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FACTORS AND FORMS OF APHASIA

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CONTEMPORARY neurophysiology and micro-anatomy of the brain have substantially advanced our conceptions of the functional organization of this complex organ, and progress in our knowledge of the structure of language and the evolution of speech processes has made the contemporary study of speech much richer than it was a few decades ago.

As a result of the work of I. P. Pavlov and his school there exist excellent grounds for considering the cerebral cortex as the central section of the extero-, proprio-, and interoceptive analysers, which connect the organism with the outer and inner world and permit regulation of its activity. According to this point of view, the fundamental forms of reflection of the outer world and the regulation of behaviour are carried out in man by means of the analysis and synthesis of immediate signals impinging on the organism, and also by means of the "second system of signals" (at whose base lies speech) which processes the immediate impressions and forms a higher level of indirect, or "symbolic", reflection of reality.

Man's speech activity, which is based on the interaction of separate analysers, not only participates in the creation of an abstract and generalized picture of the world, but also creates new conditions for the regulation of human behaviour. Speech allows us to single out the essential aspects of the stimulation which impinges on us, to analyse the conditions of the tasks which are posed, to formulate an intention, to plan for their solution and to collate the results obtained with the initial plans. In all of these ways, speech provides for flexible self-regulation of man's psychological activity.

* Professor Luria was unable to attend the meeting and his paper was read for him by Dr. Macdonald Critchley.

In the light of contemporary morphological data, there is good reason to look upon the neural organization of the cerebral cortex as a complex hierarchical system, the separate parts of which are connected by vertical (afferent-efferent) and horizontal (transcortical) linkages.

Underlying each of the fundamental sections of the cortex are the "primary" or "extrinsic" zones. These zones receive afferent fibres from those nuclei of the thalamus which have a direct connexion with the periphery.

These zones are overlain by "secondary" or "projectional-associative" zones (Poliakov, 1959, 1962) whose neuronal organization is close to that of the primary zones, but which differ in that the second and third layers of the cortex are more developed. Thanks to this greater development, these secondary zones provide more complex and systemic forms of operation of the given analyser.

The third level of organization of the cerebral cortex consists of the so-called "tertiary zones" ("intrinsic" zones) which receive impulses from both the intermediary nuclei of the thalamus and from other primary parts of the cerebral cortex. They may be considered "overlapping zones" of the cortical endings of the separate analysers. These sections of the cerebral cortex possess a lesser degree of modal specificity and apparently they are connected with the execution of more complex functions, entailing several analysers. There are many reasons for believing that the posterior parts of the tertiary zones are connected chiefly with the execution of what Sechenov (1878) called "the synthesis of separate influences in simultaneous groups". The anterior (fronto-temporal) parts of these zones act chiefly in synthesizing the separate influences into sequential series (Luria, 1958, 1963).

If we accept that all the systems are under the constant, tonic influence of the reticular formation and provide multilevel zones of excitation in the central nervous system, then the circle of knowledge with which the study of the pathology of higher nervous functions, and in particular aphasia, must be linked will become clear.

Contemporary psychology and linguistics allow us to regard speech as a complex functional system which uses language for communication, for the formation of cognitive processes, and for the regulation of one's own behaviour.

Language, which man uses for communication and the organization of psychic processes, is a complex system of codes which allows us to designate known objects in conditional auditory complexes, to form concepts, and to develop thought within certain contexts. Each side of this system possesses its own functional organization.

Troubezkoï (1939), Jakobson and Halle (1956), and others have shown that these codes are organized into a system of phonemes, each of which singles out definite, persistent sound-cues from the flow of sound. These cues play a decisive rôle in the corresponding language. Both auditory and articulative analysis participate in the selection of these persistent units of oral speech, and even small changes in these essential (or "phonemic") auditory-articulate cues unavoidably lead to a change in the sense of the word (for example, the change in the sound which alters the meaning of the English word "gold" into the word "cold", or the word "vine" into the word "wine"). These stable units of speech, or phonemes, are united in words of certain sequential series to form the basis for the sound system of language. All these very complex systems of phonemic codes come into existence with the close participation of the auditory and kinaesthetic analysers. When these forms of analysis are disturbed the sound organization of speech may break down.

The whole system of phonemes is itself formed under the influence of more complex systems of semantic codes which have been laid down during social history and are mastered by the children in contact with adults. This system of semantic codes possesses a complex hierarchical structure. It begins with the system of words, behind each of which there stands not only a unitary image, but a complex system of generalizations of those things which the word signifies. A conception of the significance of a word as a system of generalizations, and the psychological

analysis of its development was given by Vygotsky (1934); he demonstrated the complexity of the semantic connexions which stand behind a word and described the fundamental stages of their formation. The study of a word's semantic structure constitutes one of the great achievements of contemporary psychology. The semantic organization of language is continued in a system of grammatical and, in particular, syntactic codes, which permit the formulation of complex relations of phenomena as well as the change from a unitary concept to logical connexions. This system of logico-grammatical codes, which has been well studied by linguists, makes language a means which allows us to express a connexion or relation, and which constitutes the basis for complex cognitive processes.

Speech processes based on the phonetic and semantic codes of language have another aspect, which unfortunately, has attracted insufficient attention. As Jackson (1884) showed, speech consists not so much of separate words as of sentences and expressions in which a single thought is formed, and which constitute units of extended speech. As the classical investigations of neurologists and psychologists have shown, this process of transition from thought to developed expression and back again takes place with the closest participation of inner speech, and constitutes a very special side of the organization of the speech process which has particularly attracted the attention of linguists in recent years (Jakobson and Halle, 1956; Chomsky, 1957).

Speech, then, is a complex functional system which is supported by the combined work of a whole series of zones in the cerebral cortex, each of which makes a specific contribution to the development of speech.

Naturally the destruction of any zone in the cerebral cortex first interferes with the work of one or other of the analysers which participate in the speech process, and, secondly, leads to the disintegration of all functional systems of speech.

Our best course is to examine a series of examples which show to what an extent speech defects take on different forms when each of these factors is isolated.

Sensory Aphasia

We will begin with an analysis of those forms of speech disorder which arise after destruction of the left temporal lobe.

Since the time of Wernicke (1874) it has been known that destruction of the posterior third of the upper temporal convolution of the left hemisphere produces a *sensory aphasia*, which includes the symptoms of disturbance of the understanding of speech, defects in the repetition of words and naming of objects, impairment in writing, and several distinctive defects of the patient's spontaneous speech.

The physiological mechanisms underlying these defects have for long been obscure. Some workers visualized a disintegration of the "auditory image of the word", which, it was assumed, was caused by the loss of perception of the speech parts of the tone scale. Others denied the auditory nature of these defects and claimed that sensory aphasia should be regarded as a specific manifestation of some more general intellectual disorder.

Time has revealed the fallacies of both points of view. Later investigators found that the acuity of hearing throughout the tone-scale is preserved; on the other hand, it has been convincingly shown that such patients can in no way be looked upon as demented and even operations of abstract thought may be intact (Beyn, 1947; Luria, 1947).

Further investigation suggested sensory aphasia to be a particular disorder of auditory function—a *type of disturbance of the analysis and synthesis of speech sounds* which arises when the cortical elements of the auditory analyser are impaired.

In the most severe cases, the patient is unable to pick out the principal (meaning-differentiating) cues of speech sounds. In milder cases the defect shows itself only when attempts are made to distinguish somewhat similar phonemes (for instance, voiced and unvoiced consonants, such as "b" and "p", "d" and "t"). Therefore such patients write or repeat syllables "bapa" as "baba" or "papa", showing that they are aware of some kind of difference, but are not able to specify this difference.

Comparable disturbances appear when an attempt is made to develop differential conditioned reflexes. Patients quickly master the instruction to lift the right hand on hearing a high tone, and the left on hearing a low tone, and they perform these actions without errors. However, they are unable to perform

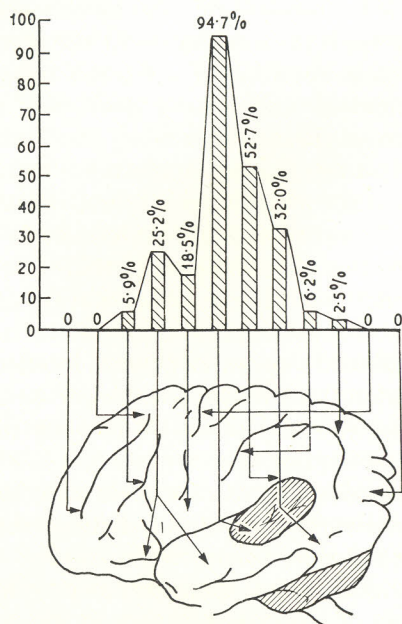


FIG. 1. The number of failures in discrimination of correlative phonemes in different brain lesions (based on 800 observations of missile wounds of the left hemisphere).

the same differentiating reactions in answer to speech sounds (for instance, raise the right hand at the sound "b", and the left hand at the sound "p"). The patients either confuse these sounds, or else they begin to differentiate them by some non-essential cue, such as their pitch.

Fig. 1, representing the combined results from approximately

800 patients with missile wounds of the brain, illustrates this condition, showing that similar disturbances are chiefly found during destruction of the posterior sections of the upper temporal convolutions of the left hemisphere or the zones of the cerebral cortex located in the immediate vicinity of these sections.

It is of interest that gross destruction of phonemic hearing is not necessarily accompanied by the disintegration of other forms of auditory analysis. In a series of cases one could see that the differentiation of rhythmical and pitch relations remained when the left temporal region was impaired.

The disturbance of phonemic hearing may with good reason be regarded as a *primary defect* which arises when the upper and posterior section of the left temporal lobe is destroyed. Only in very rare cases of so-called pure verbal deafness can such a defect remain an isolated symptom. Usually it leads to a whole system of secondary disorders which constitute the picture of sensory aphasia.

Naturally, a patient whose phonemic hearing is disturbed cannot distinguish sounds within the flow of speech and cannot accurately repeat words. Each attempt evokes confusion and vain attempts to grope for that sound. It is therefore just this repetition of syllables, words, and especially phrases, which evoke sound substitutions in such a patient, and occasionally, if he catches the general meaning of the word or phrase, verbal paraphasia. Such a patient can easily copy a sentence from a given text, but when dictated to he is completely helpless. This in turn leads to great difficulty in the isolation of separate phonemes, to substitution of acoustically similar phonemes, and to inability to preserve intact the necessary auditory components of words.

Disturbance of phonemic hearing obviously precludes understanding of the meaning of the word which reaches the subject. Being converted into an inco-ordinate combination of sounds, sometimes bordering on noise, words cease to be perceived as articulated sound-complexes with clear-cut meaning. Sometimes the patient begins to guess the meaning of the words on the basis of imperfect sound cues. Thus the Russian word "golos" (voice) which has lost its phonemic clarity is sometimes

perceived by the patient as "kolos" (ear), sometimes as "kholost" (bachelor), sometimes as "gorod" (city). In less marked cases, such disturbance in understanding the meaning of a word occurs only in fatigue, or especially when the volume of words presented to the patient increases. Therefore, the repetition of the task "show me your eye . . . nose . . . ear . . . eye . . . ear . . . nose" quickly causes a patient to exhibit the phenomenon of "alienation of the meaning of words", and the patient, repeating "no . . . nosh . . . nozh . . . What is a nozh?", begins to experience noticeable difficulties in pointing out the named object. This phenomenon appears even more clearly during the simultaneous presentation of a *pair of words* ("show me your eye and nose . . . ear and eye"). In this case the patient either forgets one of the words, or misinterprets its pronunciation, or even loses grasp of its meaning, pointing to some entirely different object.

Naturally, disintegration of phonemic hearing also leads to disturbance in *naming* of objects. The instability of the sound-structure of words sometimes so impedes their appearance that even a hint of the initial sounds of the word cannot help the patient to grasp it, and he either attempts to overcome the blending of close phonemes by giving literal paraphrasias, or he reproduces a word which is associatively connected with one he is seeking. As investigations have shown (Lotmar, 1919, 1933; Sapir, 1929; Galperin and Golubova, 1933; Ombredane, 1951), this arousal of accessory associations is subject to a series of physiological laws, and appears more clearly the less the patient's attention is attracted by the location of the sound structure of the word sought.

Intellectual disturbance in patients with sensory aphasia (which, unfortunately, has been studied only rarely) (see Beyn, 1947; Ombredane, 1951) occurs especially in those aspects of the intellectual process where speech links are essential.

Acoustic-Amnesic Aphasia

Destruction of the temporal region of the brain does not always evoke the picture of sensory aphasia which we have just

described. Intra-cerebral tumours or abscesses of the left temporal area, like impairment of the central sections of the temporal lobe, may not destroy the secondary areas of the auditory cortex, but only put them into a pathological state.

In these cases, phonemic hearing may remain relatively intact and the defects described below occur only in special situations, manifesting themselves primarily in impaired retention of stable audio-speech traces.

Such patients may correctly repeat phonemes similar in sound and they lose their clear differentiation only when the amount of information impinging upon them is increased (for instance, making a mistake during the reproduction of three sequential syllables: Ba-pa-ba or pa-ba-pa, or when writing three words similar in sound structure: zabor, sabor, zapor—fence, church and bolt).

They repeat separate words easily, but they are unable to repeat a series of three or four words, especially if it is suggested that they maintain a given order. They are often hindered in naming subjects and in addition, hinting the beginning of a word is of little help. In connexion with this, they find significant difficulty in developed speech and speech thought, which is greatly disturbed because of the instability of verbal traces.

I have described this syndrome as "acoustic amnesic" aphasia elsewhere (Luria, 1947, 1962) and will not dwell on it in more detail here.

Motor Aphasia

Since the time of Broca the view has existed that motor aphasia follows a lesion of the posterior third of the lower frontal convolution of the left hemisphere (Broca's area), and that its basis is a disturbance of the "motor image of the word".

Both views have turned out to be inexact. It is now clear that motor aphasia may occur with impairment of at least two different centres in the brain, and that different factors underlie the two resulting forms of motor aphasia.

Aphasia which arises from damage to the lower part of the post-central region of the left hemisphere (operculum

Rolandi) may be called *afferent (or kinaesthetic)* motor aphasia; and we may call aphasia which appears when the Broca zone is disturbed, *efferent (or kinetic)* motor aphasia. Each of these types is connected with separate primary defects and is characterized by separate clinical syndromes.

Afferent Motor Aphasia

No movement can be accomplished without its own clear-cut *afferent basis*. The efferent impulse itself cannot maintain guided movement which involves a great number of possible components. Only systems of continual afferent correction may give efferent impulses the needed address, impart to them the needed corrections and thus give movement practical guidance.

This view is also supported in relation to speech articulation. The complex combinations of delicate movements of the tongue, lips, and larynx require especially clear-cut directional impulses. If the necessary afferent synthesis is impaired, the differential directional impulses, necessary for speech muscles, become impossible.

Such afferent synthesis is provided by the post-central part of the cortex. If the impaired centre affects the upper or middle parts of these sections, there arises the phenomenon of "afferent paresis" or cortical afferent ataxia or apraxia. If the injury is located in the lower sections of this zone movements of the articulatory muscles lose their afferent basis and the fundamental units of motor speech, the articulems, are fundamentally disturbed.

In more severe cases of such disorders, the patient cannot find a single combination of movements needed for the pronunciation of the corresponding sound. In milder cases (and also in the early stages of the growth of a tumour in this area, or in the late stages of recovery) these substitutions begin to take on a more concrete character, and the patient may repeat "l" as "n" or "d" (a confusion of sounds made by the front part of the tongue) or "b" as "m" or "p" (confusion of lip sounds). This *disturbance of the articulem* constitutes a primary defect which arises during impairment of a given area of the brain.

This primary defect leads to secondary or systemic disturbances, which in turn create a form of afferent (or kinaesthetic) motor aphasia.

Such a patient is not able to pronounce sounds or words using a kinaesthetic foundation, but may successfully compensate for this defect by using visual afferentation as a guide. Restorative work in these patients therefore uses the reconstruction of articulations on the basis of visual analysis.

Analogous defects appear in these patients in *writing*. Articulations which are used to specify the sound structure of a word participate so actively in writing that it suffices to ask a young schoolboy to write when his tongue is immobile or his mouth is open (so that the possibility of normal articulation is excluded) to cause the number of errors in writing to increase sixfold (Nazarova, 1952). Therefore it is entirely natural that during disturbance of articulation, writing is impeded, with defects reflecting the defects of the articulem. Unlike the cases of sensory aphasia described above, here substitutions of sounds close in their articulation appear, and such a patient might write "khalat" (robe) as "khanat" or "khatat", "stol" (table) as "snot", or "snol" and show great difficulty noticing and correcting these errors.

Efferent Motor Aphasia

Efferent (kinetic) motor aphasia, which arises when Broca's area is destroyed, differs considerably from the afferent (kinaesthetic) motor aphasia. Different factors underlie it and the disturbances of motor speech which are observed during its presence are of a different character.

To pronounce a whole word the presence of clearly differentiated articulations is not sufficient. It is also necessary to have smooth transitions of separate articulations, each of which, in practice, is defined by its place in the whole series of sounds which constitute the word (the sound "p" in the words "pool", "pellet", and "pink" is pronounced differently, depending on the anticipated vowels). Any disturbance of the ability to modify articulation depending on the place of the sound in the

word unavoidably leads to disturbance of the speech act. In this way pronunciation of a separate word is already connected with the *sequential (serial) organization of articulation*.

There are many reasons for thinking that the cerebral organization of the motor processes built up serially over time (in other words, kinetic organization) is primarily provided for by special systems of the cortex, and that the *frontal areas of the brain*, in particular the *premotor zone*, are of decisive significance in this connexion.

Impairment of the premotor areas of the brain does not destroy the kinaesthetic basis of movement, but leads to marked disturbance of its serial organization (skilled movements) (Fulton, 1935; Foerster, 1936; Luria, 1947, 1962, 1963). Patients with such impairments are not in a condition to de-innervate a preceding link of movement and to move smoothly on to the next link. They cannot break a given rhythm, or complete a motor habit smoothly, and the "kinetic melody" in them turns into a series of isolated movements, each of which requires its own special impulse.

Analogous phenomena arise in speech acts when the Broca's area is impaired. Patients with such impairment (Luria, 1948, 1962), unlike those with afferent motor aphasia, exhibit movements which are necessary for the articulation of separate sounds; however, they prove not to be in a condition to change an articulation relative to its place in a word, to de-innervate a previous articulation, or to change smoothly from one articulation to another. Attempting to pronounce the Russian word "mookha" (fly), they hopelessly repeat "moo . . . m . . . m . . . ma" and they move from one articulation to another only if both articulative complexes are introduced in highly different contexts (for instance: "moo" equals the cow moos, "ha" equals the man laughs). The pronunciation of words requiring more complex transitions becomes a completely unattainable goal. All of this gives us a basis for calling this form efferent (or kinetic) motor aphasia.

The disturbance of serial organization of a spoken word and the pathological inertness of its elements are reflected in the

writing of patients with efferent (kinetic) motor aphasia. The obstacles in writing consist not so much in the inability to distinguish the necessary sounds and letters as in the disturbance of the serial organization of the sounds in the words. Typical are the rearrangement of letters in the word, the repetition of letters, and, when the lesion has spread to subcortical motor ganglia, the perseveration of separate movement elements in writing.

Characteristic peculiarities appear both in repeated speech and in remembered speech of the patients of this group. Disturbance of dynamic schemes (kinetic melodies) and pathological inertness of the motor processes indicate that speech becomes de-automatized. A word once aroused easily becomes perseverated and the correct repetition of new words or the designation of new subjects is easily replaced by the perseverated reproduction of a previous word which is only afterwards corrected. In milder cases these defects may become very obvious when the patient is fatigued, or when there is an increase in the number of words presented for repetition, or of the number of objects to be named.

A characteristic of this form of motor aphasia is a significant difficulty in transition from the pronunciation of separate sounds to a whole phrase, or, even more, to a linked expression. Although such a transition does not present any extra difficulties to a patient with afferent (kinaesthetic) motor aphasia, for a patient with "efferent" (kinetic) motor aphasia the transition to smooth development speech presents a special difficulty which becomes more noticeable during restoration of learning in such patients. In later stages of recovery the well-known clinical syndrome of "telegram style" may appear.

Semantic Aphasia

We have tried to distinguish the factors which underlie the phonemic and articulatory organization of speech, and to describe the forms of aphasia which arise during disturbance of these factors. The same must be done for the semantic organization of speech. Here we must search for some general paralinguistic factors, a task which will be far more difficult.

The significance of each word is not exhausted by its relationship to one or another subject, action, or quality. As has been well shown in linguistics, and especially in psychology, each word contains a whole complex of varied ties and relations. This complex of united ties constitutes the *significance* of the word. An even more complicated system of information stands behind the bond of words, namely, the syntagma or sentence. Those logico-grammatical relations which in the Indo-European languages are based on the case forms, auxiliary words (conjunctions and prepositions) and the arrangements of the words in the sentence, always demand operations with completely *simultaneous systems of connexions* beyond the limits of the immediate meaning of the word, and involve simultaneous groups of interrelated meanings. In the simplest case (for instance, in the communication of a concrete event of the type "the house is burning") these systems may be of a relatively elementary character. In more complex cases, for instance, in the application of prepositions which express relations (as in "the circle is under the square") or the late-arising complex case forms (for instance, the attributive significance of the genitive case of the type "the father of my brother", or "the brother of my father"), the significance of the whole construction goes beyond the limits of the meaning of the separate words, and may even demand an abstraction from these immediate meanings. If we carefully examine a phrase like "on the branch of the tree there is a bird's nest" (Russian: *Na vetkie dereva gnezdo ptitsy*, or four nouns in different cases) it will become clear to us that the perception of this system is impossible without the most complex simultaneous synthesis of the four nouns which compose it, and that without this synthesis the whole phrase falls into four disconnected designations.

Such a position permits us to take a necessary step towards the physiological analysis of those forms of brain activity which lie at the foundation of the semantic, or more exactly, of the logico-grammatical structure of speech.

We must search for those cortical systems which provide the possibility of such simultaneous syntheses, and verify that the

destruction of these systems leads to a whole complex of secondary symptoms, among which are included the disturbance of the semantic and logico-grammatical structure of speech.

For a number of reasons, which I have examined elsewhere (Luria, 1947, 1958, 1962, 1963), we are forced to conclude that the functions of complex simultaneous and spatial synthesis are primarily connected with the tertiary parieto-temporal-occipital areas of the cortex—a zone overlapping the central areas of the visual, tactile, vestibular, and auditory analysers. Destruction of these regions leads to disturbance of simultaneous (and spatial) synthesis. If the impairment is located within the limits of the "wide visual sphere" on the borders of the occipital and lower parietal regions, it may lead to disturbance of the synthesis of separate signs of visually perceived objects.

It is in these cases that there appears that picture of "semantic aphasia" described by Head (1926). In this form of aphasia the acoustic structure of speech is preserved, and "the alienation of the meaning from the word" characteristic of sensory aphasia does not arise, but the patient proves to be unable to perceive those complex relations into which the logico-grammatical system of language places separate concepts.

We were able to distinguish those forms of language constructions in which the destruction of simultaneous synthesis appears especially clearly. Such forms are the constructions of prepositional relations (of the type "the circle is under the cross"), several case constructions (of the type of construction of the genitive case with attributive significance "the brother's father", or "the father's brother"), complex comparative constructions which require abstractions from the immediate meaning of a word (for instance, "less bright" equals "dark"), constructions with a double negative (for example, "I am not used to not submitting to rules"), grammatical constructions which require a complex system of interrelated subordination of words, inversions and the so-called "distant constructions" (in which the understanding of the thought requires a rapprochement of distant elements of the phrase separated by other words or introductory clauses).

The understanding of all these constructions is greatly disturbed in patients with destruction of the parieto-temporo-occipital areas of the cortex and they are said to exhibit the phenomenon of "semantic aphasia".

The assumption that underlying this picture there is primary disturbance of simultaneous synthesis is supported by the fact that the remaining components included in this syndrome (disorders of orientation in space, constructive apraxia, acalculia) also include the same factor, and the fact that those syntheses (sensory-motor kinetic melody, prosodic structure of speech, etc.) remain preserved in these cases (Luria, 1958, 1959*a*, *b*, 1963).

It is characteristic that amnesic aphasia, which is a typical component of this syndrome, may be understood as a disturbance of that system of differential semantic ties which facilitates the normal comprehension of the name of a subject. The fact that, in contrast to the forgetting of words during sensory aphasia, a hint about the initial sounds of the elusive word immediately helps the patient to remember it, supports this conclusion.

Dynamic Aphasia

It remains for us to recall briefly one last aspect of the study of disturbances of speech in local lesions of the brain, the importance of which was noted long ago, but which up to recent times has remained almost uninvestigated.

Even by 1884, Hughlings Jackson and others had repeatedly asserted that speech appears in the structure of sentences, that to speak means to "propositionize" and that the disturbance of developed narration is one of the fundamental forms of pathological speech.

This disturbance of developed narrative speech may appear in different forms of aphasia and take on different characteristics. However, there exists a form in which it appears particularly well, and in which the factors which it evokes may be investigated with particular success.

It was Kleist who first noted that destruction of the frontal

area of the left hemisphere (most often the third frontal convolution) may lead to a distinctive "lack of spontaneity of speech".

Patients with this form of disorder do not manifest disturbance in either the external (auditory or motor), or in the internal (logico-grammatical) organization of speech. They pronounce words easily, name objects, exhibit no signs of "the alienation of the meaning of words" and are relatively well able to understand logico-grammatical constructions. The fundamental disturbance in these patients appears when they change over from repeated or habitual speech to independent expression.

As a rule, the signs of this disturbance appear in the answers to questions. Ordinarily, each question evokes echolalic repetition by the patient. If the question may be answered by a habitual stereotype or simple statement, the reply is readily given. If it demands the origination and formulation of a new linkage, the answer is delayed, and the patient begins to experience serious difficulties. This defect appears particularly well when the patient is asked to narrate a long passage, or to give a connected talk. The patient either completely fails to fulfil the task, saying that nothing comes to mind, or else confines himself to habitual clichés. One such patient, when asked to give an oral composition on the theme "The North", said, "In the north there are bears", and after a long pause added, "That's what I must tell you." This defect is not connected with the disturbance of memory. The patient who had just refused to transmit in a connected manner the contents of a story which was read to him, easily reconstructed it by answering questions put to him. It is characteristic that a written composition is even more difficult for these patients and although they show no defects in writing from dictation, they are not able to compose even the simplest written narrative.

We are still not able to identify clearly the physiological factors which lie behind the disturbance of these dynamic schemes of active "propositionizing".

Fundamental to this dynamic aphasia is probably a disturbance of *inner speech*, which, according to Vygotsky (1934, 1956, 1962) has a shortened structure, a predicative function, and

serves as a fundamental means for the transformation of a foreshortened idea into developed outer speech and for the change of developed speech into a foreshortened scheme of thought. This proposition, as analysis has shown, finds support in the fact that the ability to connect words to simple syntagma, and to perceive directly the grammatical form of a word which allows it to enter into a context with other words, is disturbed in these patients (Luria, 1963). In contrast to the situation in patients with sensory and semantic aphasia, the predicative structure of speech is especially damaged in these patients, and, as Zvetkova has shown, these patients require five to six times longer to locate verbs than nouns.

All this gives us a foundation for regarding this form of aphasia as a distinctive type of destruction of contextual speech, which leaves the fundamental codes of language relatively well preserved, and to this can be joined the proposition of Jakobson and Halle (1956), who suggested the possible existence of two types of aphasia: one which causes the primary destruction of language codes, and one which causes destruction of speech contexts.

Further investigations must continue the work on the clarification of the forms of speech disorder and on the analysis of those factors which underlie it.

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