry knocking noise. It is a glottal stop, an indeterminate plosive phoneme, to which one finds velars reduced in languages with a leniar consonantal system, and often as well in child language (or aphasia) at a corresponding stage.

Obviously the opposition of vowels and stops, or, in other words, of opening and closure, precedes the opposition between complete and attenuated closure, i.e., between stops and fricatives. The opposition of an *U* to an *I* involves two parallel distinctions, which allows the combination of two opposite properties in a rounded palatal or an unrounded velar phoneme, is, needless to say, a secondary acquisition. The complexity of affricates is of exactly the same nature.

When continuing to compare the linguistic acquisitions of the child with the typology of the languages of the world, one comes to the conviction that also the sequential combinability of phonemes and finally the system of grammatical meanings are in turn subject to the same rule of the SUPERPOSITION OF VALUES.

The universality and the internal logic of the hierarchy observed

above allow us apparently to assume the same order for the genesis of human language (glottogony). This invariability enables linguists to verify and to accept, for instance, the ingenious hypothesis recently suggested by P. van Ginneken (and previously by L. Noiré) as to the beginnings of human language: consonantal oppositions must have preceded vocalic oppositions. It is true that this inquirer assumes a still earlier stage, one of clicks, but he himself notes that these did not function as phonemes but rather as merely vocal gestures forming, to be precise, a prelinguistic and an extralinguistic layer, to which we would only add a 'post-linguistic' layer, as the study of aphasia seems to indicate. In a similar way A. Trombetti's hypothesis regarding the anteriority of stops appears to be also corroborated, whereas the priority of affricates surmised by N. Marr must be discarded.

We have tried to trace the rigorous stratification of several phonemic oppositions and to look for a tentative elucidation of this ordering. The principle is simple to the point of being trivial: it is impossible to put in place the roof without having first erected the frame, nor can one take away the frame without having first removed the roof. And it is this principle which governs both the dynamic and static aspects of language; in this way once disparate facts can now be coordinated, some supposed 'unsolvable enigmas' may be eliminated, and seemingly disparate and blind laws obtain a unifying sense. The phonological development of the child as well as the aphasic regressions are in their broad outlines nothing but the corollary of this principle.

All this proves that the choice of differential elements within a language, far from being arbitrary or fortuitous, is on the contrary regulated by laws (or tendencies) of a universal and immutable nature. We have just briefly examined a few LAWS OF IMPLICATION of the type: the existence of an entity Y implies the existence of an entity X in the same phonemic system. One could just as well examine another series of laws, no less important for the typology of languages. These are LAWS OF INCOMPATIBILITY of the type: the existence of an entity Y excludes the existence of an entity X in the same phonological system.

Obsessed, despite his searching fervor, by that fear of purposiveness which characterized the decline of the past century, F. de Saussure taught as follows: "Contrary to the false idea which we like to foist on language, the latter is not a mechanism created and aimed to express concepts". Now, however, we are in a position to reply to the devastating hypercriticism of the previous era, that it is precisely common sense, and in particular the idea which as talking beings intuitively have about language, is the most realistic: language is indeed a tool regulated and aimed to express concepts. It efficiently masters the sound matter and transforms these physical objects into opposite attributes capable of bearing meaning. One of the proofs for this statement are the rules of phonological structure sketched above.

Written in Charlottenlund, Denmark, for the Fifth International Congress of Linguists, Brussels 1939.

Translated from the French by Rodney Sangster.

2. WHY “MAMA” AND “PAPA”?

In Spring 1959, during a linguistic seminar at the Center for Advanced Study in the Behavioral Sciences, George Peter Murdock endeavored to verify the alleged tendency of unrelated languages “to develop similar words for father and mother on the basis of nursery forms”. Murdock’s (1957) tables of kinship terms assembled for his “World Ethnographic Sample” supplied the investigation with 1,072 terms (531 for mother and 541 for father). The valuable seminar report has recently been published by Murdock (1959). As the author concludes, “the purpose of this paper is merely to present the data, which clearly confirm the hypothesis under test” – a striking convergence in the structure of these parental kin terms throughout historically unrelated languages. He asks whether linguists – “now that the facts are established” – could not “clarify the theoretical principles that account for them”. In May 26, 1959, at the same seminar, I ventured to answer Murdock’s call, and now I am happy to contribute those remarks to the book dedicated to Heinz Werner.

“The child”, H. Werner (1940) stressed, “grows out of his child’s world into an alien world of adults. His behavior is the result of an interaction between these two worlds.” One could add that likewise the behavior of adults with regard to the child they nurse and educate is a result of an interaction between both worlds. In particular, the so-called “baby talk” used by the grownups when speaking with infants is a kind of pidgin, a typical mixed language, where the addressers try to adjust themselves to the verbal habits of their addressees and to establish a common code suitable for

both interlocutors in a child-adult dialogue. The socialized and conventionalized lexical coinages of this baby talk, known under the name of nursery forms, are deliberately adapted to the infant’s phonemic pattern and to the usual make-up of his early words; and, on the other hand, they tend to superimpose upon the child a sharper delimitation and higher stability of word meaning.

Some of such nursery forms overstep the limits of the nurseries, enter into the general usage of the adult society, and build a specific infantile layer in standard vocabulary. In particular, adult language usually adopts the nursery forms designating each of the two mature members of the nuclear family. Very frequently these intimate, emotional, childishly tinged words coexist with more general and abstract, exclusively adult parental terms. Thus, for instance, in English, *mama* (*mamma*, *mammy*, *ma*, *mom*, *mommy*) and *papa* (*pap*, *pappy*, *pa*, *pop* or *dada*, *dad*, *daddy*) differ in use from the higher terms *mother* and *father*; in a similar way, Russian distinguishes *mama* and *papa* or *t’at’a* from *mat’* (Common Slavic *mati*) and *otec* (Common Slavic *otīci*). In Indo-European the intellectualized parental designations **mātēr* and **pātēr* were built from the nursery forms with the help of the suffix *-ter*, used for various kin terms. I am inclined to trace to these prototypes not only the cited English nouns and the Slavic *mati* but also the root of the Slavic paternal term *ot-* and similar forms in some other Indo-European languages: cf. Vasmer’s (1954) data on Rus. *otec*. The root in question could have lost its initial *p-* through an infant-like elimination of consonantal diversity in **pātēr* when this adult term went down into the nursery.

As an instructive example of the difference in formal and functional properties between the two levels of parental appellations, the use of Bulgarian words *mama* and *majka* “mother” may be cited. The nursery forms like *mama*, adequately characterized by E. Georgieva (1959) as intermediate between common and proper nouns (*polunaricatelni*, *naricatelno-sobstveni imena*), can be used in standard Bulgarian neither with articles nor with possessive pronouns. The bare *mama* means either “my, addresser’s mother” or “I, addressee’s mother”. As to the term *majka*, it may appear with

any "short possessive pronominal form" (*ti, mu, i, vi, im*) except the first person pronoun *mi*. One's own mother is spoken of in Bulgarian as *mama* or occasionally as *majka* "mother", as far as it is clear from context or situation whose *majka* is meant. Finally, in a distancing fashion, the expression *mojata majka* "the mother of mine" may be used, while the turn *majka mi* "'my mother" is ordinarily avoided. If the parental terms assembled by Murdock could be divided into these two – *mama-papa* and *mother-father* – classes, his statistical test would yield even more overwhelming results.

Nursery coinages are accepted for a wider circulation in the child-adult verbal intercourse only if they meet the infant's linguistic requirements and thus follow the general line of any inter-language, as formulated in the indigenous name for Russenorsk, the hybrid tongue of Russian and Norwegian fishermen: *moja på tvoja* "mine in your way" (Broch, 1927). Those settled nursery forms adopted by speech communities ostensibly reflect the salient features and tendencies of children's speech development and their universal homogeneity. In particular the phonemic range of the intimate parental terms proves to be "severely limited". The principles underlying the successive stages in the child's acquisition of language enable us to interpret and clarify the "cross-language parallels" in the structure of such terms throughout the world.

Consonantal clusters appear in no more than 1.1 per cent of the 1,072 parental terms counted by Murdock, and child's speech at its early stages uses no consonantal groups but only combinations of consonants with vowels. Such combinations are nearly constant in the *mama-papa* words, and purely vocalic roots are exceptional: only three among the tabulated instances.

Stops and nasals – briefly, consonants formed by a complete oral closure – predominate in parental terms. According to Murdock's tabulation, stops and nasals approach to 85 per cent of nonsyllabics. The exact ratio cannot be stated, because all nonsibilant fricatives were lumped together with corresponding stops.

Labial and dental – briefly, backward-flanged, or, in acoustical terminology, diffuse consonants – prevail over velars and palatals –

briefly, forward-flanged (hornlike), acoustically compact consonants. More than 76 per cent of all the terms counted include a labial or dental as opposed to more than 10 per cent with velars and palatals. A more exact computation would ask for a split of Murdock's class of sibilant fricatives into hissing (diffuse) and hushing (compact) consonants.

Wide vowels, especially /a/, are obviously preponderant, but it is impossible to extract numerical data from Murdock's table, because the narrower and wider vowels within each of the three classes – front, unrounded back, and rounded back – are lumped together, and the relation – /e:/i/ = /a:/ə/ = /o:/u/ – which underlies many vocalic patterns is disregarded.

The contrast between the consonantal presence and vocalic absence of an obstruction in the vocal tract finds its optimal expression when a consonant with a complete oral closure, and especially a backward-flanged consonant with a closure in the front of the oral cavity, is opposed to a forward-flanged vowel with a wide frontal opening. On the acoustical level, vowels differ from consonants by a sharply defined formant structure and a high total energy. The compact vowel displays the maximal energy output, while the diffuse consonant with an oral occlusion represents the maximal reduction in the energy output. Thus nursery names for mother and father, like the earliest meaningful units emerging in infant speech, are based on the polarity between the optimal consonant and the optimal vowel (Jakobson and Halle, 1957).

The principle of maximal contrast accounts for the constituents common to the majority of the *mama-papa* terms. As to the order of these constituents, the sequence "consonant plus vowel" appears to be almost compulsory; yet this question has been omitted in Murdock's test. During the babbling period in the infant's development, many of the uttered syllables consist of a vocalic sound succeeded by a consonantal articulation. The most natural order of sound production is an opening of the mouth followed by its closure. Among Russian interjections, one observes such infantile sound gestures as [ʼap] and [ʼam]; when changed into verbal roots, they are adapted to the Russian phonemic pattern by substituting

a fricative velar for the initial aspiration: *xapat'*, *xamat'*, *xamkat'*. As soon as the child moves from his babbling activities to the first acquisition of conventional speech, he at once clings to the model "consonant plus vowel". The sounds assume a phonemic value and thus need to be correctly identified by the listener, and since the best graspable clue in discerning consonants is their transition to the following vowels, the sequence "consonant plus vowel" proves to be the optimal sequence, and therefore it is the only universal variety of the syllable pattern.

Among 436 dentals and palatals, briefly, medial, acoustically acute consonants (the T, N, C and S classes in Murdock's table), there are 159, or 39 per cent, which are followed by a palatal, i.e., acute vowel, while among 507 labials and velars, briefly peripheral, acoustically grave consonants (Murdock's P, M, K, and η classes) only 88, or 17 per cent, are accompanied by acute vowels. The considerably higher percentage of acute vowels after acute rather than grave consonants reflects an assimilative influence of consonantal tonality upon the tonality of the subsequent vowel, and the same tendency is manifest in the early stage of children's speech. At this stage, vocalic differences do not possess their own phonemic value, and the consonant functions as the only carrier of significant distinctions, the only genuine phoneme. The *mama-papa* terms, like the primary word units in infant language, do not comprise different consonants, and a dissyllabic form usually reiterates one and the same consonant. At first child's language is devoid of any hierarchy of linguistic units and obeys the equation: one utterance—one-sentence—one word—one morpheme—one phoneme—one distinctive feature. The *mama-papa* pair is a vestige of that stage of one-consonant utterances.

The reduplication of syllables, while passed over in Murdock's test, appears, however, as a favorite device in nursery forms, particularly in parental terms, and in the early word units of infant language. At the transition from babbling to verbal behavior, the reduplication may even serve as a compulsory process, signaling that the uttered sounds do not represent a babble, but a sensible, semantic entity. The patently linguistic essence of such a duplica-

tion is quite explicable. In contradistinction to the "wild sounds" of babbling exercises, the phonemes are to be recognizable, distinguishable, identifiable; and in accordance with these requirements, they must be deliberately repeatable. This repetitiveness finds its most concise and succinct expression in, e.g., *papa*. The successive presentations of the same consonantal phonemes, repeatedly supported by the same vowel, improve their intelligibility and contribute to the correctness of message reception (cf. Pollack, 1959).

The most spectacular results of Murdock's test concern the distribution of nasal and oral consonants between maternal and paternal terms: 55 per cent of the words denoting mother and only 15 per cent of those denoting father belong to M, N, and η consonant classes. Thus the traditional assertions that "the mother is usually named with an *m*-form, the father with a *p*, *b*, *t*, or *d*-form" (Lewis, 1951) obtain an instructive statistical corroboration. The origin and the evolution of the *m*-form can easily be traced, if one rejects any, as Lewis says, "mystical" beliefs in the weak *m* "suited to name a woman" or in the "centripetal" connotation of the nasals as opposed to the "centrifugal" meaning of the oral stops, as well as the equally superstitious speculations about the child's "meaningless" syllables, "arbitrarily" interpreted and taught by the grownups to the children "in the nurseries of all countries" (Jespersen, 1922).

Often the sucking activities of a child are accompanied by a slight nasal murmur, the only phonation which can be produced when the lips are pressed to mother's breast or to the feeding bottle and the mouth is full. Later, this phonatory reaction to nursing is reproduced as an anticipatory signal at the mere sight of food and finally as a manifestation of a desire to eat, or more generally, as an expression of discontent and impatient longing for missing food or absent nurser, and any ungranted wish. When the mouth is free from nutrition, the nasal murmur may be supplied with an oral, particularly labial release; it may also obtain an optional vocalic support. Eloquent material on the shape and function of those nasal interjections has been collected by such sagacious observers

of infant speech as Grégoire (1937), Leopold (1939), Smoczyński (1955), and others. It should be noted in this connection that of the two Russian catching interjections [‘ap], [‘am] the latter and the corresponding verbal root *xam-* are associated with nutrition.

Since the mother is, in Grégoire’s parlance, *la grande dispensatrice*, most of the infant’s longings are addressed to her, and children, being prompted and instigated by the extant nursery words, gradually turn the nasal interjection into a parental term, and adapt its expressive make-up to their regular phonemic pattern. Some investigators, however, for example, Leopold (1947), insist that not seldom this transition from the *m*-interjection to the maternal term proved to be delayed, and one of the two parental terms, *papa*, appeared as the first thoroughly designative verbal unit, whereas, for instance, the form *mama* existed in the language of Leopold’s daughter as an interjection only: “it had no intellectual meaning and cannot be considered to be a semantic alternative of *papa*, which was learned with real meaning at 1;0. *Mama* with the standard meaning was not learned until 1;3.”

The transitional period when *papa* points to the parent present, while *mama* signals a request for the fulfillment of some need or for the absent fulfiller of childish needs, first and foremost but not necessarily for the mother, is attentively described by Grégoire: “Edm. a paru réclamer sa maman, absente ce jour-là, en disant [mam:am:am:]; or, c’est [papa] qu’il émet, lorsqu’il la voit rentrer. ... Edm. me voit lui préparer une tartine; il énonce [mamā], et non [papa].” Likewise Smoczyński’s children in the middle of their second year, when begging for something from their father, addressed him: [mama ma-ma ma:-ma:-ma:].

The priority of paternal terms with their oral stop, in relation to the maternal terms with nasal, is well founded both on the semantic and on the phonological level. Parsons’ (1955) observations on the preoedipal mother-child identity in its plain contradistinction to the father’s role give an answer to the question why the first distant, merely deictic, rudimentarily cognitive attitude in child’s verbal behavior is embodied in the paternal term, which “heralds just the transition from affective expression to designative language” (Ja-

kobson, 1941), whereas in the maternal term, the purely referential value arises in a later (Parsons would probably suggest – oedipal) stage. It would be interesting to examine whether there is a difference in the settlement of *mama* “with the standard meaning” in the speech development of boys on the one hand and girls on the other. On the phonological level, it may be observed that the optimal consonant-vowel contrast is achieved by the backward-flanged vowel. The addition of a new, open resonator brings the nasal consonants closer to vowels and thus attenuates the maximal contrast. The phonemic formation of nasal consonants implies the existence of the consonant-vowel contrast and is a superstructure upon this contrast.

Although the *mama-papa* terms are nursery words, they conform to the developmental character of infant language, and neither their penetration into the national language nor their international diffusion invalidates this basic conformity. Therefore the complete exclusion of “forms resembling *mama* and *papa*” from Murdock’s text, “unless comparative data on related languages clearly demonstrated their indigenous origin”, seems to be superfluously rigorous.

The captivating test of the eminent anthropologist deserves to be continued and developed. The phonemic relation between the maternal and paternal term should be examined and tabulated. How frequently do both terms belong to the nasal or to the oral class? How often do both of these terms contain a labial or both of them a dental? What are the types of combination between the opposition labial-dental and nasal-oral within the pairs of parental terms? Reinforced, multiform polarizations seem to play here a noticeable role. Cf. such pairs as Russian *mama-t’at’a*, where the feature nasal-oral is combined with the two tonality features – grave-acute and sharp(palatalized)-plain(nonpalatalized). The coincidence of the latter two features creates the optimal contrast of high and low tonality.

Among familial terms the nursery forms are not confined to parental designations, and it would be a tempting task to trace how the different degrees of relationship designated correspond to

the development of the child's language. Thus Russian *baba* “grandma” and *d'ad'a* “uncle” (cf. *papa* and *t'at'a*) introduce the voicing of consonants, a later feature in the phonemic patterning of Russian (and all Slavic) children. The terms *d'ed* “grandpa” and *t'ot'a* shift from /a/ to other vowels, which belong to the later phonemic acquisitions of children. Nurse is called either *mamka*, a diminutive from *mama*, or *n'an'a* “nanny”, opposed by its nasals of high tonality (sharp and acute), briefly by a typically diminutive sound symbolism, to *mama* with its nasals of low tonality (plain and grave).

We observe that only seniors in age and function are supplied here with nursery names, and we face the relevant question: for what kinsmen are there such names in a given language or stock of languages? A wide field is open for productive joint work of linguists, anthropologists, and experts in psychology of mental and behavioral development.

Written in Stanford, California, 1959, for *Perspectives in Psychological Theory*, dedicated to Heinz Werner (New York, 1960).

3. ANTHONY'S CONTRIBUTION TO LINGUISTIC THEORY

The half-dream soliloquies of the two-year-old Anthony, recorded on tape, transcribed and analyzed by his mother, the Stanford linguist Ruth Weir, lead us into a fascinating and hitherto unexplored province of language. As Vygotsky's profound investigation of inner speech has disclosed, the so-called egocentric talk of children is an "intermediate link between overt and inner speech". We have been taught that "egocentric speech is inner speech in its functions; it is speech directed inward." In a child's development, speech proves to be "interiorized psychologically before it is interiorized physically". Anthony adds a new and apposite angle to Vygotsky's discovery: the transition from overt to inner speech displays a graduated order.

Our overt speech is directed toward an outside addressee and requires a listener. Our inner speech obviously meets with no listener and is not supposed to reach an actual addressee. Children's egocentric talk has no concern for any outside addressee, but it tolerates, not seldom even favors the presence of a listener, whereas their pre-sleep speech does imply the absence of human hearers. It is meant as a genuine soliloquy, the speaker's *privatissimum*, ready to be cut off as soon as he realizes that his solitude has been broken. Hence the verbal activities of the child in his crib bring us a step nearer to true inner speech, namely, to its most hidden and perplexing variety, the speech of dreams. The soliloquies of Anthony falling asleep give us a suggestive insight into the speech of our dreams, which in the whole of our verbal behavior plays a no less vital part than do dreams themselves in our mental life.

For linguistic study in this border zone of inner speech and dream speech, the various examples of reduction and condensation are particularly inviting. One could hardly find a more gratifying text for the investigation of radical ellipsis on the different levels of language – fragmentation not only of sentences, clauses, and phrases but also of words used side by side in their full and truncated form: *Anthony* and *Antho-*, *dance* and [dæn-], *donkey* and [dɒn-].

Sometimes it is difficult to separate features typical of inner speech in general from those which characterize the speech development in young children. Nonetheless, here one immediately detects new and valuable clues to the study of child language. According to Ruth Weir's subtle observations, the lowering of the cognitive, referential function in Anthony's soliloquies brings to the fore all the other language functions. A typical property of children's speech is an intimate interlacement of two functions – the metalingual and the poetic one – which in adult language are quite separate. Although the pivotal role which in language learning belongs to the acquisition of metalanguage is well-known, the predominantly metalingual concern of the somnolent child with language itself comes as a great surprise. It shows us the ways in which language is gradually mastered. Many of the recorded passages bear a striking resemblance to the grammatical and lexical exercises in textbooks for self-instruction in foreign languages:

“What color – What color blanket – What color mop – What color glass... Not the yellow blanket – The white... It's not black – It's yellow... Not yellow – Red... Put on a blanket – White blanket – And yellow blanket – Where's yellow blanket... Yellow blanket – Yellow light... There is the light – Where is the light – Here is the light.”

Selection of modifiers for one head word and selection of head words for one modifier: “Big and little – Little Bobby – Little Nancy – Big Nancy.” Antonyms (either contraries or contradictories) follow each other: “On the blanket – Under the blanket... Berries – Not berries... Too hot – Not too hot.” The disjunctive *or* is missing. Members of a paradigmatic set (either lexical or grammatical), joined to each other by a conjunctive *and* or without

any conjunction at all, are open to selection: "Hat for Anthony and Bobo – For Bobo – Not for Anthony – Hat for Anthony." The desired choice is finally made: Anthony is the designated proprietor.

He practices confronting different grammatical forms of the same vocable, especially of the same verb: "Fix the music – Music is *fixed*... Cobber *crossed* the street – Cobbers always *cross* the street [with the adverb manifestly opposing the present to the preterit]... Anthony *write* – Pencil's always *writing* [a pair followed and supported by a parallel couple: *smiling* – *smile*]... *Take off* – *Took off*... *See* – *I see*... *Where are you going* – *I am going*." Vocables used both in verbal and nominal function are juxtaposed: "Can bite – Bite – Have a bite... Broke the vacuum – The broke – Get some broke – Alice broke the baby fruit" [*break* is generally replaced by the alternant *broke*). Nouns and verbs are deliberately used side by side with their anaphoric substitutes: "Take the monkey – Take it... Stop the ball – Stop it... Go for glasses – Go for them... Don't jump – Don't ticklish – Don't do that."

Grammatical alternations and purely phonemic minimal pairs are purposely strung together: /tøk/ – /tʊk/ – /bæk/ – /tʊk/ – /tek/ – /buk/ ... /wat/ – /nat/ – /nait. *Light* and *like* or *likes* and *lights* attract each other. *Back* and *wet* are blended in the portmanteau word *Babette*. Thus in the child's pre-sleep speech, lexical, morphological, and phonemic sets appear to be projected from the paradigmatic axis into the syntagmatic one.

In chains of repetitive sentences the variation within each pair be limited to one single unit:

There's a hat
 There's another
 There's hat
 There another hat
 That's a hat.

The whimsical interchange of two syntactical operations – properly singled out by Ruth Weir as a "build-up" and a "break-down" – are patently similar to the play of Anthony's coevals who alternately assemble and dismantle their toys. The gradual constituting of a sentence from its originally separate and autonomous components,

each with a predicative function, and, on the other hand, the progressive filling-in and expansion of primary sentence frames are equally instructive procedures, which bring to light the mechanism of syntactical learning and training. How informative, for instance, are Anthony's sentence frames, where the place of the noun is signaled by the article, while the noun itself has not yet been selected:

"Anthony take the – Take the book... This is the – This is the – Book... That's a – That's a – That's a kitty – That a Fifi here... Mommy get some – Mommy get some – Soap."

Predicate phrases without expressed subject or with a merely deictic pronominal subject (*That's a kitty*) and transitional forms between subject-predicate declarative sentences and vocative-imperative sequences indicate how explicit two-term propositions may embarrass the somnolent child. The type of sentence he prefers is a mere annex to an implied or required situation.

Anthony's bedtime play with language as a condensed summary of his day imperatively calls for further investigation of how usual such self-educational linguistic games are among dozing children. Yet however prominent the metalingual function is in Ruth Weir's records, she is right in considering the copresence of other functions. In particular, the last and longest of Anthony's "paragraphs" discussed by his mother, with its eight times recurring leitmotiv "Daddy dance", is not only an elaborate lesson in grammar but also a moving and poignant psychoanalytic document, utilizing the child's whole inventory of expressive devices. And above all, it is a true and beautiful poetic composition comparable to the masterpieces of children's art – verbal and pictorial:

That's for he – Mamamama with Daddy – Milk for Daddy – OK – Daddy dance – Daddy dance – Hi Daddy – Only Anthony – Daddy dance – Daddy dance – Daddy give it – Daddy not for Anthony – No – Daddy – Daddy got – Look at Daddy (*falsetto*) – Look at Daddy here – Look at Daddy – Milk in the bottle – I spilled it – Only for Daddy – Up – That's for Daddy – Let Daddy have it – Take off – Take off – The – Turn around – Turn around – Look at donkey – That's the boy – That's the donkey – [dæn] Daddy [dæn] – Pick up the [dæn] – I can pick up – I can – How

about – How about the Daddy – OK – Daddy's two foot – Daddy had some feet – [bi:bə] – Put on a record for you – What Daddy got – Daddy got – On the plane – Look at pillow – What color pillow – What color – Is not black – It's yellow – Daddy dance – Ah, Daddy – Take it to Daddy – Daddy put on a hat – Daddy put on a coat – Only Daddy can – I put this in here – See the doggie here – See the doggie – I see the doggie (*falsetto*) – I see the doggie (*falsetto*) – Kitty likes doggie – Lights up here – Daddy dance – Daddy dance – Daddy dance – With Bobo – What color's Bobo – What color's Bobo

Introduction to Ruth Weir's *Language in the Crib* (The Hague, 1962).

4. APHASIA AS A LINGUISTIC TOPIC

As the developments of the last decades prove, aphasia is an extremely productive field for linguistic study; furthermore, the cooperation of linguists, psychologists, psychiatrists, neurologists and other experts is of ever increasing value here.

The first real interpreter of aphasia, Hughlings Jackson, recognized that an aphasic mutation may be regarded as twofold in nature: when a patient says "chair" for "table", he shows, first, a deficit in not saying "table" and, second, a compensation in saying "chair" instead.¹

For the study of expressive language this approach is particularly illuminating: aphasia can lead to a redistribution of linguistic functions. This may be illustrated by the following examples.

In Norwegian, stressed syllables carry two different intonations which, other things being equal, serve to distinguish words; this distinctive function limits the use of intonation for expressive purposes. In standard German, intonation does not differentiate words but is often used to signal the emotional attitude of the speaker. A Norwegian woman, whom Monrad-Krohn² examined, had been struck by a bombfragment and had lost her ability to distinguish the two word-differentiating intonations of her mother tongue. Consequently her use of intonation was fully released for expressive variation, and as a result she was mistaken by her countrymen for

¹ Jackson, H., "On Affections of Speech From Disease of the Brain", *Brain*, 1879 (reprinted in *Brain*, 38, 1915).

² Monrad-Krohn, G. H., "Dysprosody or altered 'melody of language'", *Brain*, 70, 1947.

a Norwegian-speaking German and often met their animosity in Nazi-occupied Oslo.

In the next illustration the loss of a distinctive feature in aphasia is compensated for by an additional expressive feature. In Czech the opposition of long and short vowels is capable of distinguishing word meanings. Thus, *draha* means “road” when the first vowel is a long /a:/ and the second a short /a/ – /dra:ha/; but if the distribution of long and short is inverted, then the word /draha:/ is the feminine singular of the adjective “dear”; the corresponding neuter form in colloquial Czech is /drahi:/. Hence in Czech, emphasis cannot be rendered by the prolongation of a short vowel, whereas in Russian, in which the quantity of vowels has no distinctive value, the increase of the length of a vowel plays an important expressive role. Czech patients with language disturbances are apt to lose the distinctive opposition of long and short vowels. An aphasic, instructed to interpret the word /dra:ha/ “road”, answered /co je drahi:/ “(that) which is dear”. A female patient of the Prague psychiatrist, Antonin Heveroch, exclaimed /sem na:čena/ “I’m excited”, and when asked why she said /na:čena/ instead of the correct Czech /načena/, replied that when she felt most excited, then she was [na:čena]. Hence what appears to be a pathological phenomenon in Czech corresponds to the normal pattern in Russian.³

Again, in Czech, the main stress, falling on the initial syllable, signals the division of the sound chain into words – it is a configurational feature. There is, moreover, a tendency to accent the penult, which has an expressive function. In Polish, on the other hand, the main stress is on the penult.

In an aphasic case recorded by the Prague psychiatrist, Arnold Pick,⁴ the loss of distinctive vowel quantity was accompanied by a shift of the stress from the first to the next-to-the-last syllable of the word, which gave rise to an unwarranted suspicion of some previous Polish influence on the patient. What actually happened

³ Jakobson, R., *O češskom stixe* (Berlin-Moscow, 1923).

⁴ Pick, A., “Über Änderungen des Sprachcharakters als Begleiterscheinung aphasischer Störungen”, *Zeitschrift f. d. ges. Neurol. u. Psychiatr.*, 45, 1919.

was that the expressive accent became the main stress and assumed the configurational function, because the loss of quantity induced a reinforcement of the stress, and the accent on the penult appears more prominent as it contrasts with both the following and the preceding syllables of the same word and provides a peak with two slopes. Here we observe a redistribution of configurational and expressive features; it is probable that the same factors just described caused the shift of the stress from the initial syllable to the penult in Polish and in those peripheral Czech and Slovak dialects which, like Polish, lost the free quantity. So the ontogeny of this pathological case and the phylogeny of Polish are subject to the same structural principles.

The losses and compensations in aphasia throw new light on the interrelationship of the so-called cognitive and expressive elements in language; and aphasia provides a vital topic indeed for a conference on Expressive Language.

Research in the field of speech pathology is progressing rapidly; three fundamental works appeared shortly after World War II, synthesizing the results achieved, namely Kurt Goldstein's *Language and Language Disturbances*,⁵ André Ombredane's *L'aphasie et l'élaboration de la pensée explicite*,⁶ and the Russian book *Travmatičeskaja afazija*, written by the psychologist and psychiatrist A. R. Luria and based on an amazing number of cases from the last war.⁷ All three outstanding experts assign high importance to the linguistic problems involved in the study of aphasia; their works suggest that linguists cannot abstain from taking a more active role in the investigation of speech disorders and in the revision of previous theories.

The application of purely linguistic criteria to the interpretation and classification of aphasic facts can contribute substantially to the science of language and language disturbances, provided that linguists remain as careful and cautious when dealing with psychological and neurological data as they have been in their tradi-

⁵ New York, 1948.

⁶ Paris, 1951.

⁷ Moscow, 1947.

tional field. First of all, they should be familiar with the technical terms and devices of the medical disciplines dealing with aphasia; then, they must submit the clinical case reports to thorough linguistic analysis; and further, they should themselves work with aphasic patients in order to approach the cases directly and not only through prepared records which are quite differently conceived and elaborated. Although Goldstein, Luria, Ombredane, and some other psychopathologists have studied and utilized the basic linguistic literature, any variety of aphasia, any individual case offers highly complex and intricate linguistic material which cannot be satisfactorily analyzed without the cooperation of a linguist equipped with all the technical means and methods of the modern science of language.

There is one level of aphasic phenomena where amazing agreement has been achieved during the last twenty years between those psychiatrists and linguists who have tackled these problems. I am referring to the analysis of the disintegration of the sound pattern. This dissolution exhibits a time order of great regularity. Aphasic regression has proved to be a mirror of the child's acquisition of speech sounds; it shows the child's development in reverse. Furthermore, comparison of child language and aphasia enables us to establish several "laws of implication". Thus, if we observe that in the child's language the acquisition of a certain phenomenon B implies the acquisition of a phenomenon A, we discover that the loss of A in aphasia implies the loss of B, while the rehabilitation of an aphasic goes in the same direction as in the case of a child – the reacquisition of B implies the renewed presence of A. If, subsequently, we examine the distribution of these elements in the languages of the world, we detect that the presence of phenomenon B implies the presence of phenomenon A, and that the absence of A implies the absence of B.⁸

The search for this order of acquisitions and losses and for the general laws of implication cannot be confined to the phonemic pattern but must be extended also to the grammatical system. Only

⁸ See *Selected Writings*, I, p. 328ff.

a few preliminary attempts have been made in this direction, and these efforts deserve to be continued.

Today, however, I should like to discuss a completely different problem which, I think, is of importance not only for the study of aphasia but for the general science of language, especially for the analysis of verbal structure, verbal behavior, and verbal art. The problem has been alluded to in the various papers of our symposium; in particular, one of the principal concepts involved in this problem emerged again and again in the interchanges and each time provoked vivid discussion. Our chairman has devoted to this concept one of his most captivating books.⁹ I refer to the concept of the metaphor.

The two opposite tropes, metaphor and metonymy, present the most condensed expression of two basic modes of relation: the internal relation of similarity (and contrast) underlies the metaphor; the external relation of contiguity (and remoteness) determines the metonymy.

Language in its various aspects deals with both modes of relation. Whether messages are exchanged or communication proceeds unilaterally from the addresser to the addressee, there must be some kind of contiguity between the participants of any speech event to assure the transmission of the message. The separation in space, and often in time, between two individuals, the addresser and the addressee, is bridged by an internal relation: there must be a certain equivalence between the symbols used by the addresser and those known and interpreted by the addressee. Without such an equivalence the message is fruitless – even when it reaches the receiver, it does not affect him.

If I say “he did”, then in order to grasp this message you must know the meanings of *he* and of *did*; you must know and understand the English lexical units, their grammatical form (for instance *did* in contradistinction to *does*) and also the syntactical rules of their combination (*he did* in contradistinction to *did he*). Briefly, you must have a common code with the addresser, so that when listening to his message you can identify its constituents with the

⁹ Werner, H., “Die Ursprünge der Metapher”, 1919.

corresponding code units. We may, then, define the addresser as an encoder and the addressee as a decoder.

However, it is not enough to know the code in order to grasp the message. When I say “he did”, you may be familiar with the words *he* and *did* and with the rules of word order, and you will then realize that I speak about some man who performed some action, but in order to learn who this person is and what the action is which he performed, you need to know the context, verbalized or non-verbalized, but verbalizable. Here we again enter the field of contiguity. The components of any message are necessarily linked with the code by an internal relation of equivalence and with the context by an external relation of contiguity.

Let us start with the smallest units of language endowed with meaning, the so-called morphemes, for example with the suffix /-ist/. In the grammatical code of English this morpheme denotes a superlative grading. Grading in respect to what quality? The answer is given by the context to which the suffix belongs. The word is the context of morphemes, just as a sentence is the verbal context of words and an utterance the verbal context of sentences, while a morpheme in its turn is the context of phonemes. In the word *biggest* /bígist/ the grammatical meaning of the suffix /-ist/ refers to the lexical meaning of the root-morpheme /bíg-/; but not only the components /bíg-/ and /-ist/, but also the capability of /bíg-/ to form a superlative using the suffix /-ist/, and consequently the whole word unit /bígist/, all this is contained in the code.

When operating with the hierarchy – phoneme, morpheme, word, sentence, utterance – linguists are tempted to see this arrangement as a merely quantitative scale, whereas in fact each of these ranks is also qualitatively, structurally different. Sometimes there has appeared a tendency to disregard the word, or at least to minimize its peculiarity, but Edward Sapir,¹⁰ with his remarkable insight into problems of verbal structure, warningly insisted on the pivotal position of the word as “the actual formal unit of speech” among other linguistic entities, and the statistical data interpreted by

¹⁰ Sapir, E., *Language* (New York, 1921).

George Zipf¹¹ and Benoit Mandelbrot¹² have confirmed this view. Among the linguistic units compulsorily coded, the word is the highest. We are not supposed to coin new words in our discourse, unless they are made clear to the listener by either translation into conventional words or by an explicit context.

The rules governing the combination of words into sentences belong to the code. If "John loves Mary", it does not mean that "Mary loves John", and to find out whom the addresser presents as the lover and whom as the beloved, the listener must know the syntactical rules of English. The order "actor-action-acted upon" is prescribed by the code, but the speaker is free to choose the substantives designating the actor or the goal and the verb designating the action, so that instead of the more likely communication about John loving Mary, a rather unusual but perfectly clear and correct sentence, "chanterelles love sour cream", may be heard in a jocular formulation of a culinary recipe or in a fanciful fairy-tale.

While the combination of words into a sentence is still bound by syntactical rules, we are no longer restricted by compulsory rules when we combine sentences in an utterance, although there obviously exist not only stereotyped sentences but also entire ready-made utterances.

Thus every level of linguistic units presents a different relationship between code and context, and these differences are of great consequence for the various problems of linguistic structure and especially for the study of aphasia. Since aphasia is first and foremost an impairment of language, no exact diagnosis can be made without a competent linguistic examination of what in the patient's language is impaired. In particular, how does he operate with code and context? How does he treat linguistic units of different ranks? The linguistic classification of the various cases must be based on such verbal symptoms from which the whole syndrome can be most reliably inferred.

¹¹ Zipf, G. K., *Human Behavior and the Principle of Least Effort* (Cambridge, Mass., 1949).

¹² Mandelbrot, B., "Structure formelle des textes et communication", *Word*, 10, 1954.

First, it is important to ascertain which aspect of verbal behavior is the most affected. Is it encoding or decoding? This is the basis of the classical distinction between the so-called emissive (or expressive) aphasia on the one hand, and the receptive (or sensory) aphasia on the other.

Second, of the two modes of relation, similarity and contiguity, the aphasic suffers impairment or at least greatest deterioration of only one mode in his verbal behavior. Patients with impaired internal relations and intact external relations are able to follow, carry on and complete a context. They have a perfect sense of what in the theory of communication is called "transitional probabilities". Since such a patient's whole attention is concentrated on building a context, he often exhibits unusual skill in completing a fragmentary word or a partial sentence which is presented to him. The easier it is for such a patient to find words suggested by the context, the more difficulties he has with wordfinding in the proper sense of this neuropsychiatric term; that is, difficulties with spontaneous selection of words, for instance of words starting a sentence, and even more, a discourse, or words grammatically independent of the other constituents of the sentence, and especially words divorced from sentences. One must again and again insist with Goldstein on distinguishing between the "summoning up of words" in fluent speech, and autonomous "searching for words" which do not depend on context.

Aphasics with impaired internal relation (similarity disorder) have difficulty in arranging code units according to their similarity. They are able to combine two units with each other within a message, but not to substitute one unit for another on the basis of their mutual resemblance (or contrast). They have lost the power to make an equation between corresponding words of two different codes (heteronyms), or semantically similar words of the same code (synonyms), or between a word and a more explicit phrase (circumlocution).

From early childhood, any normal user of language is able to talk about language itself. For example, a speaker mentions *champagne*, but has some doubt whether the listeners really caught the

word. He may then return to the word: "I mean fizz" (colloquial synonym), or "You know, the sparkling white wine from France" (circumlocution), or simply, "I said champagne" (pleonasm). All these sentences refer to the verbal code. Actually they say: "*champagne* and *fizz* are substitutable for each other as they carry the same meaning in the code we use: in this code *champagne* is the name of a French sparkling white wine: the word I used is *champagne*". Here one verbal code acts at the same time both as topic of and as vehicle for the discourse. This use of language to discuss language, labeled "metalanguage" in logic, is deficient in aphasics with a similarity disorder. Despite any instructions, they cannot respond to the stimulus word of the examiner with an equivalent word or expression. Any gift for translation, either intralingual or interlingual, is lost by these patients, and if they had been bilingual their code switching becomes totally impaired. Also the capacity for intersemiotic translation, i.e., transposition from one sign system to another, is missing. Therefore the patient finds it hard to name an object shown to him in a picture or pointed to by the examiner.

Since the attention of such a patient is focused upon contiguity, and since he cannot perceive sameness or likeness, it is quite natural that the instruction to repeat the stimulus word is for him an impossible task. Of the two varieties of figural speech – metaphor, based on similarity, and metonymy, founded on contiguity – only the latter is used and grasped by him. He will not react to the stimulus word *champagne* with metaphors such as *ginger pop* or *geyser* or *mistress*, which suggest some analogy between two images, but he will readily resort to metonymical shifts from the cause to the immediate or further effect (*tipsiness* or *hangover*), from the thing contained to the container (*bottle*), from the goal to an auxiliary tool (*corkscrew*), and from the whole to a part (*foam*).

It is questionable whether this breaking down of similarity relations can be ascribed to the loss of an "abstract attitude", as Goldstein terms it. The metonymical and the metaphorical steps are but two different types of what he calls "abstract behavior". Perhaps this notion is too vague to be used in the analysis and clas-

sification of aphasia. In this connection it must be recalled that the most abstract words in our vocabulary, the purely analytical units such as conjunctions, prepositions, pronouns, and articles, are the best preserved and the most frequently used in the speech of aphasics focused upon context. If such indices of relations are retained in this type of aphasia (similarity disorder), it is because their primary function is to provide the connective tissue of the context.

The other cardinal type of aphasia is the reverse of the syndrome discussed. The patient cannot operate with contiguity, but operations based on similarity remain intact. Thus he loses the ability to propositionize. The context disintegrates. First the relational words are omitted, giving rise to the so-called "telegraphic style", whereas in the case of similarity disorder they are the last survivors. The more a word is syntactically independent, the stronger its tenacity in the speech of aphasics with a contiguity disorder, and the sooner it is dropped by patients with a similarity disorder. Thus the "kernel subject word" – in Bloomfield's terminology¹³ – is the first to fall out of the sentence in cases of similarity disorder and, conversely, is most tenacious in cases of contiguity disorder.

Of the two relative freedoms of the speaker – free selection of words and their free combination into larger contexts – the former is limited in cases of similarity disorder, and the latter in cases of contiguity disorder, in which the sentence and the entire utterance tend to be reduced to a one-word sentence and to a one-sentence utterance.

Since the hierarchy of linguistic units is a superposition of ever larger contexts, the contiguity disorder which affects the construction of contexts destroys this hierarchy. On the one hand, the word ceases to serve as a constituent of larger contexts, and on the other, it becomes indissoluble into its grammatical components. Thus a patient of this type may apprehend and employ the compound *staircase* without being capable of recognizing or repeating its components *stair* and *case* used alone. The same indissolubility of words promotes the decay of inflectional variation – conjugation

¹³ Bloomfield, L., *Language* (New York, 1933).

and declension. This deficit, along with the loss of relational words and syntactical pattern, is a typical symptom of the so-called "agrammatism".

As long as a patient with contiguity disorder is still capable of discerning the root and the suffix, the sameness of the suffix (homeoteleuton) is more palpable for him than the sameness of the root combined with different suffixes, derivational (paregmenon) or inflectional (polyptoton), because homeoteleuton associates words by similarity (e.g., *jeweler, hatter, tinner, worker*), while paregmenon (e.g., *jewel, jeweler, jewelry*) and polyptoton (*who, whose, whom*) associate them by contiguity. For the same reason aphasics of this type use metaphors or, properly, infantile quasi-metaphors based on an inexact identification, whereas patients with similarity disorder deal with metonymies.

At advanced stages of contiguity disorder, the word tends to be the maximum and at the same time the minimum denotative unit, and in certain cases even the minimum distinctive unit. In our *Preliminaries to Speech Analysis* we quoted three rare English words – *gip, gib* and *gid*. If a normal native speaker is presented with these unfamiliar vocables, the three examples convey the following information: none of the features and feature combinations contained in them contradict the English code; consequently these samples may be English words, and if they are words, then most probably each of them has a different meaning, as the phonemic distinctions between them indicate. But those aphasics for whom the word is the ultimate unit are unable to grasp, discern, or repeat the unfamiliar samples quoted, although they consist of the usual English phonemes and phonemic groups. Thus they can utter *big, give, dig*, etc., but cannot say *gib*. Most often, however, the conflict between the two ranks of the linguistic scale – the distinctive and the significative units – is settled by cutting down the inventory of phonemes and phonemic clusters. The last residues of such aphasic speech are one-phoneme, one-word, one-sentence utterances.

This type of aphasia, contiguity disorder, presents the most regular and consistent regression towards early infantile stages of

language and therefore, particularly, demands systematic comparison with children's linguistic development.

The opposition of the two types of verbal behavior – the metonymical, concerned with external relations and the metaphorical, involving internal relations – underlies the alternative syndromes of aphasic disturbances – similarity disorder and contiguity disorder. While each of these two types of aphasia tends toward unipolarity, normal verbal behavior is bipolar. But any individual use of language, any verbal style, any trend in verbal art displays a clear predilection either for the metonymical or for the metaphorical device.

Presented at the Clark University Conference on Expressive Language Behavior, 1953, and published in *Clark University Monographs on Psychology and Related Disciplines* (Worcester, 1955).

5. TWO ASPECTS OF LANGUAGE AND TWO TYPES OF APHASIC DISTURBANCES

5.1. THE LINGUISTIC PROBLEMS OF APHASIA

If aphasia is a language disturbance, as the term itself suggests, then any description and classification of aphasic syndromes must begin with the question of what aspects of language are impaired in the various species of such a disorder. This problem, which was approached long ago by Hughlings Jackson,¹ cannot be solved without the participation of professional linguists familiar with the patterning and functioning of language.

To study adequately any breakdown in communications we must first understand the nature and structure of the particular mode of communication that has ceased to function. Linguistics is concerned with language in all its aspects – language in operation, language in drift,² language in the nascent state, and language in dissolution.

At present there are psychopathologists who assign a high importance to the linguistic problems involved in the study of language disturbances;³ some of these questions have been touched

¹ Hughlings Jackson, *Papers on affections of speech* (reprinted and commented by H. Head), *Brain*, XXXVIII (1915).

² E. Sapir, *Language* (New York, 1921), Chapter VII: "Language as a historical product; drift."

³ See, for instance, the discussion on aphasia in the *Nederlandsche Vereeniging voor Phonetische Wetenschappen*, with papers by the linguist J. van Ginneken and by two psychiatrists, F. Grewel and V. W. D. Schenk, *Psychiatrische en Neurologische Bladen*, XLV (1941), p. 1035ff.; cf. furthermore, F. Grewel, "Aphasie en linguistiek", *Nederlandsch Tijdschrift voor Geneeskunde*, XCIII (1949), p. 726ff.

upon in the best recent treatises on aphasia.⁴ Yet, in most cases, this valid insistence on the linguist's contribution to the investigation of aphasia is still ignored. For instance, a new book, dealing to a great extent with the complex and intricate problems of infantile aphasia, calls for a coordination of various disciplines and appeals for cooperation to otolaryngologists, pediatricians, audiologists, psychiatrists, and educators; but the science of language is passed over in silence, as if disorders in speech perception had nothing whatever to do with language.⁵ This omission is the more deplorable since the author is Director of the Child Hearing and Aphasia Clinics at Northwestern University, which counts among its linguists Werner F. Leopold, by far the best American expert on child language.

Linguists are also responsible for the delay in undertaking a joint inquiry into aphasia. Nothing comparable to the minute linguistic observations of infants of various countries has been performed with respect to aphasics. Nor has there been any attempt to re-interpret and systematize from the point of view of linguistics the multifarious clinical data on diverse types of aphasia. That this should be true is all the more surprising in view of the fact that, on the one hand, the amazing progress of structural linguistics has endowed the investigator with efficient tools and methods for the study of verbal regression and, on the other, the aphasic disintegration of the verbal pattern may provide the linguist with new insights into the general laws of language.

The application of purely linguistic criteria to the interpretation and classification of aphasic facts can substantially contribute to the science of language and language disturbances, provided that linguists remain as careful and cautious when dealing with psychological and neurological data as they have been in their traditional field. First of all, they should be familiar with the technical terms and devices of the medical disciplines dealing with aphasia;

⁴ A. R. Luria, *Travmatičeskaja afazija* (Moscow, 1947); Kurt Goldstein, *Language and Language Disturbances* (New York, 1948); André Ombredane, *L'aphasie et l'élaboration de la pensée explicite* (Paris, 1951).

⁵ H. Myklebust, *Auditory Disorders in Children* (New York, 1954).

then, they must submit the clinical case reports to thorough linguistic analysis; and, further, they should themselves work with aphasic patients in order to approach the cases directly and not only through a reinterpretation of prepared records which have been quite differently conceived and elaborated.

There is one level of aphasic phenomena where amazing agreement has been achieved during the last twenty years between those psychiatrists and linguists who have tackled these problems, namely the disintegration of the sound pattern.⁶ This dissolution exhibits a time order of great regularity. Aphasic regression has proved to be a mirror of the child's acquisition of speech sounds: it shows the child's development in reverse. Furthermore, comparison of child language and aphasia enables us to establish several LAWS OF IMPLICATION. The search for this order of acquisitions and losses and for the general laws of implication cannot be confined to the phonemic pattern but must be extended also to the grammatical system. Only a few preliminary attempts have been made in this direction, and these efforts deserve to be continued.⁷

5.2. THE TWOFOLD CHARACTER OF LANGUAGE

Speech implies a SELECTION of certain linguistic entities and their COMBINATION into linguistic units of a higher degree of complexity. At the lexical level this is readily apparent: the speaker selects words and combines them into sentences according to the

⁶ The aphasic impoverishment of the sound pattern has been observed and discussed by the linguist Marguerite Durand together with the psychopathologists Th. Alajouanine and A. Ombredane (in their joint work *Le syndrome de désintégration phonétique dans l'aphasie*, Paris, 1939) and by R. Jakobson (the first draft, presented to the International Congress of Linguists at Brussels in 1939 – see N. Trubetzkoy, *Principes de phonologie*, Paris, 1949, pp. 317-79 – was later developed into an outline, "Kindersprache, Aphasie und allgemeine Lautgesetze", *Uppsala Universitets Årsskrift*, 1942:9; both papers are reprinted in *Selected Writings*, I, The Hague, 1962, 328-401).

⁷ A joint inquiry into certain grammatical disturbances was undertaken at the Bonn University Clinic by a linguist, G. Kandler, and two physicians, F. Panse and A. Leischner: see their report, *Klinische und sprachwissenschaftliche Untersuchungen zum Agrammatismus* (Stuttgart, 1952).

syntactic system of the language he is using; sentences in their turn are combined into utterances. But the speaker is by no means a completely free agent in his choice of words: his selection (except for the rare case of actual neology) must be made from the lexical storehouse which he and his addressee possess in common. The communication engineer most properly approaches the essence of the speech event when he assumes that in the optimal exchange of information the speaker and the listener have at their disposal more or less the same "filing cabinet of *prefabricated* representations": the addresser of a verbal message selects one of these "preconceived possibilities" and the addressee is supposed to make an identical choice from the same assembly of "possibilities already foreseen and provided for".⁸ Thus the efficiency of a speech event demands the use of a common code by its participants.

"'Did you say *pig* or *fig*?' said the Cat. 'I said *pig*,' replied Alice."⁹ In this peculiar utterance the feline addressee attempts to recapture a linguistic choice made by the addresser. In the common code of the Cat and Alice, i.e. in spoken English, the difference between a stop and a continuant, other things being equal, may change the meaning of the message. Alice had used the distinctive feature stop vs. continuant, rejecting the latter and choosing the former of the two opposites; and in the same act of speech she combined this solution with certain other simultaneous features, using the gravity and the tenseness of /p/ in contradistinction to the acuteness of /t/ and to the laxness of /b/. Thus all these attributes have been combined into a bundle of distinctive features, the so-called PHONEME. The phoneme /p/ was then FOLLOWED by the phonemes /i/ and /g/, themselves bundles of simultaneously produced distinctive features. Hence the CONCURRENCE of simultaneous entities and the CONCATENATION of successive entities are the two ways in which we speakers combine linguistic constituents.

Neither such bundles as /p/ or /f/ nor such sequences of bundles as /pig/ or /fig/ are invented by the speaker who uses them. Neither

⁸ D. M. MacKay, "In search of basic symbols", *Cybernetics, Transactions of the Eighth Conference* (New York, 1952), p. 183.

⁹ Lewis Carroll, *Alice's Adventures in Wonderland*, Chapter VI.

can the distinctive feature stop vs. continuant nor the phoneme /p/ occur out of context. The stop feature appears in combination with certain other concurrent features, and the repertory of combinations of these features into phonemes such as /p/, /b/, /t/, /d/, /k/, /g/, etc. is limited by the code of the given language. The code sets limitations on the possible combinations of the phoneme /p/ with other following and/or preceding phonemes; and only part of the permissible phoneme-sequences are actually utilized in the lexical stock of a given language. Even when other combinations of phonemes are theoretically possible, the speaker, as a rule, is only a word-user, not a word-coiner. When faced with individual words, we expect them to be coded units. In order to grasp the word *nylon* one must know the meaning assigned to this vocable in the lexical code of modern English.

In any language there exist also coded word-groups called PHRASE-WORDS. The meaning of the idiom *how do you do* cannot be derived by adding together the meanings of its lexical constituents; the whole is not equal to the sum of its parts. Word-groups which in this respect behave like single words are a common but nonetheless only marginal case. In order to comprehend the overwhelming majority of word-groups, we need be familiar only with the constituent words and with the syntactical rules of their combination. Within these limitations we are free to put words in new contexts. Of course, this freedom is relative, and the pressure of current clichés upon our choice of combinations is considerable. But the freedom to compose quite new contexts is undeniable, despite the relatively low statistical probability of their occurrence.

Thus, in the combination of linguistic units there is an ascending scale of freedom. In the combination of distinctive features into phonemes, the freedom of the individual speaker is zero: the code has already established all the possibilities which may be utilized in the given language. Freedom to combine phonemes into words is circumscribed; it is limited to the marginal situation of word coinage. In forming sentences with words the speaker is less constrained. And finally, in the combination of sentences into utterances, the action of compulsory syntactical rules ceases, and the

freedom of any individual speaker to create novel contexts increases substantially, although again the numerous stereotyped utterances are not to be overlooked.

Any linguistic sign involves two modes of arrangement.

1) COMBINATION. – Any sign is made up of constituent signs and/or occurs only in combination with other signs. This means that any linguistic unit at one and the same time serves as a context for simpler units and/or finds its own context in a more complex linguistic unit. Hence any actual grouping of linguistic units binds them into a superior unit: combination and contexture are two faces of the same operation.

2) SELECTION. – A selection between alternatives implies the possibility of substituting one for the other, equivalent to the former in one respect and different from it in another. Actually, selection and substitution are two faces of the same operation.

The fundamental role which these two operations play in language was clearly realized by Ferdinand de Saussure. Yet of the two varieties of combination – concurrence and concatenation – it was only the latter, the temporal sequence, which was recognized by the Geneva linguist. Despite his own insight into the phoneme as a set of concurrent distinctive features (*éléments différentiels des phonèmes*), the scholar succumbed to the traditional belief in the linear character of language “*qui exclut la possibilité de prononcer deux éléments à la fois*”.¹⁰

In order to delimit the two modes of arrangement which we have described as combination and selection, F. de Saussure states that the former “is *in presentia*: it is based on two or several terms jointly present in an actual series”, whereas the latter “connects terms *in absentia* as members of a virtual mnemonic series”. That is to say, selection (and, correspondingly, substitution) deals with entities conjoined in the code but not in the given message, whereas, in the case of combination, the entities are conjoined in both, or only in the actual message. The addressee perceives that the given utterance (message) is a COMBINATION of constituent parts (sen-

¹⁰ F. de Saussure, *Cours de linguistique générale*, 2nd ed. (Paris, 1922), pp. 68f. and 170f.

tences, words, phonemes, etc.) SELECTED from the repository of all possible constituent parts (the code). The constituents of a context are in a state of CONTIGUITY, while in a substitution set signs are linked by various degrees of SIMILARITY which fluctuate between the equivalence of synonyms and the common core of antonyms.

These two operations provide each linguistic sign with two sets of INTERPRETANTS, to utilize the effective concept introduced by Charles Sanders Peirce:¹¹ there are two references which serve to interpret the sign – one to the code, and the other to the context, whether coded or free, and in each of these ways the sign is related to another set of linguistic signs, through an ALTERNATION in the former case and through an ALIGNMENT in the latter. A given significative unit may be replaced by other, more explicit signs of the same code, whereby its general meaning is revealed, while its contextual meaning is determined by its connection with other signs within the same sequence.

The constituents of any message are necessarily linked with the code by an internal relation and with the message by an external relation. Language in its various aspects deals with both modes of relation. Whether messages are exchanged or communication proceeds unilaterally from the addresser to the addressee, there must be some kind of contiguity between the participants of any speech event to assure the transmission of the message. The separation in space, and often in time, between two individuals, the addresser and the addressee, is bridged by an internal relation: there must be a certain equivalence between the symbols used by the addresser and those known and interpreted by the addressee. Without such an equivalence the message is fruitless: even when it reaches the receiver it does not affect him.

¹¹ C. S. Peirce, *Collected Papers*, II and IV (Cambridge, Mass., 1932, 1934) – see Index of subjects.

5.3. SIMILARITY DISORDER

It is clear that speech disturbances may affect in varying degrees the individual's capacity for combination and selection of linguistic units, and indeed the question of which of these two operations is chiefly impaired proves to be of far-reaching significance in describing, analyzing, and classifying the diverse forms of aphasia. This dichotomy is perhaps even more suggestive than the classical distinction (not discussed in this paper) between EMISSIVE and RECEPTIVE aphasia, indicating which of the two functions in speech exchange, the encoding or the decoding of verbal messages, is particularly affected.

Head attempted to classify cases of aphasia into definite groups,¹² and to each of these varieties he assigned "a name chosen to signify the most salient defect in the management and comprehension of words and phrases" (p. 412). Following this device, we distinguish two basic types of aphasia – depending on whether the major deficiency lies in selection and substitution, with relative stability of combination and contexture; or conversely, in combination and contexture, with relative retention of normal selection and substitution. In outlining these two opposite patterns of aphasia, I shall utilize mainly Goldstein's data.

For aphasics of the first type (selection deficiency), the context is the indispensable and decisive factor. When presented with scraps of words or sentences, such a patient readily completes them. His speech is merely reactive: he easily carries on conversation, but has difficulties in starting a dialogue; he is able to reply to a real or imaginary addresser when he is, or imagines himself to be, the addressee of the message. It is particularly hard for him to perform, or even to understand, such a closed discourse as the monologue. The more his utterances are dependent on the context, the better he copes with his verbal task. He feels unable to utter a sentence which responds neither to the cue of his interlocutor nor to the actual situation. The sentence "it rains" cannot be produced unless the utterer sees that it is actually raining. The deeper the

¹² H. Head, *Aphasia and Kindred Disorders of Speech*, I (New York, 1926).

utterance is embedded in the verbal or non-verbalized context, the higher are the chances of its successful performance by this class of patients.

Likewise, the more a word is dependent on the other words of the same sentence and the more it refers to the syntactical context, the less it is affected by the speech disturbance. Therefore words syntactically subordinated by grammatical agreement or government are more tenacious, whereas the main subordinating agent of the sentence, namely the subject, tends to be omitted. As long as beginning is the patient's main difficulty, it is obvious that he will fail precisely at the starting point, the cornerstone of the sentence-pattern. In this type of language disturbance, sentences are conceived as elliptical sequels to be supplied from antecedent sentences uttered, if not imagined, by the aphasic himself, or received by him from the other partner in the colloquy, actual if not imaginary. Key words may be dropped or superseded by abstract anaphoric substitutes.¹³ A specific noun, as Freud noticed, is replaced by a very general one, for instance *machin*, *chose* in the speech of French aphasics.¹⁴ In a dialectal German sample of "amnesic aphasia" observed by Golstein (p. 246ff.), *Ding* 'thing' or *Stückel* 'piece' were substituted for all inanimate nouns, and *überfahren* 'perform' for verbs which were identifiable from the context or situation and therefore appeared superfluous to the patient.

Words with an inherent reference to the context, like pronouns and pronominal adverbs, and words serving merely to construct the context, such as connectives and auxiliaries, are particularly prone to survive. A typical utterance of a German patient, recorded by Quensel and quoted by Goldstein (p. 302), will serve as illustration:

"Ich bin doch hier unten, na wenn ich gewesen bin ich wees nicht, we das, nu wenn ich, ob das nun doch, noch, ja. Was Sie her, wenn ich, och ich weess nicht, we das hier war ja..."

¹³ Cf. L. Bloomfield, *Language* (New York, 1933), Chapter XV: Substitution.

¹⁴ S. Freud, *On Aphasia* (London, 1953), p. 22.

Thus only the framework, the connecting links of communication, is spared by this type of aphasia at its critical stage.

In the theory of language, since the early Middle Ages, it has repeatedly been asserted that the word out of context has no meaning. The validity of this statement is, however, confined to aphasia, or, more exactly, to one type of aphasia. In the pathological cases under discussion an isolated word means actually nothing but 'blab'. As numerous tests have disclosed, for such patients two occurrences of the same word in two different contexts are mere homonyms. Since distinctive vocables carry a higher amount of information than homonyms, some aphasics of this type tend to supplant the contextual variants of one word by different terms, each of them specific for the given environment. Thus Goldstein's patient never uttered the word *knife* alone, but, according to its use and surroundings, alternately called the knife *pencil-sharpener*, *apple-parer*, *bread-knife*, *knife-and-fork* (p. 62); so that the word *knife* was changed from a FREE FORM, capable of occurring alone, into a BOUND form.

"I have a good apartment, entrance hall, bedroom, kitchen," Goldstein's patient says. "There are also big apartments, only in the rear live bachelors." A more explicit form, the word-group *unmarried people*, could have been substituted for *bachelors*, but this univerbal term was selected by the speaker. When repeatedly asked what a bachelor was, the patient did not answer and was "apparently in distress" (p. 270). A reply like "a bachelor is an unmarried man" or "an unmarried man is a bachelor" would present an equational predication and thus a projection of a substitution set from the lexical code of the English language into the context of the given message. The equivalent terms become two correlated parts of the sentence and consequently are tied by contiguity. The patient was able to select the appropriate term *bachelor* when it was supported by the context of a customary conversation about "bachelor apartments", but was incapable of utilizing the substitution set *bachelor = unmarried man* as the topic of a sentence, because the ability for autonomous selection and substitution had been affected. The equational sentence vainly

demanded from the patient carries as its sole information: “‘bachelor’ means an unmarried man” or “an unmarried man is called ‘a bachelor’”.

The same difficulty arises when the patient is asked to name an object pointed to or handled by the examiner. The aphasic with a defect in substitution will not supplement the pointing or handling gesture of the examiner with the name of the object pointed to. Instead of saying “this is [called] a pencil”, he will merely add an elliptical note about its use: “To write”. If one of the synonymic signs is present (as for instance the word *bachelor* or the pointing to the pencil) then the other sign (such as the phrase *unmarried man* or the word *pencil*) becomes redundant and consequently superfluous. For the aphasic, both signs are in complementary distribution: if one is performed by the examiner, the patient will avoid its synonym: “I understand everything” or “Ich weiss es schon” will be his typical reaction. Likewise, the picture of an object will cause suppression of its name: a verbal sign is supplanted by a pictorial sign. When the picture of a compass was presented to a patient of Lotmar’s, he responded: “Yes, it’s a ... I know what it belongs to, but I cannot recall the technical expression ... Yes ... direction ... to show direction ... a magnet points to the north.”¹⁵ Such patients fail to shift, as Peirce would say, from an INDEX or ICON to a corresponding verbal SYMBOL.¹⁶

Even simple repetition of a word uttered by the examiner seems to the patient unnecessarily redundant, and despite instructions received he is unable to repeat it. Told to repeat the word “no”, Head’s patient replied “No, I don’t know how to do it.” While spontaneously using the word in the context of his answer (“No, I don’t ...”), he could not produce the purest form of equational predication, the tautology $a = a$: “no” is “no”.

One of the important contributions of symbolic logic to the science of language is its emphasis on the distinction between OB-

¹⁵ F. Lotmar, “Zur Pathophysiologie der erschwerten Wortfindung bei Aphasischen”, *Schweiz. Archiv für Neurologie und Psychiatrie*, XXXV (1933), p. 104.

¹⁶ C. S. Peirce, “The icon, index and symbol”, *Collected papers*, II (Cambridge, Mass., 1932).

JECT LANGUAGE and METALANGUAGE. As Carnap states, "in order to speak *about* any *object language*, we need a *metalanguage*."¹⁷ On these two different levels of language the same linguistic stock may be used; thus we may speak in English (as metalanguage) about English (as object language) and interpret English words and sentences by means of English synonyms, circumlocutions and paraphrases. Obviously such operations, labeled METALINGUISTIC by the logicians, are not their invention: far from being confined to the sphere of science, they prove to be an integral part of our customary linguistic activities. The participants in a dialogue often check whether they are using the same code. "Do you follow me? Do you see what I mean?" the speaker asks, or the listener himself breaks in with "What do you mean?" Then, by replacing the questionable sign with another sign from the same linguistic code, or with a whole group of code signs, the sender of the message seeks to make it more accessible to the decoder.

The interpretation of one linguistic sign through other, in some respect homogeneous, signs of the same language, is a metalinguistic operation which also plays an essential role in children's language learning. Recent observations have disclosed what a considerable place talk about language occupies in the verbal behavior of pre-school children.¹⁸ Recourse to metalanguage is necessary both for the acquisition of language and for its normal functioning. The aphasic defect in the "capacity of naming" is properly a loss of metalanguage. As a matter of fact, the examples of equational predication sought in vain from the patients cited above, are metalinguistic propositions referring to the English language. Their explicit wording would be: "In the code that we use, the name of the indicated object is 'pencil'"; or "In the code we use, the word 'bachelor' and the circumlocution 'unmarried man' are equivalent."

Such an aphasic can neither switch from a word to its synonyms

¹⁷ R. Carnap, *Meaning and Necessity* (Chicago, 1947), p. 4.

¹⁸ See the remarkable studies of A. Gvozdev: "Nabljudenija nad jazykom malen'kix detej", *Russkij jazyk v sovetskoj škole* (1929); *Usvoenie rebenkom zvukovoj storony russkogo jazyka* (Moscow, 1948); and *Formirovanie u rebenka grammatičeskogo stroja russkogo jazyka* (Moscow, 1949).

or circumlocutions, nor to its HETERONYMS, i.e. equivalent expressions in other languages. Loss of bilingualism and confinement to a single dialectal variety of a single language is a symptomatic manifestation of this disorder.

According to an old but recurrent bias, a single individual's way of speaking at a given time, labeled IDIOLECT, has been viewed as the only concrete linguistic reality. In the discussion of this concept the following objections were raised:

Everyone, when speaking to another person, tries, deliberately or involuntarily, to hit upon a common vocabulary: either to please or simply to be understood or, finally, to bring him out, he uses the terms of his addressee. There is no such thing as private property in language: everything is socialized. Verbal exchange, like any form of intercourse, requires at least two communicators, and idiolect proves to be a somewhat perverse fiction.¹⁹

This statement needs, however, one reservation: for an aphasic who has lost the capacity for code switching, the "idiolect" indeed becomes the sole linguistic reality. As long as he does not regard another's speech as a message addressed to him in his own verbal pattern, he feels, as a patient of Hemphil and Stengel expressed it: "I can hear you dead plain but I cannot get what you say ... I hear your voice but not the words ... It does not pronounce itself."²⁰ He considers the other's utterance to be either gibberish or at least in an unknown language.

As noted above, it is the external relation of contiguity which unites the constituents of a context, and the internal relation of similarity which underlies the substitution set. Hence, for an aphasic with impaired substitution and intact contexture, operations involving similarity yield to those based on contiguity. It could be predicted that under these conditions any semantic grouping would be guided by spatial or temporal contiguity rather than by similarity. Actually Goldstein's tests justify such an ex-

¹⁹ "Results of the Conference of Anthropologists and Linguists", *Indiana University Publications in Anthropology and Linguistics*, VIII (1953), p. 15 [this paper is reproduced below, pp. 554-567].

²⁰ R. E. Hemphil and E. Stengel, "Pure word deafness", *Journal of Neurology and Psychiatry*, III (1940), pp. 251-62.

pectation: a female patient of this type, when asked to list a few names of animals, disposed them in the same order in which she had seen them in the zoo; similarly, despite instructions to arrange certain objects according to color, size, and shape, she classified them on the basis of their spatial contiguity as home things, office materials, etc. and justified this grouping by a reference to a display window where "it does not matter what the things are", i.e. they do not have to be similar (pp. 61 f., 263 ff.). The same patient was willing to name the primary hues – red, yellow, green, and blue – but declined to extend these names to the transitional varieties (p. 268 f.), since, for her, words had no capacity to assume additional, shifted meanings associated by similarity with their primary meaning.

One must agree with Goldstein's observation that patients of this type "grasped the words in their literal meaning but could not be brought to understand the metaphoric character of the same words" (p. 270). It would, however, be an unwarranted generalization to assume that figurative speech is altogether incomprehensible to them. Of the two polar figures of speech, metaphor and metonymy, the latter, based on contiguity, is widely employed by aphasics whose selective capacities have been affected. *Fork* is substituted for *knife*, *table* for *lamp*, *smoke* for *pipe*, *eat* for *toaster*. A typical case is reported by Head:

When he failed to recall the name for "black", he described it as "What you do for the dead"; this he shortened to "dead" (I, p. 198).

Such metonymies may be characterized as projections from the line of a habitual context into the line of substitution and selection: a sign (e.g. *fork*) which usually occurs together with another sign (e.g. *knife*) may be used instead of this sign. Phrases like "knife and fork", "table lamp", "to smoke a pipe", induced the metonymies *fork*, *table*, *smoke*; the relation between the use of an object (toast) and the means of its production underlies the metonymy *eat* for *toaster*. "When does one wear black?" – "When mourning the dead": in place of naming the color, the cause of its traditional use is designated. The escape from sameness to contiguity is par-

ticularly striking in such cases as Goldstein's patient who would answer with a metonymy when asked to repeat a given word and, for instance, would say *glass* for *window* and *heaven* for *God* (p. 280).

When the selective capacity is strongly impaired and the gift for combination at least partly preserved, then CONTIGUITY determines the patient's whole verbal behavior, and we may designate this type of aphasia SIMILARITY DISORDER.

5.4. CONTIGUITY DISORDER

From 1864 on it was repeatedly pointed out in Hughlings Jackson's pioneer contributions to the modern study of language and language disturbances:

It is not enough to say that speech consists of words. It consists of words referring to one another in a particular manner; and, without a proper interrelation of its parts, a verbal utterance would be a mere succession of names embodying no proposition (p. 66).²¹

Loss of speech is the loss of power to propositionize... Speechlessness does not mean entire wordlessness (p. 114).²²

Impairment of the ability to PROPOSITIONIZE, or, generally speaking, to combine simpler linguistic entities into more complex units, is actually confined to one type of aphasia, the opposite of the type discussed in the preceding chapter. There is no WORDLESSNESS, since the entity preserved in most of such cases is the WORD, which can be defined as the highest among the linguistic units compulsorily coded, i.e., we compose our own sentences and utterances out of the word stock supplied by the code.

This contexture-deficient aphasia, which could be termed CONTIGUITY DISORDER, diminishes the extent and variety of sentences. The syntactical rules organizing words into higher units are lost;

²¹ H. Jackson, "Notes on the physiology and pathology of the nervous system" (1868), *Brain*, XXXVIII (1915), pp. 65-71.

²² H. Jackson, "On affections of speech from disease of the brain" (1879), *Brain*, XXXVIII (1915), pp. 107-29.

this loss, called AGRAMMATISM, causes the degeneration of the sentence into a mere "word heap", to use Jackson's image.²³ Word order becomes chaotic; the ties of grammatical coordination and subordination, whether concord or government, are dissolved. As might be expected, words endowed with purely grammatical functions, like conjunctions, prepositions, pronouns, and articles, disappear first, giving rise to the so-called "telegraphic style", whereas in the case of similarity disorder they are the most resistant. The less a word depends grammatically on the context, the stronger is its tenacity in the speech of aphasics with a contiguity disorder and the earlier it is dropped by patients with a similarity disorder. Thus the "kernel subject word" is the first to fall out of the sentence in cases of similarity disorder and, conversely, it is the least destructible in the opposite type of aphasia.

The type of aphasia affecting contexture tends to give rise to infantile one-sentence utterances and one-word sentences. Only a few longer, stereotyped, "ready made" sentences manage to survive. In advanced cases of this disease, each utterance is reduced to a single one-word sentence. While contexture disintegrates, the selective operation goes on. "To say what a thing is, is to say what it is like," Jackson notes (p. 125). The patient confined to the substitution set (once contexture is deficient) deals with similarities, and his approximate identifications are of a metaphoric nature, contrary to the metonymic ones familiar to the opposite type of aphasics. *Spyglass for microscope, or fire for gaslight* are typical examples of such QUASI-METAPHORIC EXPRESSIONS, as Jackson termed them, since, in contradistinction to rhetoric or poetic metaphors, they present no deliberate transfer of meaning.

In a normal language pattern, the word is at the same time both a constituent part of a superimposed context, the SENTENCE, and itself a context superimposed on ever smaller constituents, MORPHEMES (minimum units endowed with meaning) and PHONEMES. We have discussed the effect of contiguity disorder on the combination of words into higher units. The relationship be-

²³ H. Jackson, "Notes on the physiology and pathology of language" (1866), *Brain*, XXXVIII (1915), pp. 48-58.

tween the word and its constituents reflects the same impairment, yet in a somewhat different way. A typical feature of agrammatism is the abolition of inflection: there appear such UNMARKED categories as the infinitive in the place of diverse finite verbal forms, and in languages with declension, the nominative instead of all the oblique cases. These defects are due partly to the elimination of government and concord, partly to the loss of ability to dissolve words into stem and desinence. Finally, a paradigm (in particular a set of grammatical cases such as *he – his – him*, or of tenses such as *he votes – he voted*) present the same semantic content from different points of view associated with each other by contiguity; so there is one more impetus for aphasics with a contiguity disorder to dismiss such sets.

Also, as a rule, words derived from the same root, such as *grant – grantor – grantee* are semantically related by contiguity. The patients under discussion are either inclined to drop the derivative words, or the combination of a root with a derivational suffix and even a compound of two words become irresolvable for them. Patients who understood and uttered such compounds as *Thanks-giving* or *Battersea*, but were unable to grasp or to say *thanks* and *giving* or *batter* and *sea*, have often been cited. As long as the sense of derivation is still alive, so that this process is still used for creating innovations in the code, one can observe a tendency toward oversimplification and automatism: if the derivative word constitutes a semantic unit which cannot be entirely inferred from the meaning of its components, the GESTALT is misunderstood. Thus the Russian word *mokr-ica* signifies 'wood-louse', but a Russian aphasic interpreted it as 'something humid', especially 'humid weather', since the root *mokr-* means 'humid' and the suffix *-ica* designates a carrier of the given property, as in *nelépica* 'something absurd', *svetlīca* 'light room', *temnica* 'dungeon' (literally 'dark room').

When, before World War II, phonemics was the most controversial area in the science of language, doubts were expressed by some linguists as to whether phonemes really play an autonomous part in our verbal behavior. It was even suggested that the mean-

ingful (SIGNIFICATIVE) units of the linguistic code, such as morphemes or rather words, are the minimal entities with which we actually deal in a speech event, whereas the merely DISTINCTIVE units, such as phonemes, are an artificial construct to facilitate the scientific description and analysis of a language. This view, which was stigmatized by Sapir as “the reverse of realistic”,²⁴ remains, however, perfectly valid with respect to a certain pathological type: in one variety of aphasia, which sometimes has been labeled “atactic”, the word is the sole linguistic unity preserved. The patient has only an integral, indissolvable image of any familiar word, and all other sound-sequences are either alien and inscrutable to him, or he merges them into familiar words by disregarding their phonetic deviations. One of Goldstein’s patients “perceived some words, but ***the vowels and consonants of which they consisted were not perceived” (p. 218). A French aphasic recognized, understood, repeated, and spontaneously produced the word *café* ‘coffee’ or *pavé* ‘roadway’, but was unable to grasp, discern, or repeat such nonsensical sequences as *féca*, *faké*, *kéfa*, *pafé*. None of these difficulties exists for a normal French-speaking listener as long as the sound-sequences and their components fit the French phonemic pattern. Such a listener may even apprehend these sequences as words unknown to him but plausibly belonging to the French vocabulary and presumably different in meaning, since they differ from each other either in the order of their phonemes or in the phonemes themselves.

If an aphasic becomes unable to resolve the word into its phonemic constituents, his control over its construction weakens, and perceptible damage to phonemes and their combinations easily follows. The gradual regression of the sound pattern in aphasics regularly reverses the order of children’s phonemic acquisitions. This regression involves an inflation of homonyms and a decrease of vocabulary. If this twofold – phonemic and lexical – disablement progresses further, the last residues of speech are one-phoneme, one-word, one-sentence utterances: the patient relapses into the

²⁴ E. Sapir, “The psychological reality of phonemes”, *Selected Writings* (Berkeley and Los Angeles, 1949), p. 46ff.

initial phases of infant's linguistic development or even to the pre-lingual stage: he faces *aphasia universalis*, the total loss of the power to use or apprehend speech.

The separateness of the two functions – one distinctive and the other significative – is a peculiar feature of language as compared to other semiotic systems. There arises a conflict between these two levels of language when the aphasic deficient in contexture exhibits a tendency to abolish the hierarchy of linguistic units and to reduce their scale to a single level. The last level to remain is either a class of significative values, the WORD, as in the cases touched upon, or a class of distinctive values, the PHONEME. In the latter case the patient is still able to identify, distinguish, and reproduce phonemes, but loses the capacity to do the same with words. In an intermediate case, words are identified, distinguished, and reproduced; according to Goldstein's acute formulation, they "may be grasped as known but not understood" (p. 90). Here the word loses its normal significative function and assumes the purely distinctive function which normally pertains to the phoneme.

5.5. THE METAPHORIC AND METONYMIC POLES

The varieties of aphasia are numerous and diverse, but all of them lie between the two polar types just described. Every form of aphasic disturbance consists in some impairment, more or less severe, either of the faculty for selection and substitution or for combination and contexture. The former affliction involves a deterioration of metalinguistic operations, while the latter damages the capacity for maintaining the hierarchy of linguistic units. The relation of similarity is suppressed in the former, the relation of contiguity in the latter type of aphasia. Metaphor is alien to the similarity disorder, and metonymy to the contiguity disorder.

The development of a discourse may take place along two different semantic lines: one topic may lead to another either through their similarity or through their contiguity. The METAPHORIC WAY would be the most appropriate term for the first case and the

METONYMIC WAY for the second, since they find their most condensed expression in metaphor and metonymy respectively. In aphasia one or the other of these two processes is restricted or totally blocked – an effect which makes the study of aphasia particularly illuminating for the linguist. In normal verbal behavior both processes are continually operative, but careful observation will reveal that under the influence of a cultural pattern, personality, and verbal style, preference is given to one of the two processes over the other.

In a well-known psychological test, children are confronted with some noun and told to utter the first verbal response that comes into their heads. In this experiment two opposite linguistic predilections are invariably exhibited: the response is intended either as a substitute for, or as a complement to the stimulus. In the latter case the stimulus and the response together form a proper syntactic construction, most usually a sentence. These two types of reaction have been labeled SUBSTITUTIVE and PREDICATIVE.

To the stimulus *hut* one response was *burnt out*; another, *is a poor little house*. Both reactions are predicative; but the first creates a purely narrative context, while in the second there is a double connection with the subject *hut*: on the one hand, a positional (namely, syntactic) contiguity, and on the other a semantic similarity.

The same stimulus produced the following substitutive reactions: the tautology *hut*; the synonyms *cabin* and *hovel*; the antonym *palace*, and the metaphors *den* and *burrow*. The capacity of two words to replace one another is an instance of positional similarity, and, in addition, all these responses are linked to the stimulus by semantic similarity (or contrast). Metonymical responses to the same stimulus, such as *thatch*, *litter*, or *poverty*, combine and contrast the positional similarity with semantic contiguity.

In manipulating these two kinds of connection (similarity and contiguity) in both their aspects (positional and semantic) – selecting, combining, and ranking them – an individual exhibits his personal style, his verbal predilections and preferences.

In verbal art the interaction of these two elements is especially

pronounced. Rich material for the study of this relationship is to be found in verse patterns which require a compulsory PARALLELISM between adjacent lines, for example in Biblical poetry or in the Finnic and, to some extent, the Russian oral traditions. This provides an objective criterion of what in the given speech community acts as a correspondence. Since on any verbal level – morphemic, lexical, syntactic, and phraseological – either of these two relations (similarity and contiguity) can appear – and each in either of two aspects, an impressive range of possible configurations is created. Either of the two gravitational poles may prevail. In Russian lyrical songs, for example, metaphoric constructions predominate, while in the heroic epics the metonymic way is preponderant.

In poetry there are various motives which determine the choice between these alternants. The primacy of the metaphoric process in the literary schools of romanticism and symbolism has been repeatedly acknowledged, but it is still insufficiently realized that it is the predominance of metonymy which underlies and actually predetermines the so-called “realistic” trend, which belongs to an intermediary stage between the decline of romanticism and the rise of symbolism and is opposed to both. Following the path of contiguous relationships, the realist author metonymically digresses from the plot to the atmosphere and from the characters to the setting in space and time. He is fond of synecdochic details. In the scene of Anna Karenina’s suicide Tolstoj’s artistic attention is focused on the heroine’s handbag; and in *War and Peace* the synecdoches “hair on the upper lip” and “bare shoulders” are used by the same writer to stand for the female characters to whom these features belong.

The alternative predominance of one or the other of these two processes is by no means confined to verbal art. The same oscillation occurs in sign systems other than language.²⁵ A salient ex-

²⁵ I ventured a few sketchy remarks on the metonymical turn in verbal art (“Pro realizm u mystectvi”, *Vaplite*, Kharkov, 1927, No. 2; “Randbemerkungen zur Prosa des Dichters Pasternak”, *Slavische Rundschau*, VII, 1935), in painting (“Futurizm,” *Iskusstvo*, Moscow, Aug. 2, 1919), and in motion pictures (“Úpa-

ample from the history of painting is the manifestly metonymical orientation of cubism, where the object is transformed into a set of synecdoches; the surrealist painters responded with a patently metaphorical attitude. Ever since the productions of D. W. Griffith, the art of the cinema, with its highly developed capacity for changing the angle, perspective, and focus of "shots", has broken with the tradition of the theater and ranged an unprecedented variety of synecdochic "close-ups" and metonymic "set-ups" in general. In such motion pictures as those of Charlie Chaplin and Eisenstein,²⁶ these devices in turn were overlaid by a novel, metaphorical "montage" with its "lap dissolves" – the filmic similes.²⁷

The bipolar structure of language (or other semiotic systems) and, in aphasia, the fixation on one of these poles to the exclusion of the other require systematic comparative study. The retention of either of these alternatives in the two types of aphasia must be confronted with the predominance of the same pole in certain styles, personal habits, current fashions, etc. A careful analysis and comparison of these phenomena with the whole syndrome of the corresponding type of aphasia is an imperative task for joint research by experts in psychopathology, psychology, linguistics, poetics, and SEMIOTIC, the general science of signs. The dichotomy discussed here appears to be of primal significance and consequence for all verbal behavior and for human behavior in general.²⁸

To indicate the possibilities of the projected comparative research, we choose an example from a Russian folktale which employs parallelism as a comic device: "Thomas is a bachelor; Jeremiah is unmarried" (*Fomá xólost; Erjóma neženát*). Here the

dek filmu", *Listy pro umění a kritiku*, I, Prague, 1933), but the crucial problem of the two polar processes awaits a detailed investigation.

²⁶ Cf. his striking essay "Dickens, Griffith, and We": S. Eisenstein, *Izbrannye stat'i* (Moscow, 1950), p. 153 ff.

²⁷ Cf. B. Balazs, *Theory of the Film* (London, 1952).

²⁸ For the psychological and sociological aspects of this dichotomy, see Bateson's views on "progressional" and "selective integration" and Parson's on the "conjunction-disjunction dichotomy" in child development: J. Ruesch and G. Bateson, *Communication, the Social Matrix of Psychiatry* (New York, 1951), pp. 183 ff.; T. Parsons and R. F. Bales, *Family, Socialization and Interaction Process* (Glencoe, 1955), pp. 119f.

predicates in the two parallel clauses are associated by similarity: they are in fact synonymous. The subjects of both clauses are masculine proper names and hence morphologically similar, while on the other hand they denote two contiguous heroes of the same tale, created to perform identical actions and thus to justify the use of synonymous pairs of predicates. A somewhat modified version of the same construction occurs in a familiar wedding song in which each of the wedding guests is addressed in turn by his first name and patronymic: "Gleb is a bachelor; Ivanovič is unmarried." While both predicates here are again synonyms, the relationship between the two subjects is changed: both are proper names denoting the same man and are normally used contiguously as a mode of polite address.

In the quotation from the folktale, the two parallel clauses refer to two separate facts, the marital status of Thomas and the similar status of Jeremiah. In the verse from the wedding song, however, the two clauses are synonymous: they redundantly reiterate the celibacy of the same hero, splitting him into two verbal hypotheses.

The Russian novelist Gleb Ivanovič Uspenskij (1840-1902) in the last years of his life suffered from a mental illness involving a speech disorder. His first name and patronymic, *Gleb Ivanovič*, traditionally combined in polite intercourse, for him split into two distinct names designating two separate beings: Gleb was endowed with all his virtues, while Ivanovič, the name relating a son to his father, became the incarnation of all Uspenskij's vices. The linguistic aspect of this split personality is the patient's inability to use two symbols for the same thing, and it is thus a similarity disorder. Since the similarity disorder is bound up with the metonymical bent, an examination of the literary manner Uspenskij had employed as a young writer takes on particular interest. And the study of Anatolij Kamegulov, who analyzed Uspenskij's style, bears out our theoretical expectations. He shows that Uspenskij had a particular penchant for metonymy, and especially for synecdoche, and that he carried it so far that "the reader is crushed by the multiplicity of detail unloaded on him in a limited verbal space,

and is physically unable to grasp the whole, so that the portrait is often lost."²⁹

To be sure, the metonymical style in *Uspenskij* is obviously prompted by the prevailing literary canon of his time, late nineteenth-century "realism"; but the personal stamp of Gleb Ivanovič made his pen particularly suitable for this artistic trend in its extreme manifestations and finally left its mark upon the verbal aspect of his mental illness.

A competition between both devices, metonymic and metaphoric, is manifest in any symbolic process, be it intrapersonal or social. Thus in an inquiry into the structure of dreams, the decisive question is whether the symbols and the temporal sequences used are based on contiguity (Freud's metonymic "displacement" and synecdochic "condensation") or on similarity (Freud's "identification and symbolism").³⁰ The principles underlying magic rites have been resolved by Frazer into two types: charms based on the law of similarity and those founded on association by contiguity. The first of these two great branches of sympathetic magic has been called "homoeopathic" or "imitative", and the second, "contagious magic".³¹ This bipartition is indeed illuminating. Nonetheless, for the most part, the question of the two poles is still neglected, despite its wide scope and importance for the study of any symbolic behavior, especially verbal, and of its impairments. What is the main reason for this neglect?

Similarity in meaning connects the symbols of a metalanguage with the symbols of the language referred to. Similarity connects

²⁹ A. Kamegulov, *Stil' Gleba Uspenskogo* (Leningrad, 1930), pp. 65, 145. One of such disintegrated portraits cited in the monograph: "From underneath an ancient straw cap, with a black spot on its visor, peeked two braids resembling the tusks of a wild boar; a chin, grown fat and pendulous, had spread definitively over the greasy collar of the calico dicky and lay in a thick layer on the coarse collar of the canvas coat, firmly buttoned at the neck. From underneath this coat to the eyes of the observer protruded massive hands with a ring which had eaten into the fat finger, a cane with a copper top, a significant bulge of the stomach, and the presence of very broad pants, almost of muslin quality, in the wide bottoms of which hid the toes of the boots."

³⁰ S. Freud, *Die Traumdeutung*, 9th ed. (Vienna, 1950).

³¹ J. G. Frazer, *The Golden Bough: A Study in Magic and Religion*, Part I, 3rd ed. (Vienna, 1950), chapter III.

a metaphorical term with the term for which it is substituted. Consequently, when constructing a metalanguage to interpret tropes, the researcher possesses more homogeneous means to handle metaphor, whereas metonymy, based on a different principle, easily defies interpretation. Therefore nothing comparable to the rich literature on metaphor³² can be cited for the theory of metonymy. For the same reason, it is generally realized that romanticism is closely linked with metaphor, whereas the equally intimate ties of realism with metonymy usually remain unnoticed. Not only the tool of the observer but also the object of observation is responsible for the preponderance of metaphor over metonymy in scholarship. Since poetry is focused upon the sign, and pragmatical prose primarily upon the referent, tropes and figures were studied mainly as poetic devices. The principle of similarity underlies poetry; the metrical parallelism of lines, or the phonic equivalence of rhyming words prompts the question of semantic similarity and contrast; there exist, for instance, grammatical and anti-grammatical but never agrammatical rhymes. Prose, on the contrary, is forwarded essentially by contiguity. Thus, for poetry, metaphor, and for prose, metonymy is the line of least resistance and, consequently, the study of poetical tropes is directed chiefly toward metaphor. The actual bipolarity has been artificially replaced in these studies by an amputated, unipolar scheme which, strikingly enough, coincides with one of the two aphasic patterns, namely with the contiguity disorder.

³² C. F. P. Stutterheim, *Het begrip metafoor* (Amsterdam, 1941).

Written in Eastham, Cape Cod, 1954, and published as Part II of the *Fundamentals of Language* (The Hague, 1956), and, in a somewhat different version, with a dedication to Raymond de Saussure, in the volume *Language: an Enquiry into its Meaning and Function* (New York, 1957).

6. TOWARD A LINGUISTIC TYPOLOGY OF APHASIC IMPAIRMENTS

6.1. INTRODUCTION

In 1907 Pierre Marie opened a discussion on aphasia with the modest statement: “N’étant malheureusement pas du tout psychologue, je me contenterai de parler ici en médecin qui a médicalement observé de faits médicaux” (Marie, 1926). Here *mutatis mutandis* I should like to use the same formula: as a mere linguist versed neither in psychology nor in medicine, I shall confine myself strictly to linguistic observations of linguistic facts only. The first, fundamental paper on aphasia, “Notes on the Physiology and Pathology of Language”, written nearly a century ago by Hughlings Jackson, carries the significant subtitle “Remarks on those Cases of Disease of the Nervous System, in which Defect of Expression is the most Striking Symptom” (see Jackson, 1958, p. 121). Since defects of verbal expression as well as verbal expression itself obviously belong to the domain of linguistics, the key to “the most striking symptoms” of aphasia cannot be found without the guiding and vigilant assistance of linguistics.

We are faced with the crucial question: what categories of verbal signs, and of signs in general, are affected in any given case? This is a linguistic question or, on a larger scale, a semiotic problem, if along with Charles Peirce (see 1932, p. 134) we mean by semiotic the general science of signs which has as its basic discipline linguistics, the science of verbal signs. Jackson (see 1958, p. 159) had also envisaged this widened scope of aphasic impairments and, consequently, favored the term *asemasia*, coined by Hamilton.

Since the semiotic traits of aphasia, in Peirce's sense of this adjective, constitute "the most striking symptom" of the disease, they are semiotic also in the medical usage of this word.

Linguists can only agree with Jackson that the pathology of language, far from being a random disturbance, obeys a set of rules; and that no rules underlying the regression of language can be elicited without the consistent use of linguistic techniques and methodology. The disorders of language display their own peculiar order and require a systematic linguistic comparison with our normal verbal code.

If, as stated by Brain (1961, p. 51), linguistics actually is "the most recent field of work in aphasia", this tardiness, harmful both for the science of language and for the science of language disorders, easily finds a historical explanation. The study of aphasia requires the structural analysis of language; yet the elaboration of such an analysis has come about only in the latest stages of linguistic science. Ferdinand de Saussure realized half a century ago that in any kind of aphasia "au dessus du fonctionnement des divers organes il existe une faculté plus générale, celle qui commande aux signes, et qui serait la faculté linguistique par excellence" (see 1922, p. 27). However, before it became possible to specify in what way and to what degree this faculty was affected, it was necessary to re-examine the constituents of language at all levels of complexity with respect to their linguistic functions and mutual relations. It is remarkable that in 1878 two great pioneers, the Polish linguist Baudouin de Courtenay (1881), and the London neurologist Jackson (1958, p. 156) quite independently of each other refuted the notion of an immediate transition from words (or morphemes, the smallest grammatical units) to "an articulatory movement, a physical state", describing it as an "unwarranted, paralogistic jump" in linguistic operations (Baudouin), and as a "fallacy" which "confuses the real issues" and is "not warrantable in a medical inquiry" (Jackson).

A parallel development in the medical and linguistic search for a way out of this impasse may be observed. Some fifty years later, a demand for systematic phonological research, consistently match-

ing sound with meaning, was made by the First International Congress of Linguists in 1928 and was widely discussed at the First International Congress of Slavists (Prague, 1929) and in the two inaugural volumes of the *Travaux du Cercle Linguistique de Prague*, which were dedicated to this assembly.

Simultaneously, at the annual meeting of the German Neurological Society in Würzburg, Wolpert (1929) argued against the possibility of divorcing *Wortklangverständnis* from *Wortsinnverständnis* in the examination of aphasia. Experts in speech disorders did not fail to bring the rapid progress of the new linguistic discipline to the attention of their colleagues. Thus, for example, at the Sixth Congress of the French Phoniatic Society, J. Froment and E. Pichon pointed out the importance of phonology for studies in language disturbances (*Rapport*, 1939). Froment illustrated his point by applying phonological criteria to the motor aphasiac: "Ce n'est pas phonétiquement qu'il s'est apauvri, c'est phonologiquement. Il peut être comparé à un pianiste, qui, ayant à sa disposition un bon clavier et tous ses doigts, aurait perdu la mémoire ou presque toute mélodie, et qui plus est, ne saurait même pas reconnaître ses notes."

The first steps towards a joint investigation of language disorders were taken by Dutch linguists and psychoneurologists. They discussed the common problems in a special conference in Amsterdam in 1943, where the neurologist Bernard Brower brought to light the need for basic phonological concepts in the study of aphasia. It was the use of these concepts which exemplified what Jackson and Freud (1953) meant by a close correspondence between functional retrogression and the development of the language pattern, thus supporting Jackson's view that early acquisitions are more tenacious and resistant to brain damage than those which have been added more recently (cf. Jakobson, 1962; Alajouanine, Ombredane and Durand, 1939).

In books by Luria (1947) and Goldstein (1948), we find the first efforts by neurologists towards the systematic utilization of modern linguistic principles for the analysis of aphasic impairments. When, for example, Luria specifies that in so-called sensory aphasia the

deficiency of auditory perceptions is actually confined to the breakdown of phonemic perception, the whole syndrome of this impairment yields itself to a clear linguistic analysis. Both this monograph, based on an enormous amount of clinical material, and Luria's later works, which display a greater and greater linguistic skill and orientation towards the science of language, present us with a sound foundation for thoroughly integrated medical and linguistic research in the pathology of language. Specialists in pathology must unite with specialists in language in order to cope with this important task and in order to liquidate the residue of that "chaos" which Head (1926) had exposed in contemporary views on aphasia.

In his recent survey of linguistic problems connected with the study of aphasia, the Moscow linguist Ivanov (1962) emphasized that first and foremost we need extensive samples of the spontaneous, unconstrained speech of patients, whereas at present our usual, often our only, material consists of medical tests and interviews, which display the metalingual operations of the patient rather than his unforced, habitual utterances. I am sorry to have to add that some of these tests clash with the elementary requirements of linguistic methodology. If the experimenter has not sufficiently familiarized himself with the science of language, he will give a distorted interpretation to the data, especially if his criteria for classification are borrowed from obsolete school grammars and have never undergone a thorough linguistic check-up. Statistics proceeding from such classifications are apt to disorient the research in aphasia.

In the study of speech pathology, one approach at variance with linguistic reality is the hypothesis that language impairments in aphasia can be viewed as a unitary general disorder, with the allegedly dissimilar types of aphasia representing differences in quantity of disturbance, rather than in quality. Any linguist who has had the opportunity to observe different specimens of aphasic speech can only confirm and support the views of those neurologists, psychiatrists and psychologists who are getting an increasingly clearer insight into the qualitative diversity of the

aphasic patterns. A linguistic analysis of these patterns imperatively leads to the ascertainment of distinct and integral syndromes as well as to their structural typology. The linguistic errors made by the adherents of the unitarian heresy have prevented them from discriminating between the various verbal failures of aphasiacs.

6.2. FIRST DICHOTOMY:
ENCODING (COMBINATION, CONTIGUITY) DISORDERS
VERSUS DECODING (SELECTION, SIMILARITY) DISORDERS

Two fundamental operations underlie our verbal behavior: SELECTION and COMBINATION. Kruszewski's *Outline of the Science of Language*, printed eighty years ago (1883) but still vital, connects these two operations with two models of relationship: selection is based on similarity, and combination on contiguity. My attempt to explore this twofold character of language and to apply it to the study of aphasia by delimiting two kinds of impairments, termed 'similarity disorder' and 'contiguity disorder' (Jakobson and Halle, 1956), met with an encouraging response from specialists in the diagnosis and treatment of aphasia. In turn, their discussion of this dichotomy has impelled me to recognize that the division of aphasia into similarity and contiguity disorders is closely linked with the classical sensory and motor dichotomy. According to Osgood and Miron (1963, p. 73), "a contingency in aphasic syndromes between these two dichotomies" was envisaged by J. Wepman (cf. also Fillenbaum, Jones and Wepman, 1961); verifying experiments led Goodglass (Goodglass and Mayer, 1958; Goodglass and Berko, 1960) to a similar conclusion; both dichotomies have been expressly united by Luria (1958, pp. 17, 27).

Before discussing the indissoluble unity of the two divisions, which requires an explanation, let us exemplify their linguistic correlation. We all know how inexact, one-sided and superficial the traditional terms "motor" and "sensory" aphasia are. However, if the syndrome characterizing a given type of aphasia can be unambiguously described, purely conventional nomenclature is harmless as long as we are aware that it is nothing but convention.

Several terminological substitutes have been proposed. The adjectives 'expressive' and 'impressive' carry too many meanings; particularly, in linguistics they are used in a totally different sense. The labels 'emissive' – 'receptive' are clearer; yet the impairment of internal speech, an important consequence of classical motor aphasia, could hardly be subsumed under the name emissive aphasia. The terms 'encoding' and 'decoding impairments' perspicuously indicate the type of damages. They could be used with an optional appendage: 'predominantly encoding' and 'predominantly decoding', since impairments in one of the two coding processes generally affect the opposite process also. This is particularly true of decoding impairments, which affect the encoding process much more than *vice versa*. The greater autonomy of the decoding process may be illustrated by a person's purely passive mastery of a foreign language or by the grasping of adult speech by speechless infants. Pathological cases are the most instructive. Lenneberg (1962) observed and described an eight-year-old boy who had learned to understand language despite a congenital inability to produce speech.

The classical motor (*alias* Broca's) aphasia is the basic variety of encoding impairments; correspondingly, the so-called sensory (*alias* Wernicke's) aphasia is the basic form of decoding impairments. Since it is Luria's illuminating portrayal of six aphasic syndromes which has served as the starting point of my linguistic interpretation in this paper, I shall follow Luria's nomenclature for the six types in question, even though Luria himself, and all of us, undoubtedly agree with Kurt Goldstein when he states that any terminology used at present in the field of aphasia "is somewhat confused" and "does not at all do justice to the complexity and variation of the modifications of language found in patients" (1948, p. 148).

The traditional Broca's aphasia, termed "efferent" (or "kinetic") by Luria, is palpably opposed to sensory or Wernicke's aphasia; the one being the most typical contiguity disorder, the other being the most conspicuous similarity disorder. Combination is disturbed in efferent aphasia. On the phonemic level this means difficulties

in using phoneme clusters, difficulties in constructing syllables and difficulties in making the transition from phoneme to phoneme and from one syllable to another. Prosodic features (for example, Russian stress, Norwegian pitch and Czech vowel quantity) are affected because they involve the syllabic context. There are constraints on sequences, reflected in the compulsion to make phonemic assimilations. Fry (1959) cites a typical example. A patient, when reading the sequence of words: *wood, kick, wear, feet*, substituted *w* for the initial consonant of the even words upon the model of the odd words. To such deteriorations in phonemic ensembles, the sensory aphasiac opposes an inability to utilize certain phonemic constituents; single distinctive features, as, for instance, the consonantal opposition grave/acute or voiced/ voiceless, are lost.

On the level of meaningful units, the deficiency is primarily grammatical in the efferent type of aphasia but primarily lexical in the sensory type. Goldstein's motor agrammatism (1948, p. 81), or true agrammatism as Alajouanine formulates it (1956, p. 16), is, indeed, the most typical manifestation of efferent aphasia. Therefore, the so-called 'little tools of language' – connectives, articles, pronouns – which serve to cement the grammatical context, remain intact in the sensory disorder but are the first to be suppressed in the efferent disorder. The fundamental syntactic relationship is that of dependence; thus in agrammatism with its 'telegraphic style' all kinds of dependent words – adverbs, adjectives, finite verbs – are lost. In efferent aphasia "the abolishment of predicates, which evidently presents a definite loss of power to propositionize" (Jackson, 1958, p. 60), is, however, only the focal expression of a general tendency to abolish any syntactic rank. It is quite natural that of the two types of syntactic dependence, government and agreement, the latter is somewhat more resistant in the contiguity disturbances of efferent aphasia, because agreement is a sequential dependence which involves grammatical similarity, whereas government is built on mere contiguity. Ultimately, speech is reduced to primaries, independent words – nouns and nominal forms of verbs – in holophrastic usage. In contrast, in sensory aphasia the gram-

matical subject, which is the only part of the sentence which is independent of the context, is apt to be lost, since the chief stimulus for the subject lies in selection rather than in combination. It is the kernel term of the syntactic construction and most frequently, in some languages even obligatory, the subject marks the beginning of the sentence. An impoverishment of the variety of nouns, a tendency to supplant them by generalized, pronominalized substitutes, and an inability to furnish synonyms and antonyms are the symptoms of a pronounced similarity disorder. This disorder may cause disturbances in word-finding and/or in phoneme-finding. Both kinds of disturbances may reinforce each other, but we could hardly deduce one of these two linguistic levels of disturbances from the other, i.e. we could not trace the disintegration of the verbal code to the disintegration of the phonemic code (cf. Critchley, 1959, p. 289).

Likewise, morphology brings to light a noticeable contrast between efferent and sensory disorders. In languages with a rich inflectional system, such as Russian or Japanese (cf. Panse and Shimoyama, 1955), efferent aphasia exhibits a considerable deficiency in suffixes. Even in English with its scanty grammatical endings, an atrophy of desinences, especially those "which express syntactic relations", has been observed (Goodglass and Hunt, 1958). In the efferent aphasiacs whom Goodglass and Hunt tested, the break-down of three phonemically identical desinences – *z* with its automatic alternants *iz* and *s* – presents a significant hierarchy, and a very clear principle accounts for the order of their dissolution. The higher the grammatical construction, the more imminent is its disintegration. The first to be affected is the clause, and, therefore, the third person singular verbal ending which signals the subject-predicate relation (for example *John dreams*) is the least viable. The possessive ending (*John's dream*), which signals a relationship within a phrase, is somewhat more resistant. The word is the last of the three constructions affected; hence the plural nominal ending (*dreams*), which depends neither on the clause nor on the phrase, is the least impaired.

Whereas in efferent aphasia lexical root-morphemes exercise a

higher viability than grammatical morphemes (affixes) and grammatical words (in particular pronouns), the opposite state of affairs exists in sensory aphasia. As Beyn (1957, p. 93) and Luria (1958, p. 20) have pointed out, patients with this form of aphasia "lose the power to understand the roots of words", whereas suffixes "ordinarily remain considerably more comprehensible". Beyn, moreover, notes the cardinal role of pronouns in the speech of these patients. It may be noted that words with one and the same root but with diverse suffixes are bound by semantic contiguity (e.g. *editor-edition-editorial-editorship*), whereas words with different roots but one and the same suffix display semantic similarity (e.g. actors such as: *editor, auditor, solicitor*, etc.). Thus, patients having a similarity disorder differentiate suffixes rather than roots, whereas patients having a contiguity disorder differentiate roots rather than suffixes.

The affection of internal speech which, as Luria discovered, accompanies efferent disorders, finds its explanation in the essential characteristic of this type of aphasia: the break-down of contextual speech. Our internal speech is the context of our utterances; since all verbal contiguities are destroyed in the efferent type, the impairment of internal speech is inevitable. The corresponding deficiency in sensory aphasia is the loss of metalingual operations, which is the unavoidable result of similarity disorders.

The dichotomy of encoding and decoding disturbances finds its most typical expression in the divergent or, one might say, polar syndromes of efferent and sensory aphasia. At the same time these two syndromes clearly demonstrate the contrast between contiguity and similarity disorders. The indissoluble unity of the two divisions requires explanation. We can ask why the context is impaired in encoding disorders although it is retained intact in decoding disorders and why, on the other hand, those autonomous constituents which remain intact in encoding disorders are impaired in decoding disorders, where no autonomous constituents survive. The answer lies in the fact that the encoding and decoding processes present a cardinal difference in ordering. Encoding starts with the selection of constituents which are to be combined and integrated into a

context. Selection is the antecedent, whereas building up the context is the consequent or the aim of the encoder. For the decoder this order is inverted. First the decoder is faced with the context, second, he must detect its constituents; combination is the antecedent, selection is the consequent, that is, the ultimate aim of the decoding process. The encoder begins with an analytic operation which is followed by synthesis; the decoder receives the synthesized data and proceeds to their analysis. In aphasic disorders the consequent is impaired, while the antecedent remains intact; combination, therefore, is deficient in the encoding types of aphasia, and selection in the decoding types. (See Table I.)

Table I

ENCODING	DECODING
<i>intact</i> - constituents	<i>context</i> - <i>antecedent</i>
<i>impaired</i> - context	<i>constituents</i> - <i>consequent</i>

Similarity relations underlie the selective operation, whereas combination is based on contiguity. Thus, the difference between encoding and decoding troubles merges with the dichotomy of contiguity and similarity disorders. The difference between the encoding and decoding processes or, in the terms of Hippocrates, between the brain's function as the speaker's 'messenger' and as the listener's 'interpreter' (see Penfield and Roberts, 1959, p. 7), plays a tremendous role in the disorders of language and gives rise to thoroughly divergent types of syndromes, involving either similarity disorders or contiguity disorders.

As I outlined in a previous study (see above, pp. 49-74), metaphor is alien to the similarity disorder, and metonymy to the contiguity disorder. Now that we have discussed, on the one hand, selection, based on similarity, as the first stage of the encoding process, and, on the other hand, combination, based on contiguity, as the start of the decoding operation, let us confront two kinds of poetry: lyric, which as a rule is built primarily on similarity; and epic, which operates chiefly with contiguity. We recall that metaphor is the inherent trope in lyric poetry, and that metonymy

is the leading trope in epic poetry. In this connection, the lyric poet, we note, endeavors to present himself as the speaker, whereas the epic poet takes on the role of a listener who is supposed to recount deeds learned by hearsay. Here again, on another level, we observe the parallel relationship of encoding with similarity, and of decoding with contiguity; and this corresponds perfectly to the evidence provided by aphasia about the higher stability of similarity relations in encoding and of contiguity relations in decoding.

6.3. SECOND DICHOTOMY: LIMITATION VERSUS DISINTEGRATION

From the two basic types of aphasia – the efferent and the sensory – let us turn to the other four types discussed in Luria's monographs. Their linguistic symptoms are to be singled out and reinterpreted. Here we find two attenuated forms: among the encoding types there is what Luria calls 'dynamic' aphasia (1962, p. 182); and among the decoding disorders, the type he calls 'semantic' (1962, p. 132; 1958, p. 30; 1947, p. 151). Luria's use of the label 'semantic', let me add, deviates somewhat from the meaning given to this term by Head. The dynamic disorder affects only those units of speech which go beyond the limits of a sentence, namely extensive utterances, especially monologues. In other words, this impairment touches only those verbal combinations which exceed the bounds of the verbal code, since the combination of words and word groups into a sentence is the largest ultimate construction entirely organized on the basis of compulsory grammatical rules.

Another variant of the same syndrome has been described by Luria and his collaborators. Luria defines this variant as the "dissolution of the regulative function of speech" (1959; 1962, p. 214). Viewed in its linguistic aspect, this symptom, however, may be interpreted as an inability to transpose a verbal dialogue into a non-verbal, artificial system of signs or to carry on a dialogue combining verbal utterances with utterances transposed into the latter

system. Such semiotic activities would again go beyond the combinations stipulated and regulated by the habitual verbal code. The patient, as Luria (1962, p. 244) pointed out, "constantly slips toward accustomed verbal clichés".

In general, the transition from verbal stimuli to responses in non-verbal sign systems belongs among the most interesting linguistic and semiotic problems. The inhibition of visual dreams connected with encoding disorders of language (Anan'ev, 1960, p. 336) has been rightly interpreted as a break-down of that code which provides the transition from verbal to visual signals (Žinkin, 1959, p. 475).

The speech of dynamic and semantic aphasiacs is characterized by two opposite features; the former is marked by an excessive embedding in the code and the latter by a one-track embedding in the context. Normal language makes a distinction between word classes and syntactic functions; one and the same class can perform different functions in the sentence, whereas one and the same function can be performed by different word classes. Semantic aphasia tends to discard this dualism and assign to each word class a single specific function. Under these conditions, any word class is defined by the place which its members occupy in a syntactic sequence, and the variety of these places is subject to restrictions. Thus only the adverbial functions of the noun are retained (for example, *John likes Mary*), whereas subordinative groups of two nouns, especially if they are reversible, will be misunderstood; Luria (1958, p. 25) cites these examples: *father's brother* and *brother's father*; *a circle under a triangle* and *a triangle under a circle* as groups typically misunderstood. One of Luria's patients (1947, p. 161) has given us a lucid account of his efforts to understand the words *mother's daughter*: "I know they are two. I imagine ... mother ... and daughter ... but which of them? It's strange, but I cannot grasp this. Is it connected with the mother or with the daughter? ... It's unclear, I don't follow." Verbal predicates are comprehensible, whereas predicate nouns, especially when the copula is not expressed, perplex the semantic aphasiac. Adjectives in an attributive function are the only ones which reach

him. The explicit precedence of the subject over the direct object becomes compulsory. Consequently, passive constructions embarrass the patient, and in active clauses the order subject-object becomes irreversible. Even in such a language as Russian, where normally free stylistic variations of word order play a great role, the inverted order object-subject is misinterpreted by the patient in spite of the clear information provided by the accusative and nominative desinences. For example, *sestrú žená ljúbit*, 'sororem uxor amat', is understood as *sestrá ženú ljúbit*, 'soror uxorem amat'. The syntagmatic axis suppresses the paradigmatic axis.

Semantic aphasia simplifies and tightens the syntactic rules; furthermore, it effaces the grammatical connection between sentences, and one observes this deficiency even after the rehabilitation of the patient. Among the verbal constructions subject to compulsory rules, the sentence is usually considered the largest. It is true that rules of grammatical superposition (whether concord or agreement) work only within a sentence. Yet anaphoric rules based on mere similarity relations cross the borders of sentences. Pronouns and articles may depend on a wider context than the bounds of the sentence. Since semantic aphasia pertains to similarity disorders, it is not surprising that the regulation of anaphoric pronouns and articles may be lost. Professor J. M. Wepman gave me a good example: a patient who had recovered from a semantic disorder suddenly made a symptomatic slip: "My wife is not here today. *He* did not come with me."

6.4. THIRD DICHOTOMY: SEQUENCE (SUCCESSIVITY) VERSUS CONCURRENCE (SIMULTANEITY)

The description and classification of aphasic impairments face the pertinent question of whether a sequence or a simultaneous set of linguistic entities appears to be affected. The dichotomy of sequence and concurrence cuts across the fundamental division of aphasic impairments into encoding (combination) and decoding (selection) disorders. Of the two modes of arrangement which

operate in language – selection and combination – it is the latter which suffers from encoding disorders. There are two varieties of combination in language: concurrence and temporal sequence; it is the sequence which undergoes impairment in the efferent and dynamic types of encoding disorder, whereas the third type, afferent aphasia, disrupts concurrence. On the phonemic level, efferent aphasia disrupts the sequential concatenation of phonemes, whereas in afferent aphasia the combination of concurrent distinctive features into phonemes breaks down. The typical linguistic symptom of afferent aphasia is the wide range of fluctuations in the implementation of phonemes. In efferent aphasia only certain constituents of the sequence survive, and their context has deteriorated; in the same way, afferent aphasia preserves only single constituents of the simultaneous bundle, with the rest of the context being filled in almost at random. Sensory aphasia, oriented towards the context, causes the loss only of single constituents, that is, only separate features of the phoneme; apparently, those are lost which are least dependent on their simultaneous and sequential environ-

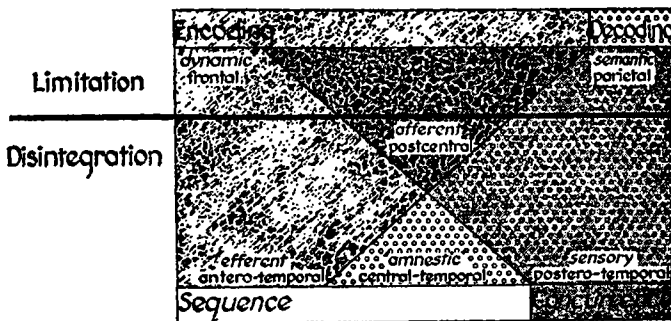


FIG. 1. The dichotomies underlying the six types of aphasic impairments

ment. In contrast, afferent aphasia seems to preserve only those features which are the least dependent on their environment and which underlie the phonemic pattern of language. However, as Luria has warningly noted (1947, p. 111), our acquaintance with afferent aphasia is still insufficient.

Afferent aphasia is an encoding disturbance in simultaneous

combination; the form of aphasia for which Luria provisionally accepts the label 'amnesic' or 'acoustico-amnesic' (1962, p. 98) is a decoding disturbance in sequential selection. Whereas sensory aphasia affects the identification of constituents with respect to a set of concurrent substitutive possibilities, amnesic aphasia impairs this identification only if a given constituent is a member of a co-ordinative pair (or larger series) of words (or clauses). Co-ordinative groups occupy a particular place among syntactic constructions. They are the only syntactic groups without any internal superposition, the only open groups with freely addible and omisable members; finally, they are the only ones where, as de Groot has neatly remarked (1957, p. 128), "there is strictly speaking, real concord, namely a pure, mutual agreement." Thus amnesic aphasia is a similarity disorder which involves the only grammatical sequence based on pure similarity, and afferent aphasia is a contiguity disorder which involves the only alignment of concurrent constituents in the sound sequence of language. The two-dimensional (sequential and concurrent) contiguity of the distinctive features troubles the encoder suffering from an afferent aphasia, whereas the two-dimensional (paradigmatic and syntagmatic) similarity of paratactic words or clauses troubles the decoder suffering from an amnesic aphasia.

6.5. CONCLUSION

These brief remarks aim, on the one hand, to indicate the specific verbal symptoms which distinguish the six types of aphasia outlined in Luria's books (1947, 1962) and, on the other hand, to retrace the interrelation of these six types from a strictly linguistic point of view. Three dichotomies have been found to underlie the six types of aphasic impairments (see Fig. 1). Speech devoid of any cognitive function and reduced to mere emotive, interjectional exclamations remains out of the scope of this survey.

Three types of aphasia – the so-called efferent, dynamic and afferent types – are characterized by CONTIGUITY disorders with a

deterioration of the context; the three other types – in Luria's nomenclature, the sensory, semantic and amnesic – display SIMILARITY disorders with damage to the code. The same two groups, viewed in terms of verbal behavior, are opposed to each other as ENCODING and DECODING disturbances.

In all three types of contiguity disorders, the ability to combine and integrate is impaired; however, in the efferent and dynamic types this impairment affects the integration of successive constituents, whereas in the afferent type it is the concurrent constituents which fail to be integrated. In the three types of similarity disorders, the ability to select and identify is affected; however, in the sensory and semantic types what suffers is simply the choice among concurrent possibilities and the identification of such alternative constituents, whereas in amnesic aphasia there are impediments in choice and identification only as regards constituents joined in a co-ordinative group. Thus, besides the simple types of contiguity disorders which involve only the successivity set, and of similarity disorders based solely on the simultaneity set, there appear two complex, intermediate types of aphasia: a contiguity disorder which implies the simultaneity axis (afferent aphasia), and a similarity disorder, dependent on the successivity axis (amnesic aphasia). Consequently, a second dichotomy is operative – the opposition of SEQUENCE and CONCURRENCE or, in Saussure's terminology (see 1922, pp. 115, 180) SUCCESSIVITY and SIMULTANEITY – which in turn divides the six types of impairments into two three-fold groups.

In contradistinction to efferent aphasia, Luria's dynamic aphasia impairs neither the phonemic nor the grammatical context, but only those verbal contexts which contain more than one sentence and thus exceed the limits of a syntactic integer. The sentence is the maximum context, structured on the basis of coded rules; therefore we are no longer restricted by compulsory ranking rules when we combine sentences into an utterance (see above, p. 54). On the other hand, semantic aphasia, in Luria's application of this term, abolishes any difference between morphological categories and their syntactic functions. Incidentally, this loss of

Table II

	<i>Aphasia</i>					
	<i>Efferent</i>	<i>Sensory</i>	<i>Dynamic</i>	<i>Semantic</i>	<i>Afferent</i>	<i>Amnesic</i>
Impaired:						
encoding (+) or						
decoding (-)	+	-	+	-	+	-
sequence (+) or						
concurrence (-)	+	-	+	-	-	+
Present:						
disruption (+) or						
limitation (-)	+	+	-	-		

delimitation between morphology and syntax seems to favor neology. The intense neology of aphasiacs and children is due to their lack of our sharp discrimination between two verbal levels: the ready-made words and the sentences, ready-made only in their grammatical pattern, but relatively free in their lexical make-up. Our selection of words is basically free and their combination is bound only by formal rules of sentence-building. For such kinds of aphasiacs, and for children at a certain developmental stage, this freedom is extended to the selection of morphemes, and their combination is bound only by formal rules of word-building.

It will be recalled that dynamic aphasia belongs to the code-focused and context-impairing types of speech disturbances and that semantic aphasia is one of the code-impairing and context-focused types. Correspondingly, dynamic aphasia affects only uncoded contexts, whereas on the other hand, semantic aphasia tends to restrict the grammatical code by limiting the autonomy of morphological categories in behalf of syntax. The dynamic and semantic types are distinguished from the efferent and sensory types respectively, the first two being limitative, the second pair being disruptive. This third dichotomy – LIMITATION versus DISINTEGRATION – involves only the simple varieties of both the encoding and decoding aphasias, but does not apply to the complex, transitional types (see Table II).

It is superfluous to add that by restricting my survey to linguistic criteria, I am not disregarding the other aspects of aphasic impairments. *Suum cuique*, and my main concern has been to avoid any

confusion of different levels. However, one must agree with Jackson's program of 1878, that a rigorous delimitation of levels must not prevent us from "endeavouring to trace a correspondence betwixt them" (1958, p. 156) and, in particular, between the affections of language and their 'anatomical substrata'.

The connection between the more anterior lesions of the cortex and the encoding impairments, as well as the connection between the more posterior lesions and the decoding impairments, is widely recognized. It is, furthermore, noteworthy that the encoding impairments of sequences correspond to anterior fronto-temporal and frontal lesions (cf. Luria, 1958, pp. 27, 30), whereas the decoding impairments, which involve concurrence, the simultaneity axis of language, are tied to postero-temporal and postero-parietal lesions. The transitional types, which connect encoding impairments with the simultaneity axis or decoding impairments with the successivity axis of language, apparently correspond to lesions in the retrocentral (afferent aphasia: cf. Luria, 1947, p. 112) and centro-temporal areas (amnesic aphasia: cf. Penfield and Roberts, 1959, p. 42; Luria, 1962, p. 98). There appears to be an eloquent conformity between the middle location of these lesions and the intermediate character of these language disorders in relation to the other types of aphasia.

Frontal-temporal and postero-temporal lesions are responsible for the basic types of encoding and decoding impairments, and in contradistinction to these two disruptive forms of aphasia, the limitative types are tied to two polar areas, namely the dynamic disorder is bound to the anterior, frontal portions of the brain (cf. Luria, 1962, p. 182), the "frontal intrinsic area of the fore-brain", and inversely the semantic disorder to the postero-parietal and parieto-occipital sections, the "posterior intrinsic areas" (cf. Luria, 1958, p. 21; Pribram, 1960).

There arises inevitably the question: What is the cerebral correlate of the relevant dichotomy – Sequence/Concurrence? Permit me to quote the tentative, but, nevertheless, most stimulating response to this question which I have received from Professor K. Pribram of Stanford University:

The question may be raised as to the true locus of disturbance in 'efferent' aphasia. Bilateral removal of Broca's area has been performed without the production of aphasia (Mettler, 1949). In monkeys fronto-insulo-temporal lesions produce the 'encoding-sequence' defect even though they do not speak. My feeling is, therefore, that the 'encoding-sequence' type of aphasia results not from a superficial involvement of area 44 but from infringement on the fronto-temporal region of the brain when lesions are deep.

If this is so, and if the anterior frontal cortex is considered as part of the medio-basal forebrain (for thalamocortical, phylogenetic and neuro-behavioral reasons), an added dividend accrues from the linguistic analysis. The two linguistic axes find their correspondence in the brain: *viz.* Decoding/Encoding is Posterior/Frontal in the brain; Concurrence/Sequence (or Simultaneity/Successivity) is arranged as Dorsolateral/Mediobasal in the brain.

The study of aphasia can no longer by-pass the pertinent fact that an intrinsically linguistic typology of aphasic impairments, outlined without any regard to the anatomical data, yields a patently coherent and symmetrical relational pattern, which proves to be remarkably close to the topography of those lesions of the brain which underlie these impairments.

6.6. SUMMARY

The six cardinal types of aphasic disorders examined by A. R. Luria and conventionally labeled: I, DYNAMIC (with lesions of the frontal portions of the brain); II, EFFERENT MOTOR (linked with the anterior fronto-temporal section of the cortex); III, AFFERENT MOTOR (retro-central); IV, AMNESTIC (centro-temporal); V, SENSORY (postero-temporal); and VI, SEMANTIC (parieto-occipital), require and suggest a clear-cut and symmetrical linguistic classification.

Types I-III affect the encoding process, while types IV-VI imply damage primarily to the decoding process. For the encoder, selection is normally followed by combination, whereas the decoder is presented first with the context, so that selection is preceded by combination. In aphasia the consequent is impaired, while the antecedent remains intact. Therefore, combination is deficient in

the encoding types of aphasia and selection in the predominantly decoding disturbances. The difference between encoding and decoding difficulties merges with the dichotomy of contiguity and similarity disorders.

Type II retains the phonemic and grammatical units but disrupts the phonemic and/or grammatical sequences; whereas type V reduces the variety of such units, while preserving the pattern of their grouping.

Type I shares with type II a deficiency in the integrative operations, but in type I they are impeded only on the higher levels: the combination of sentences into utterances and of utterances into discourse is impaired. Likewise, type VI, in contradistinction to type V, does not affect the lower levels of language. The repertory of phonemes and words remains, but morphology appears to be radically suppressed by syntax; the syntactic functions and word order overpower the morphological categories.

Types III and IV occupy an intermediate position between I-II and V-VI. Combination processes suffer in all three encoding types, but while types I and II affect different kinds of sequences, aphasiacs of type III cannot manipulate and discriminate the concurrent bundles of distinctive features. Selection processes suffer in all three decoding types, but in type IV only items arranged in a series are affected. Thus of the two Saussurian axes, successivity is involved in I-II and IV; simultaneity is involved in V-VI and III.

Paper presented to the Ciba Foundation Symposium on Disorders of Language, London, May 21st, 1963.

7. LINGUISTIC TYPES OF APHASIA

At present only few workers in the field of language disorders still believe that the role of linguistics in the study of aphasia is unimportant. Now, in various parts of America and Europe, diverse groups of scholars are attempting joint inquiry into various questions of language disturbances. In several centers neurologists, psychologists, linguists, and other specialists work together to describe, to examine, to analyze aphasia, and to obtain the most exact diagnoses and prognoses.

In a recent interdisciplinary Ciba symposium (1964) devoted to the disorders of language, it was expressly stated that for a very long time linguistics had been unable to participate efficiently in the investigation of aphasia because the development of structural analysis in the science of language is a relatively recent phenomenon. But now, with the intensive development of such scrutiny, linguists must also have their say on the disruptions of language. The participation of linguists in such research proves to be important for the study of aphasia, on the one hand, and for general linguistics, on the other, because there obviously exists a very intimate interrelation between problems of normal language in operation, language in buildup, i.e., the acquisition of language by children, and the disintegration of language, exemplified by the various types of aphasic impairments. It becomes more and more clear that such impairments have their own order, so to say an orderly hierarchy of disorders; this order actually exists and must be analyzed. Lord Brain, the initiator of the Ciba Symposium, went even farther: he said that the same analytic methods may be

applied to psychotic, especially schizophrenic, speech (1964). The linguistic work in this wider field has scarcely begun but even at the present stage schizophrenia gives clues that enable a linguist to catch certain phases and facets in the process of the illness which could otherwise easily remain unnoticed.

During the earlier period, when linguistics played only a minor role in the study of language disorders, there arose among non-linguists certain conceptions of aphasia which, to put it bluntly, show a complete disregard for the linguistic aspect of speech pathology. Such intentional neglect is intolerable for, if aphasia affects our language uniquely or primarily, it is the science of language which has to offer the first tentative answer as to the kind of aphasia encountered in any given case. Unfortunately many psychologists came to believe that aphasia presents a single unitary type only, and that no qualitative, but merely quantitative, differences may be found among the diverse varieties of verbal disturbances. This theory is in glaring contradiction with all the extant empiric data about aphasic impairments. It is impossible to confine our analysis of aphasia to a purely quantitative picture. Linguists must pay and actually pay close attention to statistical problems of language, and quantitative linguistics is one of the important aspects of our science, but to be able to count it is necessary to know what one is counting: it would be useless to count without defining qualitative characteristics, without a classification of the units and categories to be counted.

The results of the purely quantitative approach to aphasia are at variance with linguistic facts. All of the quasi-proofs used to substantiate the unitary bias are futile because they are based on fictitious rubrics which actually ignore the phonemic, morphologic, and syntactic structure of language. At present, we have a number of objective and careful descriptions of diverse aphasic cases from various linguistic areas. This material unambiguously reveals the existence of qualitatively different, even opposite, types of disturbances. Of course, polarity does not exclude transitional or mixed cases – in this respect, the disorders of language are similar to all other pathological changes.

The frequent occurrence of pure polar types cannot be denied; these fundamental dichotomies enable us to classify the aphasic impairments. Several years ago I had the opportunity to discuss one of them in detail (see above, p. 49ff.). Two different factors, selection and combination, play an essential role in any speech event. If, for instance, I intend to tell something about my father, I have to make a conscious or subconscious choice of one of the possible terms – father, parent, papa, dad, daddy; then, if I want to say that he is in bad shape, again I select one of the suitable words: ill, sick, indisposed, not healthy, ailing. Selections are one aspect of the twofold event, and the combination of the two selected verbal entities, “Father is sick”, is its other aspect. The entities among which we make our selection are mutually connected by various forms and degrees of similarity in all its varieties: likeness, similitude, equivalence, resemblance, analogy, diverse grades of specification, contrast. Contrary to selection, which is based on an internal relation, combination involves the external relation of contiguity in its various forms and degrees: neighborhood, proximity, and remoteness, subordination and coordination.

A linguistic reinterpretation of the varied cases described in the multilingual literature on aphasia, as well as observations made by myself on aphasics of different languages, made it clear to me that we have to deal with two basic types of aphasia. Either the internal relation of similarity and correspondingly the selective ability is impaired or, conversely, the external relation of contiguity and, hence, the capacity of combination appears to be affected.

After publishing my first outlines of this hitherto overlooked dichotomy (pp. 37ff., 49ff.), I was happy to find support and approval on the part of such experts in the field of aphasia as Luria in Moscow (1959, 1962), and Wepman (1961, 1963) and Goodglass (1958, 1960) in this country. Their observations and also earlier studies, especially Goldstein's (1948), prompted me to examine and point out the very close relationship between the dichotomy of selection and combination and the traditional dis-

crimination between two types of aphasia which were known under the somewhat misleading names of "sensory" and "motor". Any terminology is conventional but in this case nomenclature creates an erroneous impression, as if the entire problem lay either in the damaged articulatory activities or in the harmed sensory apparatus. This misunderstanding disappears as soon as the term "encoding" is substituted for "motor" and "decoding" for "sensory". In this way occasional symptoms are replaced by far more essential features. The difference between combination and selection disorders closely coincides with the difference between encoding and decoding disturbances. Before discussing the interrelation of these two pairs of syndromes, let us delineate the most salient types of encoding and decoding aphasia.

Among the contributions of neurologists, psychiatrists and psychologists to the study of aphasia, Luria's works seem to be the most instructive, first because he approached the different types of aphasic impairments on several levels, and second because he had the opportunity to work with numerous cases, since a high number of aphasic patients, especially war veterans with brain injuries, were brought together in Moscow clinics. The amount of cases that illustrate his findings is quite impressive. In a book published in 1962 and in a paper for the Ciba Foundation symposium (1964), Luria deals with six types of impairments, among them the basic types of encoding disorders, the traditional "Broca's" or "motor" aphasia – in Luria's nomenclature the "efferent" (or "kinetic") type – and the basic type of decoding disorders which carried in these studies the customary label "sensory" aphasia.

Permit me to give a brief answer to the question of what the main features of efferent aphasia on the various levels of the verbal pattern are. Of course, in any given case not all of these symptoms must be present and not all the linguistic levels must necessarily be affected. In some cases the deficit is chiefly or solely phonological; in some instances, the losses belong principally or only to the syntactic level.

In efferent aphasia, words are preserved, especially those which can be independent of the context – mainly substantive nouns, and in particular concrete nouns which carry the leading function. On the other hand, the construction of a sentence presents enormous difficulties; in the first place we observe the disappearance of purely grammatical words, namely connectives (conjunctions and prepositions), as well as such strictly grammatical, formal words as pronouns. The more independent the word is and the more it approaches the model of a normally initial word, the more viable it is. Thus nouns are preserved better than verbs, and substantives better than adjectives. The nominative is the only case which survives, and verbs are used in their most nominalized form. Thus, if there is an infinitive in the verbal pattern of the given language, this form shows a higher resistance in efferent aphasia than the finite verbs. The traditional label “telegraphic style” is well suited to the speech of such aphasics. Their utterances tend to be reduced to one-word sentences.

On the phonological level, the phonemes are preserved. The difficulty is not in the phonemes by themselves but in their combinations, in the transition from one phoneme to another, and in the diversity of phonemes within polysyllabic words. Intensive use is made of phonemic assimilation and dissimilation. The more independent a phoneme or distinctive feature is in respect to the context, the greater the probability of its survival. Among the distinctive features, the inherent ones are more resistant than the prosodic, since only the latter involve interphonemic relations within the sequence.

Efferent aphasia is, I repeat, a typical contiguity disorder, and eloquent manifestations of disturbed contiguity are observable on all levels of language. The root, as the lexical and least dependent part of the word, is better preserved than the grammatical suffixes. It is noteworthy that words of the same root but with different suffixes are mutually associated by semantic contiguity, whereas words with a common suffix but different roots display a semantic similarity. Among syntactic relations, “government” is more easily abolished than “agreement” because the latter links the modifier

to its initial word not only by contiguity but also by similarity, whereas "government" is confined to pure contiguity. For the efferent type of aphasia with its agrammatism, the best definition was given by the ardent proponent of a scientific approach to aphasia, Hughlings Jackson, one century ago (1958). He was the first to recognize that the main deficiency consists in the loss of the ability to propositionize, i.e., to construct a proposition.

The so-called sensory aphasia, acutely analyzed by E. S. Beyn (1957), presents an opposite linguistic syndrome. Here the syntactic wholes – sentences – are preserved. The most viable elements are those which serve to construct sentences, the so-called little words, such as connectives, pronouns, etc. Adverbs and adjectives are retained longer than verbs and nouns; the predicate is more stable than the subject. The initial substantive of the sentence presents the greatest difficulty, especially if the patient speaks a language like English or French, where as a rule the subject appears at the beginning of the sentence. This difficulty becomes particularly acute when the subject is a substantive in a nonderived, primary form, i.e., a pure lexical form with a minimal dependence on the context. It is interesting that deverbative and deadjectival nouns are less vulnerable.

If the required word is context-free, the word-finding operation is an impossible task for a patient severely affected by a selection (i.e., similarity) disorder. He is unable to build an equational sentence or to name an object drawn or pointed at; he often is incapable of responding to a word by its repetition, although the same word may be pronounced easily within a context. Some patients counter the request to repeat the negation "no" with the unwittingly whimsical statement, "No, I cannot".

Faced with these two types of aphasia, we may ask ourselves why the first of them – the loss of the ability to integrate, to create a context – affects chiefly the encoding process; and why, on the other hand, the inability to analyze a context into its constituents, to separate them, and to operate with those constituents which are not prompted by the context, handicaps first and foremost the decoding process. Before answering these questions, it seems ap-

propriate to discuss the deficits of the latter, the sensory type, on the phonemic level.

Here again the combinations are preserved, but within these combinations some phonemes are simplified, especially those which cannot be predicted from their environment. Certain phonemic distinctions are lost. For linguists this point is clear and, in accord with this linguistic experience, Luria (1959, 1962) repeatedly points out that in sensory aphasia it is not the physical but the phonemic hearing which is lost. Among psychologists, however, there are still skeptics who see only risky hypotheses in such references to a breakdown in phonemic perception. But without this hypothesis one could not explain why in a language such as Czech or Hungarian, where the contrast of long and short vowels plays a great role both in stressed and unstressed positions, a sensory aphasic may lose the ability to distinguish long and short vowels whether in hearing or in his own speech. There is no question of inability to hear or articulate vowels of longer or shorter duration; what is lost is the distinctive semantic value of the difference between long and short signals in the phonemic code.

The phonological deficits of sensory aphasics reflect the hierarchical structure of the phonemic pattern. Recently an important paper (1963) was published by the Polish linguist Doroszewski, a remarkable field worker who carefully followed, recorded, and described a typical case of sensory aphasia. In this case report one finds scrupulous observations on disturbances in the relevant Polish distinction between voiced and voiceless consonants. These data are particularly eloquent since the observer had no preconceived opinion and even disregarded the principle which underlies and explains the order of these deficits. In the opposition voice-voiceless, the voiced consonants are the so-called "marked" category. Many habitually voiced consonants lost their voicing mark in the speech of the patient, but there was no change at all of habitually voiceless (unmarked) into voiced (marked) phonemes. Besides voicing (+)/voicelessness (-), several other binary oppositions underlie the Polish consonantal system: they mark compactness (+) *versus* diffuseness (-), acuteness (+) *versus* gravity (-),

stridency (+) *versus* mellowness (-). It is indeed significant that sensory aphasia manifests a tendency to reduce the recurrence of marks in a phoneme. Thus 91 per cent of the compact (+) consonants, but only 35 per cent of the diffuse (-) consonants, lost their voicing in the speech of the Polish aphasic. Among the diffuse (-) consonants, 57 per cent of the acute (+) ones and only 6 per cent of the grave (-) ones became voiceless. Among the diffuse acute (- +) consonants, 100 per cent of the strident (+) phonemes, but a mere 50 per cent of the mellow (-) ones, changed from voiced to voiceless.

Now let us go back to the question of why the combination disturbances which hamper the construction of a context and any act of integration affect primarily the encoding activity of the patient, whereas selection disturbances strike especially the decoding activity. Both connections, which at first glance seem arbitrary, are in reality well founded. No further explanations are needed for a psychologist like Dr. Osgood, who has traced the cardinal difference between the integrating and representational capacities (1957).

In the process of encoding, impairments affect the context rather than its constituents, whereas the decoding process presents the inverse relation. Why are the constituents intact in the encoding? Because the speaker makes the selection of the elements before combining them into a whole. The secondary stage, the building of a context, is more susceptible to disruption, while its constituents are much more viable. Therefore, the encoding process succumbs most often to combination disturbances. In decoding operations we have first to grasp the whole: here lies the greater difference between the attitude of listeners and of speakers. The decoder is a probabilist to a much greater extent than the encoder. Thus there are no homonyms for the speaker; when he says "bank" he knows perfectly whether he is speaking about the shore of a river or a financial establishment, whereas the listener, as long as he is not helped by the context, struggles with homonymy and has to use a probability test. The identification of the constituents is the second stage, which can be characterized as a self-identification

of the listener with the speaker: the sequential synthesis yields to a simultaneous synthesis, and sequences change, as George Miller (1956) would say, into chunks. Naturally, the consequent is shakier than the antecedent and therefore the decoding process is particularly vulnerable to the selection disturbances.

When observers discuss encoding and decoding disorders and prefer to term them as “predominantly encoding” and “predominantly decoding”, they are obviously right because there are no purely encoding or purely decoding disorders, only a difference in hierarchy. There is a much lesser dependence of decoding on encoding than vice versa. More or less intact decoding processes are compatible with badly disrupted encodement. An eloquent case was recently presented by Lenneberg (1962); a boy who at eight years was totally speechless but at the same time understood perfectly the language of adults. On the other hand, one could hardly imagine the preservation of a full-fledged encoding capacity despite the atrophy of decoding ability. The active mastery of a language implies its passive knowledge. Each of us knows more languages passively than actively, and the stock of words one understands exceeds the number which one actually uses. The sphere of our decoding action is wider than our encoding activities.

A highly important connection observed is the impairment of internal speech in any serious case of efferent aphasia. Internal speech, a cardinal problem for both linguists and psychologists, was nevertheless somewhat neglected until it became a gratifying topic of modern Russian research. I would like to refer especially to Vygotsky (1962), Luria (1962), Žinkin (1958), Sokolov (1959), and the other authors cited by the latter. In the light of these stimulating studies, the detriment of the internal speech provoked by efferent aphasia is quite understandable. It suffices to confront agrammatism as the pivotal sign of the efferent syndrome with the predicative nature of internal speech and, moreover, to recollect that internal speech is the usual context of our externalized, uttered speech, and that it is the destruction of the contextual frame which characterizes this type of aphasia.

It is equally natural that the sensory type of aphasia entails an

incapacity for metalingual operations. The vital ability to translate one verbal sign into another (synonymic or more explicit or, inversely, more elliptic) underlies the development and use of language, but the sensory aphasia which inhibits any intralingual and interlingual translation and any identification of verbal signs abolishes the metalingual function.

Having surveyed the efferent type of combination disorders and the sensory variety of selection disturbances, we may now proceed to the other types of aphasia. It was Luria (1947, 1962) who singled out most clearly what he called dynamic aphasia. Like efferent aphasia, this type belongs to the combination disorders, but presents no disruption on either the phonemic or the grammatical level. As long as the patient operates with such entirely (both grammatically and lexically) coded units as words, or with such partly (only grammatically) coded units as sentences, there is no trouble. Difficulties begin as soon as speech exceeds the limits of a sentence and the utterance consists of more than one sentence. A combination of sentences which is free of obligatory rules, especially of hierarchical, subordinative rules, is a particularly intricate task for patients with some combination defects, and they fail to execute it, especially to build a monologue, that is, a context which is incumbent on the speaker alone.

The other deficiency of such aphasics is their vanishing capacity for switching from one system of signs to another, for instance, answering a verbal order by a prescribed gesture. According to Luria's definition, what is impaired in such cases is the regulative function of speech (1959, 1962); as a matter of fact, it is an incapacity to use two different semiotic codes alternately within the same discourse. In comparison with the efferent type, the dynamic variety is simply a more attenuated form of combination impairment: disintegration in the former type, mere limitation in the latter.

To this dualism of disintegration and limitation we find a correspondence also among the selection disorders. If the disintegration of selection processes is represented by the sensory type, the limitation of these processes appears in the variant described by Luria

(1962, 1964) under the traditional label – semantic aphasia. This type in turn demands a linguistic reinterpretation. In the various forms of selection impairments, the words and their internal structure confront the patient with much greater handicaps than the organization of the sentence. Morphology is more difficult and embarrassing for him than is syntax. The more a word within a sentence depends on the syntactic environment, the higher are its chances of being understood and uttered by a sensory aphasic; in semantic aphasia, the selection disturbance appears to be attenuated. Any grammatical category, and in particular nouns, survives solely in its primary syntactic function. Morphology yields to syntax. Each part of speech is defined by the only syntactic construction assigned to it. Nouns are confined to an adverbial position and are no longer understood when used as adnominal modifiers. Patients suffering from semantic aphasia cannot grasp the difference between phrases such as “wife’s brother” and “brother’s wife”. The predicative function of a noun, especially in clauses without copula, e.g., Russian *lev – zver’*, “[the] lion [is an] animal”, puzzles such an aphasic.

The word order in these cases becomes much more uniform and inflexible. Since in English not only aphasic but also normal speech has a rigid word order, let us take an example from a language with freer word order. The basic word order of Russian (subject, predicate, object) admits a stylistic (object, predicate, subject) because the accusative of the object and the nominative of the subject are distinguished by their declensional endings: “Luka pomnit Ol’gu” and “Ol’gu pomnit Luka” both mean “Luke remembers Olga”, whereas “Ol’ga pomnit Luku” and “Luku pomnit Ol’ga” state that Olga remembers Luke. For a Russian with semantic aphasia, any noun which precedes the verb becomes a subject, and any postverbal noun is comprehended as an object notwithstanding the inflectional endings. All such examples reveal a limitation of morphology in favor of a clear-cut and stabilized syntactic pattern.

The two remaining forms of aphasia are perhaps the most complex and notable varieties. One of them, termed by Luria (1947,

1962) afferent (or kinesthetic) aphasia, evidently belongs to the class of encoding disturbances based on a disruption of the capacity for combination. In contradistinction to the efferent type of combination disorders which affects the phonemic sequences, single phonemes merge in the afferent type. Also sensory aphasia shows deficits in phonemic distinctions, but there, as we saw, disturbances in phoneme-finding, quite similar to the word-finding difficulties, lead toward an orderly abolition of certain distinctive marks. The number of selections decreases: e.g., in the Polish case cited (Doroszewski, 1963), the presence of the compactness mark in a consonant nearly excludes the voiced-voiceless distinction. Conversely, for afferent aphasics the difficulty consists in the combination of distinctive features into a phoneme. Such a bundle of concurrent features is too complex for these patients, and they implement only one or a few features of the given phoneme with random substitution of its other constituents. The retained features carry the phonemic information, while the substitutes are mere fillers.

This type of aphasia, in both its linguistic and clinical aspects, demands a further, subtler inquiry. However, I would like to refer to an instructive annotated report on a typical case of afferent aphasia, prepared for publication jointly by two Warsaw scholars, a linguist, Halina Mierzejewska, and a psychologist, Mariusz Maruszewski (1964). This study makes it clear that there is no constancy in the repertory of preserved features and that terms of any binary opposition are mutually interchangeable: voiced and voiceless, nasal and oral, continuant and discontinuous, strident and mellow, compact and diffuse, acute and grave, sharp and nonsharp (Jakobson and Halle, 1962).

The combinations impaired are temporal sequences in the efferent type of aphasia and bundles of concurrent features in the afferent type. The relation between combination and selection disorders (or correspondingly between the prevailing encoding and decoding level of aphasia) coincides with the dichotomy of successivity and simultaneity disturbances. In the afferent type, the correspondence between both dichotomies ceases, since here it is simultaneous combinations that prove to be affected.

The opposite discrepancy between the two dichotomies is manifested in the amnesic type (Luria, 1927, 1962). If a patient suffering from amnesic aphasia is asked to point to his eye, he will do it; likewise he will fulfill the request to point to his ear. But when asked, "Show your eye and ear", he will indicate only one of the two named organs, omitting or erroneously identifying the other one. Finally, the proposal that he show his eye, ear, and nose will simply perplex this patient. It is a selection disorder, but in contrast to the sensory type, amnesic aphasia affects only an iterative selection, a selective operation expanded into a sequence. Three different choices have to be made successively by the patient from one and the same series "eye-ear-nose". "John, Peter, and Mary came to Boston" is a sentence with three coordinative nouns. "John sang, Peter played, and Mary danced" is a sentence of three coordinative clauses. The coordinative constructions are the only ones which suffer in the amnesic aphasia. They are the only grammatical sequences deprived of any internal syntactic hierarchy, and therefore the only open groups with freely addible and omissible members. The coordinative words, phrases, or clauses are linked together only by mutual formal similarity. In these groups, similarity relations involve not only the simultaneity axis but also the successivity axis of language. Through such a double play of similarity, the coordinative groups become the maximal impediment for patients with similarity disorders.

Thus three dichotomies underlie the six cardinal types of aphasia: (a) combination, which implies contiguity and affects primarily encodement *versus* selection, which implies similarity and affects primarily decodement; (b) successivity *versus* simultaneity; and (c) disintegration *versus* limitation. The afferent and amnesic types do not take part in the latter dichotomy. A tentative tabulation of these three dichotomies was proposed in my paper for the Ciba Foundation symposium (see above, p. 89).

When on a purely linguistic level I interpreted and classified all the instructive material contained in Luria's publications (1947, 1958, 1959, 1962, 1964), the factual testimonies in various European and American works on aphasia, and my own observations, I be-

came interested also in the extant attempts to classify aphasic impairments on yet other levels. I followed Hughlings Jackson's warning against any mixture of different levels in the investigation of aphasia (1958) and outlined my typology of aphasic impairments on a strictly linguistic basis. At the same time I realized that a call for autonomy should not be confused with isolation. While autonomy is rewarding, isolation is always harmful. After an autonomous examination of each given level is accomplished, it is useful and even necessary to look for the correlation between the different levels. Thus I asked myself what was done in the intricate questions of brain topography; what functional areas in the cortex were found responsible for the different types of language disorders. I used the results of this topographic research, in particular Luria's (1947, 1958, 1962) and Pribram's (1960) data. After several detailed discussions with the latter at Stanford, a close correspondence between the location of the lesions and the linguistic typology of impairments suggested itself. A tentative topographic analogue to all three linguistic dichotomies may be drafted.

The combination (contiguity) disorders appear to be connected with the more anterior lesions of the cortex, and the selection (similarity) disorders with the more posterior lesions. If we confront the basic varieties of these two kinds of disorders, the efferent type and the sensory type, we learn that the former is associated with anterotemporal and the latter with posterotemporal lesions. There are two types of milder disturbances corresponding to these two types of verbal disintegration: the combination ability undergoes a limitation in the "dynamic" impairments, and the selection ability in the "semantic" impairments. These two attenuated forms of aphasia (mere limitation *versus* disintegration) are connected with the two polar areas: the frontal intrinsic area of the forebrain is responsible for the "dynamic" impairments, and the posterior intrinsic area (the postero-parietal and parieto-occipital sections) for the "semantic" impairments (1958, 1959, 1962, 1963).

In the efferent and dynamic types of combination disorders, the successivity axis of language is affected, whereas the sensory and semantic types of selection disorders affect the simultaneity axis.

As to the two transitional types, one of them, afferent aphasia, is a combination disorder which affects the simultaneity axis, while the other, amnesic aphasia, is a selection impairment concerned with the successivity axis. These transitional types are linked with more central parts of the cortex – the afferent type with retrocentral lesions and the amnesic type with centrotemporal lesions (cf., Luria, 1947, 1962, and Penfield's views on the interpretive cortex, 1959).

Luria's and Pribram's studies (1962, 1960) and their joint research, both at Stanford University and the Burdenko Institute in Moscow, suggest that the dichotomy successivity–simultaneity corresponds to the structural difference between the mediobasal and dorsolateral areas of the brain (see above, p. 92). If this cerebral correlate of the linguistic coordinates proves to be valid, then this correspondence opens new prospects to the intricate problem of the relationship between our sequential and simultaneous perceptions, in particular between such temporal, chiefly sequential phenomena as speech and music, and such typically spatial, chiefly simultaneous phenomena as perception of visual arts. It seems to me that the dichotomy successivity–simultaneity, which plays such an essential and still unexplored role in language, gives a key to the pending investigation of different sign systems in their interrelations. Perhaps the study of this dualism will throw a new light upon the different functions and functional areas of the brain.

DISCUSSION

H. W. Magoun: May I ask you to elaborate the generalization about an impairment in mediobasal versus dorsolateral parts of the brain? Could you amplify a little more fully the relationship of the dynamic frontal, semantic parietal, amnesic centrotemporal, and sensory posterotemporal foci which were delineated to the mediobasal or dorsolateral parts of the brain?

Jakobson: All three types of successivity disorders – the dy-

namic, efferent, and amnesic types – seem to be localized much deeper and to be connected with the mediobasal area. All these three types affect the sequence, primarily the sentence and combination of sentences. If we accept Luria's and Pribram's suppositions, then the operations dealing with the time sequence appear to be connected with the mediobasal part of the brain. I confess that I feel impressed by this hypothesis because it throws new light on the dichotomy of successivity and simultaneity. This dichotomy belongs, as you know, to the burning questions in linguistics, psychology, and many other fields. Anyway, in all its aspects, the outlined dichotomy requires careful examination.

J. M. Wepman: I have discussed this concept many times with Dr. Jakobson when it was at a different stage of development than it is now. I am most interested in his naming a separate type of aphasia, called amnesic, since I think that all aphasia could probably be described, in one sense, as amnesic, as a loss of memory and the ability to recall. For myself at least, I would need a great deal of proof about the neurophysiological localization of the aphasic types he presents.

Jakobson: Luria showed me diverse illuminating cases in his Moscow Institute where he works with an impressive number and variety of aphasic patients. The results of their careful examination appear very convincing, as do the numerous and detailed post-mortem data. Many brain pictures are published in his books (1947, 1962, 1963), with a parallel description of the cases. He pays attention to the different aspects of aphasia with particular reference to the changes in speech and to the localization of the brain lesion. Pribram also, when working with Luria, made valuable observations in that area.

I completely agree that the term amnesic is very vague. But the same could be said about most of the terms used. However, I did not want to introduce new labels. A comparison of my findings with Luria's work is facilitated by my use of the same terms he uses.

May I add that I take full responsibility for the linguistic part of the paper presented, for the linguistic interpretation of Luria's

and others' clinical testimonies and of my own observations. As to the topographic data, I simply collated Luria's and Pribram's conclusions with my linguistic statements. Although we detect a striking correspondence between the linguistic and topographic dichotomies, I would propose to discuss both aspects independently.

N. Geschwind: Dr. Jakobson has given us a brilliant presentation of the major contrasting types of aphasia. I would like, however, to make some historical corrections. Dr. Jakobson stated that Hughlings Jackson was the founder of the scientific study of aphasia; I do not agree with this view. Jackson did not make the contrast between the two major types of aphasia. Bastian (1869) was probably the first to point out on the basis of clinical observation that there were aphasias in which comprehension was impaired. Jackson, in fact, actively opposed the idea that there were such aphasias. In the face of such an error, I find it hard to call Jackson the founder of the scientific study of aphasia. It is interesting that despite his brilliant contributions Bastian was severely criticized by Head (1926), in my opinion quite unfairly.

The real founder of the scientific study of aphasia was certainly Wernicke. His classic paper (1874) succeeded (where Bastian's earlier work had failed) in drawing attention to the existence of an aphasia in which the patient did not comprehend and had fluent, paraphasic speech. He contrasted this syndrome with the type of aphasia which Broca had described more than ten years earlier, in which the patient has a paucity of speech and good comprehension. It was Wernicke who really established in the eyes of the world the dichotomy between these two types of aphasia. In addition, there is little question that the greatest single source of contributions to aphasia were the students of Wernicke, among whom are such different figures as Liepmann, Goldstein, Bonhoeffer, Lissauer, and Kleist.

The point has been raised that the words "sensory" and "motor" are confusing as applied to aphasia. I think that these labels have become confusing through loss of contact with the original use of the terms by German neurologists. German neurology went

into the ascendancy in part because of the German victory in the Franco-Prussian War, and similarly suffered somewhat from neglect with Germany's defeat in World War I. There was a decline in the interest of American and British neurologists in the German literature, and confusion appeared in the use of the terms "sensory" and "motor" which had, in my opinion, been used in a consistent manner by the German authors.

A difficulty arises with the model presented by Professor Jakobson. It suggests that in association with fluent paraphasic speech there must be a disturbance of comprehension, and indeed, it is suggested, also a disturbance of repetition. Conversely, disturbance of comprehension is thought of necessity to entail a disturbance on the expressive side. Yet when we study the cases we can find that these elements may vary independently. Thus, if fluent paraphasic patients with a great flow of speech and good preservation of syntactic structures are considered, one will find that they fall into several groups: (a) some show disturbance of *both* comprehension and repetition; (b) others may show absolutely letter-perfect repetition and yet have absolutely no comprehension; (c) a third group shows marked impairment of repetition but excellent comprehension. This third group has what is called "conduction" aphasia, for which Kurt Goldstein (1917, 1927, 1948) used the term "central" aphasia. One of the odd things about these fluent paraphasic patients is the fact that repetition and comprehension can be so thoroughly dissociated that patients who show the most excellent repetition, even of foreign words in languages unknown to them, may show such a profound loss of comprehension.

C. E. Osgood: Would you not agree, perhaps, that pure echolalia almost requires lack of comprehension?

Geschwind: I would agree that forced echolalia probably does require lack of comprehension.

The second way in which Dr. Jakobson's model presents some difficulties is in its view that disturbance of comprehension (or decoding) necessarily entails a disturbance on the expressive (or encoding) side. A common argument is that for correct expression

there must be feedback. The fact is, however, that there are many excellent cases in the literature of isolated comprehension disturbances; I have partially reviewed this problem (1962). Dejerine (1892) described in detail an extensively studied patient with intact vision who had lost the ability to read, but who could write and had normal language performances otherwise. Many such cases have been described – e.g., Symonds (1953), Holmes (1950), and many others. I have personally seen three such cases. All these patients could copy words they could not read, so it is obvious that vision was intact. These well-studied individual cases in the literature establish beyond doubt the existence of isolated comprehension disturbances. I might add that one should not be impressed by large numbers of cases. Most of the best papers in the literature have probably been single-case descriptions. Mechanisms often tend to become blurred in the larger series.

Let me cite some further examples of the preservation of normal expression in the face of severe comprehension difficulty. Liepmann (1898) and Liepmann & Storck (1902) described the first case of pure word deafness to come to postmortem. Their patient was followed very carefully in life with, among other things, intensive audiometric studies. At necropsy all the peripheral hearing apparatus was shown to be intact by examination of the temporal bones, and the lesion was shown to be a central one. This patient had severe loss of comprehension of spoken language, with otherwise normal hearing and intactness or near intactness of all other aspects of language. There have been other such cases, including a recent excellent study by Hemphill & Stengel (1940). I believe that many of these varying clinical pictures which cannot be accounted for by Dr. Jakobson's model in its present form can be explained by further attention to certain anatomical features which I shall not discuss at present.

One last word is in order on the problem of localization. Dr. Jakobson's diagram of localization was not on a model of a real brain. What comes through, however, is that he and his collaborators have ended up in the same place that Wernicke did in 1874. Various investigators, such as Head (1926) and Marie (1917) set

out to destroy his scheme; they somehow ended by supporting Wernicke's views on localization, although Head at least never admitted to it.

Jakobson: I am very interested in all that Dr. Geschwind said, and on many questions we are in agreement. He may be right in pointing to the weak aspects of Jackson's views, but in some other problems, particularly in his emphasis on the verbal aspects of aphasia (1958), Jackson surpassed his contemporaries. I would place him among the precursors of modern linguistics. He launched many ideas which later were developed in the science of language, partly under his influence, partly independently.

Bastian was indeed a very remarkable specialist in the pathology of language, and actually his writings on aphasia and other speech defects should be read much more because they contain many important and still viable thoughts.

I did not say that everybody who uses the terms "motor" and "sensory" interprets them mistakenly, but there still is a danger that some people in some countries, and particularly in America, could misinterpret this terminology. However, I always tend to avoid discussion about terms. The most difficult and thankless task is to propose and promote better terms. My teacher used to say, "Call it what you want. All that matters is to know what you are speaking about."

When the decoding ability is destroyed, the encoding ability may still be preserved if it was strongly developed before the onset of the decoding disturbances, but even then such disturbances usually lead to a deterioration of encoding as well. When decoding is disrupted for a longer period, then encoding has very little chance to remain intact.

Geschwind: Dr. Jakobson suggests that comprehension (decoding) disturbances cannot last for a long time without accompanying expressive (encoding) disturbances. Yet Dejerine's patient (1892) went over two years without being able to read a word of French. During this time he continued to conduct his business at a very high level, played cards, played musical instruments, and continued to write letters on business affairs. The difficulty in

reading persisted the full period. I have personally seen such patients present a stable picture over many months.

Jakobson: Dr. Geschwind's example is quite instructive. But problems of reading and writing are not in direct correspondence to the problems of speaking and listening, because reading and writing are secondary habits, superstructures upon speech, and they differ from speech both in their development and in their disturbances. As to spoken language, may I ask whether there are recorded cases of a lengthy sensory breakdown with preservation of intact motor activities?

Geschwind: Such stable isolated comprehension disturbances are not restricted to written language. For example, Liepmann's case (1898) had stable isolated word-deafness over many months. The one patient I have seen who most closely approximated pure word-deafness, although she did not show as isolated a disturbance as either Liepmann's or Hemphill & Stengel's (1940) case, had had a stable disturbance for several months. I do not believe that it really makes a difference whether these isolated disturbances are for visual or spoken language.

Jakobson: This mild paraphasia seems to be here a byproduct of decoding disturbances. As Feuchtwanger clearly demonstrated (1932), there is neither bilateral nor unilateral implication between aphasia and amusia. When cautiously, perhaps overcautiously, I question the existence of decoding disorders without reverberations on the encoding side, I feel influenced both by the warning of psychologists against the symmetrical model of encoding and decoding aphasia and by the fact that the active mastery of language implies its passive mastery.

Wepman: I think we should not forget there is a level of language lower than the cortical one. The example that was given of the echolalic response of a patient can certainly be true, even though the conceptual level is unable to function. The patient is commonly seen who can echo or can repeat anything that is said, and yet has no spontaneous language of his own. Whether or not we even see pure types, or whether we see what we are looking for, is another problem. Although there is no ideal topographical re-

relationship between the brain and language, the fact that it is even possible to suggest such a relationship using behavioral data is important, for it provides us at least with a take-off point for discussing the issue from a linguistic point of view.

Geschwind: From the point of view of localization one fascinating fact is that there is no case on record, to my knowledge, of a child who developed the fluent and paraphasic type of aphasia. The same lesion which in the adult typically produces a fluent paraphasic aphasia produces a loss of speech in the child. For this reason, aphasia is more difficult to localize in children than in adults. Isserlin (1936) pointed out, on the basis of studies made in the German army in World War I, that the younger an aphasic was who had a lesion in the posterior speech regions, the less likely he was to become fluent and paraphasic. The fluent aphasias are mostly diseases of relatively old men.

K. de Hirsch: Both the causes and the effects of impaired language development are much more generalized in the child than they are in the adult. Whatever it is that happens to the child involves the developmental process itself. Thus, linguistic difficulties in children differ from those in adults qualitatively rather than quantitatively.

Geschwind: I agree; I believe that the difference between the child and the adult is the result of the developmental stage at which the damage occurs.

Jakobson: I agree entirely that there are two basically different kinds of repetition: the very low level of repetition – echolalia – must be sharply distinguished from intentional repetitions. In sensory aphasia the loss of ability for such repetitions parallels the incapacity for making equational statements. Goldstein (1948) fully realized that “repetition is not at all such a simple performance.” The collapse of equation is the crucial problem of sensory aphasia. According to Goldstein, “the patient of the sensory type may not realize that the word presented sometime before is the same when presented a short time later.” Word identity does not exist for him, and the word is inseparable from its context. Those linguists who deny the general meaning of a word and operate

only with contextual meanings unwittingly describe the language of sensory aphasics.

One can only agree with Dr. Geschwind's request for accurate and exhaustive descriptions of aphasic language. The number of such records is still insufficient. As was recently emphasized by the linguists Ross in the London Ciba Foundation symposium (1964) and Ivanov in Moscow (1962), we badly need a large collection of aphasic texts, edited, as Ross suggested, with the same care as the works of classic authors. It must be precisely stated in what situations the recorded utterances were produced; texts must be reproduced, transcribed, and annotated with the greatest methodological skill. At present we usually have at our disposal only the answers of the patients to the clinicians' questions. That is a classical example of objects essentially distorted by their observers. In addition to these instructive experiments, the completely free speech of aphasics with their families and conversation of aphasics with one another must be meticulously recorded.

Most of the extant records do not meet the methodological requirements. Only when aphasic speech is recorded with the joint participation of linguists and clinicians will we have well prepared and annotated samples of the various forms of aphasia. The Ciba Foundation symposium (1964) advocated the desirability and urgency of an ample anthology of precisely transcribed and annotated aphasic texts supplemented with phonographic records, where all the different types of aphasic impairments would be adequately represented.

As to the cerebral topography, I am afraid that a misunderstanding arose in our discussion. While the efferent type of aphasia is actually related to Broca's area, the dynamic type, according to Luria's (1962) and Pribram's (1960) conclusions (see above, p. 92), is linked with injuries in the more frontal portions of the brain, precisely "before Broca's area".

Osgood: I would agree that naturalistic studies of aphasics in natural environments would be helpful, but they are hard to interpret because of the multiple determination of their behavior. Perhaps either you, Dr. Jakobson, or Dr. Geschwind in his studies

with Davis Howes, have some answer to the question. Word-association shows a very clear split, with two types relating to your distinction between similarity and contiguity. They are the paradigmatic type, in which the association is in the same substitution class, *versus* the sequential type of association. An example of the first type would be table *versus* chair; of the second type, man *versus* walks. Using this basic distinction between the similarity disorder and the contiguity disorder, as carried into this analysis from your earlier writings, I certainly would expect that aphasics who are clearly identified in terms of their spontaneous behavior as having a continuity-type disorder should tend to have great difficulty in association, or tend to give very few sequential types of associates. On the other hand, the aphasic with a similarity disorder should tend to give sequential associates and not the paradigmatic type. This seems to me a straightforward prediction. Are there any data at all on word-association aphasics? Was this part of your program, Dr. Geschwind?

Geschwind: Davis Howes and I did not study the problem Dr. Osgood has referred to, and I gather that Dr. Wepman has not done so either. I do not know whether Harold Goodglass has studied it.

Wepman: One of the unfortunate things about studies of aphasics is that they have all been studies of aphasia as a generality rather than as individual types of language disturbances. I think it is time in the study of aphasia that we start with peculiar types and generalize from the individual. I have lived through an endless number of sessions with groups of aphasics. Many aphasics do not talk, you know; most of them do not talk as much as we have been talking about them.

We find that when aphasics have some interchange they are inclined to communicate quite well with gestures. They are not inclined to speak very much to each other, and they do not tend to communicate to any extent without gestures.

I am not sure that aphasics in a naturalistic environment would provide very much of a verbal corpus for study. They talk much better to people who are not aphasics than they do to each other.

They talk to pictures better than they talk to other people. There seems to be a failure in human interrelationship at the verbal level. Consequently, they will talk in a room by themselves or to a set of pictures better than they will to another person. What then is a naturalistic environment for an aphasic patient?

Jakobson: In connection with Dr. Osgood's question, may I remind you of Luria's early monograph (1927) with the results of his observations on children's habitual responses to words. Are these responses paradigmatic or syntagmatic? Is the stimulus "house" responded to by "cabin" or some other word for a certain kind of house, or perhaps by a mere synonym of "house"? These are paradigmatic responses, whereas syntagmatic responses add to the word "house" some predicate or attribute: "stands", "burns", "broken", "old", "little". This duality corresponds to our observations on similarity *versus* contiguity.

As to Dr. Wepman's important remarks concerning the natural context of aphasic utterances, yes, the ideal would be to have not only tape recordings but also sound films, since gestures may play a considerable role. In general, in our detailed discussion of aphasia, it is appropriate to recollect a statement of Hughlings Jackson's to the effect that aphasia could be labeled "asemasia" because it is not necessarily confined to deficiencies in verbal behavior but *can* extend to other semiotic activities as well, for example, gestures accompanying speech.

Geschwind: I think Jackson was wrong in asserting that aphasia involves not only verbal activity but also involves all symbolic actions and gestures. This view is part of the old concept that aphasia is an aspect of a more generalized disturbance which was given the name "asymbolia". Jackson did not, in fact, make any extensive study of the use of movements by aphasics. The pioneer study in this field was made by Liepmann (1905), the same man who five years earlier had initiated the study of apraxia in its modern sense (1900). Liepmann showed, and I have been able to confirm (1963), that there are some aphasics who show great difficulty with learned limb movements, while others preserve them. Goodglass & Kaplan (1963) studied the same problem indepen-

dently and from a different point of view and came up with essentially the same conclusions: aphasics *may* have a disturbance of gesture language but this is not necessarily the case at all.

I can give one very good example from my own experience that aphasia cannot be regarded as a general disturbance of sign activities. This case is very similar to those studied by Liepmann (1905). My patient had a dense right hemiplegia together with an aphasia in which he showed a great paucity of speech but produced good single-word responses. He could not carry out simple commands with his left side, e.g., "Point to the floor" or "Make a fist". Yet he could reply to such questions as, "What occupation were you engaged in before you became ill?" with the correct answer, "Retired". When asked if he knew the use of a hammer, he replied, "Nails". He was able to point out when the examiner made a demanded move correctly, having rejected incorrect movements by the examiner. Close consideration of this case shows that the patient could give correct verbal responses (although of only one word) in situations in which he could not make the correct gesture. The reverse is also seen. In any case there is no support for a generalized asymbolia.

Jakobson: To avoid further misunderstandings, I must state that in his works on the affections of speech (1958), Jackson never claimed that each kind of aphasia is a general deficit in all the semiotic activities. But since verbal behavior is one of the semiotic activities, it is very important to find out in any type of aphasia the relation between the affections of language and the status of all other sign systems used by the patient. Evidently there is an interrelationship between different semiotic patterns, but it does not mean that all of them must necessarily be disturbed. I recall, for instance, once more the remarkable observations of Feuchtwanger (1932), who described the mutual independence of verbal intonation and musical melody. Either of them can be lost without any harm to the other. Aphasic cases of completely monotonous speech, without any syntactic and emotive intonations but with full mastery of complex musical melodies, and vice versa, were observed and recorded. In the question of verbal problems with

respect to other semiotic provinces, I am again for autonomy but against any isolationism. When investigating aphasia, we must perform an intrinsically linguistic analysis and at the same time pay due attention to the semiotic whole.

O. Lindsley: I wonder sometimes whether we do not pay too much attention to primarily sensory or motor aspects of aphasia. I am thinking here about attention, or attentional factors; about whether we pay attention to a group of words that we have said. As an illustration, I noticed Dr. Jakobson made two statements in his talk, and these were perfectly well made, but he corrected himself and said just the opposite. That means that he somehow was paying attention to auditory feedback or afterimages of what he had said. He may have been paying attention to the specific word combinations, the contiguities, or the sequence when he uttered these phrases, but apparently they did not satisfy him and therefore he came back and corrected them with the opposites.

What I am concerned about here is something that Lashley (1951) mentioned in the Hixon Symposium some years ago, namely that the sense of a particular word like "right", "rite", or "write", which is used in a variety of combinations, could only be known after one had uttered a whole sentence, and literally one had then laid before oneself the auditory feedback or, let us say, an after-imagery which enabled one to see the context in which these same sounds had been used, as in "millwright" or the "rite" of ritual, and so forth. In other words, I am wondering whether the deterioration we are looking for is one of specific reception as much as it is of the overall attention that one pays not to individual words but to groups of words. I take it that Luria is interested in something of this sort because he has written to me about some literature on reticular activation. I suppose he has in mind attention as well. He made the statement that the only lesions which led to deterioration of verbal instruction were in the frontal area. I take it that by "verbal instruction" he means being able to keep in mind attentively, for a long period, something which has been uttered as a verbal instruction, or which the individual gives himself as a verbal instruction. So, in relation to Dr. Jakobson's state-

ment about the role of mediobasal areas, I am really concerned about whether we know something about mechanisms which control attention. If nonspecific thalamic nuclei regulate the rhythms of the brain, and if the rhythms of the brain have anything to do with attention, as some people, including myself, think, then the dorsomedial and intralaminar areas of the thalamus may possibly be concerned with this attentive role.

I believe that attentional mechanisms ought to be given more consideration when we examine aphasics. I do not know precisely how one goes about this, but I think the matter of getting at attentional mechanisms and the auditory afterimagery or the delayed feedback would be a very important part of it.

Jakobson: Dr. Lindsley's comments are most relevant. In our own activities, when we are somewhat tired and want to say many things, we can make aphasia-like mistakes and immediately correct ourselves. Yet we can concentrate our attention in two different ways – either on the context or on its constituents. That is the essential difference between us and aphasics. Aphasics have a unilaterally oriented attention, neglecting either the whole or the constituents, without being able to be unitarian, as some students of aphasia would like to see them. The clear-cut types of aphasia present the most striking examples of such one-sidedness.

For instance, in Paris Professor J. Alajouanine presented me with his most interesting cases of aphasia. There was one remarkable example of sensory aphasia, a French truck driver who had had a traffic accident. His high intelligence was preserved, however, and he was able to help us efficiently in our examination of his case. He understood what we were talking about, tried to inform us, spoke readily, and uttered long sentences. The main difficulty for this patient was to begin a sentence; its initial word was a serious handicap for him, especially when the sentence was the first in an utterance. Also, when one showed him something, e.g., a pencil, and asked, "What is this?" he could provide a detailed comment without being able to name the thing itself. Or if he was posed the question, "What is a pencil?" he could not build the required equation. How consistently the patient elim-

inated the initial subject of the sentence may be illustrated by the following circumstance. He was writing, and we asked him what he was doing; the man answered, "J'écris." Professor Alajouanine took a pen and we asked the patient what he was doing; the answer was: "Il écrit." Then I started to write and asked him what I was doing, but he was unable to start a reply. Why? Because with autonomous initial words in French – *vous, nous*, etc. – it is possible to build elliptic one-word sentences: "Qui écrit?" – "Vous." On the other hand, such elements as *je, tu, il* are mere preverbal prefixes. We repeated and repeated, in various ways, the same experiments, and we saw that the personal pronoun handicapped the patient only when it was an independent grammatical subject, whereas when functioning as preverb it presented no difficulties.

As to the question of Luria's observations about difficulties in fulfilling instruction, it is merely a variant of dynamic aphasia with the most frontal localization. Luria emphasizes the patient's inability to carry out instructions received. When we analyze all the examples he gives in different studies devoted to the "directive function of speech" (1958, 1959, 1962, 1964), we note that the common denominator of all these cases is the impossibility of passing from one system of signs to another. If one says, for instance, "Draw a circle", the patient, who has to switch from verbal activity to another semiotic system – in this case drawing – is embarrassed. We find here various types of intersemiotic relations, such as the transition from gestures to words, from words to gestures, from words to pictures, etc. I think this impairment can be clearly explained as a variant of encoding disturbances.

I. J. Hirsh: With respect to this linguistic analysis of aphasia, I want to ask whether all the aspects you have described are necessarily language-bound aphasia, in particular some of the deficiencies that you described in the cases of sensory aphasia. In reference to the duration of vowels in Czech and Hungarian, you mentioned a patient who had difficulty in judging or discriminating the durations of auditory signals when they were not words. I wonder whether this same specificity of the difficulty can be enlarged to other dimensions. Consider the example Dr. Geschwind gave

about repetition (p. 112). Is repetition more difficult for whole linguistic units, like words? Would this patient have less difficulty repeating single idiophones, or would the patient, as Dr. Geschwind said, have less difficulty in repeating sounds in a language other than his own? Finally, in the question of sequence, can the patient who has difficulty with verbal sequence demonstrate that he has no difficulty with sequences outside of language?

Jakobson: The structure of verbal sequence (its immediate constituents and its basically subordinative structure) is quite different from other temporal sequences, and therefore verbal sequences naturally confront the patient with specific problems.

In Czech – I borrow an example from the valuable study of the Prague expert on aphasia, A. Pick (1949) – “drāha”, with the length of the first vowel, means “road”; “drahā”, with the length of the second vowel, means “dear” (feminine). The difference between long and short vowels is one of the basic distinctive features in the prosodic structure of Czech or Hungarian, but the distinctive role of this difference can be lost in the language of a native aphasic, and both quoted words become homonyms, although the ability to pronounce vowels of longer and shorter duration and to perceive their acoustical difference may be preserved. The Oslo psychiatrist Monrad-Krohn (1947) describes the case of a Norwegian woman who during an air attack was wounded in the brain, incurring a very limited aphasia: she lost the ability to distinguish, both when listening and when speaking, the two word intonations which play a significant phonemic role in the Norwegian language. The fact that Norwegian intonations differentiate meanings of words precludes their use for emotive variations of sentences; in German, however, where intonational differences are not utilized for the distinction of words, they assume an emotive function. As soon as Monrad-Krohn’s patient ceased to employ word intonations for phonemic purposes, she shifted to an emotive use of intonations. The results were distressing. When she shopped, the Norwegians did not want to sell her anything, suspecting her of being a German, although in fact she knew no German. What was lost in these cases was not the Czech vocalic length or the

Norwegian pitch, but only a certain linguistic function which these features carry in their given languages. It is important to insist on this point because too often an extrinsically acoustic or articulatory interpretation is erroneously substituted for a thoroughly linguistic, phonemic approach. In any given case one must determine what is deficient in the patient's speech – phonemic distinctions or mere variations (contextual or optional) – and, whether there are some corresponding deficits in his perception and reproduction of foreign speech sounds and of nonverbal auditory signals.

Paper presented and discussed at the Conference on Speech, Language and Communication, sponsored by the Brain Research Institute, University of California, Los Angeles, in November 1963 and published in *Brain Function*, III, No. 4 (University of California Press, 1966).

BIBLIOGRAPHY

- Alajouanine, T.
1956 "Verbal reaction in Aphasia", *Brain* 79, 1.
- Alajouanine, T., A. Ombredane, and M. Durand
1939 *Le syndrome de désintégration dans l'aphasie* (Paris).
- Anan'ev, B. G.
1960 *Psixologija čuvstvennogo poznanija* (Moscow).
- Bastian, H. C.
1869 "On the various forms of loss of speech in cerebral disease", *Brit. For. Med.-Chir. Rev.*
- Baudouin de Courtenay, J.
1881 *Podrobnaja programma lekcij v 1877-1878 utebnom godu* (Kazan).
- Beyn, E. S.
1957 *Vop. Psixol.*, 4, 90.
- Bloomfield, L.
1933 *Language* (New York).
- Brain, W. R.
1961 *Speech Disorders* (London).
1964 "Statement of the Problem", *Disorders of Language* (A. V. S. de Reuck and M. O'Connor, eds.) (London), 5-20.
- Broch, O.
1927 "Russenorsk", *Archiv für slavische Philologie* 41, 209, 262.
- Carnap, R.
1948 *Meaning and Necessity* (Chicago).
- Critchley, M.
1959 In *The Centennial Lectures commemorating the one hundredth anniversary of E. R. Squibb and Sons* (New York), 269.
- Dejerine, J.
1892 "Contribution à l'étude anatomo-pathologique et clinique des différentes variétés de cécité verbale", *C. R. Soc. Biol.* (Paris), 44, 61-90.
- de Reuck, A. V. S. and M. O'Connor (eds.)
1964 *Disorders of Language* (London).
- Doroszewski, W.
1963 "Język – system znaków a procesy mowy", *Sprawozd. Prac Nauk. Wydz. Nauk Społecz.*

- Feuchtwanger, E.
1932 "Amusie", *Fortschr. Neurol. Psychiat.*, 4, 289-305.
- Fillenbaum, S., L. V. Jones and J. M. Wepman
1961 "Some linguistic features of speech from aphasic patients", *Lang. Speech*, 4, 91-108.
- Frazer, J. G.
1950 *The Golden Bough*, Part I, 3rd ed. (Vienna), chapter III.
- Freud, S.
1950 *Die Traumdeutung*, 9th ed. (Vienna).
1953 *On Aphasia* (New York).
- Fry, D. B.
1959 *Language and Speech* 2, 52.
- Georgieva, E.
1959 "Mama i majka", *Bölgarski ezik* 9, 287-289.
- Geschwind, N.
1962 "The anatomy of acquired disorders of reading", *Reading Disability* (J. Money, ed.) (Baltimore), 115-129.
1963 "Sympathetic dyspraxia", *Trans. Am. Neurol. Ass.* 88, 219-220.
- Goldstein K.
1917 "Die transkortialen Aphasien", *Erg. Neurol. Psychiat.* 2, 352-629.
1927 "Die Lokalisation in der Grosshirnrinde; nach den Erfahrungen am kranken Menschen", *Handbuch der Normalen und Pathologischen Physiologie* Vol. 10 (A. Bethe et. al. eds.) (Berlin), 600-842.
1948 *Language and Language Disturbances; Aphasic Symptom Complexes and Their Significance for Medicine and Theory of Language* (New York).
- Goodglass, H. and J. Berko
1960 "Agrammatism and inflectional morphology in English", *J. Speech Hear. Res.*, 257-267.
- Goodglass, H. and J. Hunt
1958 "Grammatical complexity and aphasic speech", *Word* 14, 197-207.
- Goodglass, H. and E. Kaplan
1963 "Disturbance of gesture and pantomime in aphasia", *Brain* 86, 703-720.
- Goodglass, H. and J. Mayer
1958 "Agrammatism in aphasia", *J. Speech Hear. Dis.* 23, 99-111.
- Grégoire, A.
1937 *L'apprentissage du langage* (= *Bibliothèque de la Faculté de Philosophie et Lettres de l'Université de Liège*, 73).
- Groot, A. W. de
1957 "Classification of word-groups", *Lingua*, 6, 113.
- Gvozdev, A.
1929 "Nabljudenija nad jazykom malen'kix detej", *Russkij jazyk v sovetskoj škole* (Moscow).
1948 *Usvoenie rebenkom zvukovoj storony russkogo jazyka* (Moscow).
1949 *Formirovanie u rebenka grammatičeskogo stroja russkogo jazyka* (Moscow).
- Head, H.

- 1926 *Aphasia and Kindred Disorders of Speech* (New York).
- Hemphill, R. E., and E. Stengel
1940 "A study on pure word-deafness", *J. Neurol. Psychiat.* 3, 251-262.
- Holmes, G.
1950 "Pure word blindness", *Folia Psychiat. Neurol. Neurochir. Neerl.* 53, 279-288.
- Isserlin, M.
1936 "Aphasie", *Handbuch der Neurologie* Vol. IV (O. Bumke and O. Foerster, eds.) (Berlin), 627-806.
- Ivanov, V. V.
1962 "Lingvistika i issledovanie afazii", *Strukturno-tipologičeskie issledovanija* (T. N. Mološnaja, ed.) (Moscow), 70-95.
- Jackson, J. Hughlings
1958 *Selected Writings* (New York).
- Jakobson, R.
1923 *O češskom stixu* (Berlin-Moscow).
1941 "Kindersprache, Aphasie und allgemeine Lautgesetze", *Uppsala Universitets årsskrift*, 1-83.
1962 *Selected Writings I* (The Hague).
- Jakobson, R. and M. Halle
1957 "Phonology in Relation to Phonetics", *Manual of Phonetics* (L. Kaiser, ed.) (Amsterdam), 215-251.
- Jespersen, O.
1922 *Language, Its Nature, Development and Origin* (London-New York).
- Kamegulov, A.
1930 *Stil' Gleba Uspenskogo* (Leningrad).
- Kruszewski, N.
1883 *Očerki nauki o jazyke* (Kazan).
- Lashley, K. S.
1951 "The problem of serial order in behavior", *Cerebral Mechanisms in Behavior* (L. A. Jeffress, ed.) (New York), 112-146.
- Lenneberg, E. H.
1962 "Understanding language without ability to speak: a case report", *J. Abnorm. Soc. Psychol.*, 419-425.
- Leopold, W. F.
1939 *Speech Development of a Bilingual Child, 1: Vocabulary Growth in the First Two Years* (Evanston & Chicago).
1947 *Speech Development of the Bilingual Child, 2: Sound Learning in the First Two Years* (Evanston & Chicago).
- Lewis, M. M.
1951 *Infant Speech* (New York & London).
- Liepman, H.
1898 *Ein Fall von reiner Sprachtaubheit: Psychiatrische Abhandlungen* (Breslau).
1900 "Das Krankheitsbild der Apraxie ('motorischen Asymbolie') auf Grund eines Falles von einseitiger Apraxie", *Mtschr. Psychiat. Neurol.* 8, 15-44; 102-132; 182-197.
1905 "Die linke Hemisphäre und das Handeln", *Münch. med. Wschr.* 52,

- 2322-2326, 2375-2378.
- Liepmann, H. and E. Storch
1902 "Der mikroskopische Gehirnbefund bei dem Fall Gorstelle", *Mtschr. Psychiat. Neurol.*, 11, 115-120.
- Lotmar, F.
1933 "Zur Pathophysiologie der erschwerten Wortfindung bei Aphasischen", *Schweiz, Archiv für Neurologie und Psychiatrie* 35, 104.
- Luria, A. R.
1927 *Rečevye reakcii rebenka* (Moscow).
1947 *Travmatičeskaja afazija* (Moscow).
1958 "Brain disorders and language analysis", *Lang. Speech* 1, 14-34.
1959a "The directive function of speech in development and dissolution", *Word* 15, 341-352, 453-464.
1959b "Disorders of 'simultaneous perception' in a case of bilateral occipitoparietal brain injury", *Brain* 82, 437-449.
1962 *Vysšie korkovyje funkeii čeloveka i ix narušenie pri lokal'nyx poraženijax mozga* (Moscow).
1963 *Mozg čeloveka i psixičeskie processy* (Moscow).
- Mandelbrot, B.
1954 "Structure formelle des textes et communication", *Word* 10.
- Marie, P.
1926 *Travaux et Mémoires*, Vol. 1 (Paris).
- Marie, P. and C. Fox
1917 "Les aphasies de guerre", *Rev. Neurol.* 31, 53-87.
- Maruszewski, M. and H. Mierzejewska
1964 "Zastosowanie analizy lingwistycznej w badaniach nad afazją", *Studia Psychologiczne* 5, 73-103.
- Mettler, F.
1949 *Selective Partial Ablation of the Frontal Cortex* (New York).
- Miller, G.
1956 "The magical number seven, plus or minus two: some limits on our capacity for processing information", *Psychol. Rev.* 63, 81-97.
- Monrad-Krohn, G. H.
1947 "Dysprosody or altered 'melody of language'", *Brain* 70, 405-415.
- Murdock, G. P.
1957 "World Ethnographic Sample", *American Anthropologist* 59, 664-687.
1959 "Cross-Language Parallels in Parental Kin Terms", *Anthropological Linguistics* 1, 1-5.
- Myklebust, H.
1954 *Auditory Disorders in Children* (New York).
- Ombredane, A.
1951 *L'aphasie et l'élaboration de la pensée explicite* (Paris).
- Osgood, C. E.
1957 "Motivational dynamics of language behavior", *Nebraska Symposium on Motivation* (M. Jones, ed.) (Lincoln), 348-424.
- Osgood, C. E. and M. S. Miron (eds.)
1963 *Approaches to the Study of Aphasia* (Urbana).
- Panse, F. and T. Shimoyama

- 1955 *Arch. Psychiat. Nervenkr.* 193, 131.
- Parsons, T.
1955 "Family Structure and the Socialization of the Child", *Family Socialization and Interaction Process*, by T. Parsons and R. F. Bales (Glen-coe, Ill.).
- Peirce, C. H.
1932 *Collected Papers* Vol. 2 (C. Harsthorne and P. Weiss, eds.) (Cam-bridge).
- Penfield, W. and L. Roberts
1959 *Speech and Brain Mechanisms* (Princeton).
- Pick, A.
1949 "Über Änderungen des Sprachcharakters als Begleiterscheinung aphasischer Störungen", *Zschr. Neurol. Psychiat.* 45, 230-241.
- Pollack, I.
1959 "Message Repetition and Message Reception", *Journal of the Acous-tical Society of America* 31, 1509-1515.
- Pribram, K. H.
1960a "The intrinsic systems of the forebrain", *Handbook of Physiology: Neurophysiology 2* (J. Field, H. W. Magoun, and V. E. Hall, eds.) (Washington), 1323-1344.
1960b "A review of theory in physiological psychology", *Ann. Rev. Psychol.* 11, 1-40.
- Rapport au VI Congrès de la Société française de phoniatrie
1939 *Rev. franç. phoniatrie* 7.
- Ross, A. S. C., P. R. F. Clark, and N. L. Haddock
1964 "Edition of text from a dysphasic patient", *Disorders of Language* (A. V. S. de Reuck and M. O'Connor, eds.) (London), 299-323.
- Ruesch, J. and G. Bateson
1951 *Communication, the Social Matrix of Psychiatry* (New York): 183ff.
- Saussure, F. de
1922 *Cours de linguistique générale*, 2nd ed. (Paris).
- Smoczyński, P.
1955 "Przyswajanie przez dziecko podstaw systemu językowego", *Societas Scientiarum Lodziensis, Sectio I, no. 19*.
- Sokolov, A. N.
1959 "Issledovanija po probleme rečevyx mexanizmov myšlenija", *Psixologičeskaja Nauka v SSSR* Vol. 1 (Moscow), 488-515.
- Stutterheim, C. F. P.
1941 *Het begrip metaphor* (Amsterdam).
- Symonds, C.
1953 "Aphasia", *J. Neurol. Neurosurg. Psychiat.* 16, 1-6.
- Trubetzkoy, N.
1949 *Principes de phonologie* (Paris).
- Vasmer, M.
1954 "otéc", *Russisches etymologisches Wörterbuch* 2, 290.
- Vygotsky, L. S.
1962 *Thought and Language* (E. Hanfmann and G. Vakar, eds. and transl.) (Cambridge).

- Weir, R.
1962 *Language in the Crib* (The Hague).
- Werner, H.
1919 "Die Ursprünge der Metapher".
1940 *Comparative Psychology of Mental Development*, 2nd rev. ed. 1957, (New York).
- Wernicke, C.
1874 *Der aphasische Symptomencomplex. Eine psychologische Studie auf anatomischer Basis* (Breslau).
- Wolpert, I.
1929 *Dtsch. Z. Nervenheilk.* 3, 187.
- Žinkin, N. I.
1958 *Mexanizmy reči* (Moscow) (English translation [*Mechanisms of Speech*] published by Mouton, The Hague, 1968).
1959 In *Psixologičeskaja nauka v SSSR* 1 (Moscow), 470.
- Zipf, G. K.
1949 *Human Behavior and the Principle of Least Effort* (Cambridge).