THE ACOUSTIC SIGNAL AND THE REFLEX THEORY

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The reflex theory based on Pavlov's teaching and amplified by the latest discoveries on neurophysiology, psychology and even by the theory of information leaves the concept of a closed reflex arc and accepts the thesis of an open reflex circuit. Stimuli from the environment, acoustic signals included, pass through the individual from the receptor to the effector and as a reaction return to the environment. On passing through the individual the stimuli are transformed, under pathological conditions deformed, even blocked.

In the receptive and central part certain phases of the reflex circuit play their role in the acceptance and transformation of acoustic signals, as follows:

1. Environment supplies acoustic signals. The acceptance of them by the individual depends on dialectic relations between the environment and the individual and depends on life constellation too: insignificant signals are not accepted as stimuli to reaction and extinguish gradually. Signals of both positive or negative importance i.e. signals of advantage or danger are accepted. It depends on the acoustic quality of signals too: too powerful or too frequent stimuli cause inhibition, too weak stimuli remain below the level of perception.

In no case is the acceptance of signals considered to be a mechanical passive process, on the contrary the activity of the individual plays its important role. It is known that the individual not only accepts but looks for stimuli — according to inner motivation caused by instinctive tension and by the necessities of life.

2. In the receptor the hearing and basic analysis of sounds is performed. The crackling sounds as phylogenetically older and complex sounds inclusive tones as phylogenetically younger are differenciated in Corti's organ.

3. The neural tracts and lower centres the reticular formation belongs to, have functional importance in transformation of signals through non-specific perception and therefore through affective accent. These functions which may be called listening, perform the lowest evaluation of signals by means of the orientation reflex.

4. The cortical area of the acoustic analyser analyses sound qualities, especially timbre. Evolutionally older regions of cortex (alocortex) take part in the evaluation of modulation factors; this may be considered the lowest degree of communication.

5. The conjunction of acoustic analyser with the other analysers performs the

basic (primitive) analysis and synthesis of signals. There imitative reflexes and conditioning take place.

On the level of the first signal system the psychological processes of recognition appear: i.e. perception, association, retention and recall of the complex ideas associated with acoustic signal. Through this gnostic function the signal is transformed into the information, the sound is transformed into the meaningful sound.

6. In the cortical areas of the dominant hemisphere the highest functions of human communication (on the level of the second signal system) are localized. We accept the three-phase division (according to the American authors—Wepman, Jones, Bock, Pelt):

a) in the input, recognition of the acoustic structure of complex verbal sounds takes place. It is essentially so called decoding (in the sense of the theory of information) or the same thing that Hardy calls "auding" and Lurija "phonematic hearing".

The recognition—verbal gnostic function—is performed according to individual life experience.

b) In the integrating part, unterstanding of the contents of the acoustic information, i.e. the evaluation on the highest level, and programming takes place.

c) In the output corresponding reaction is formed through so called encoding (or verbal praxis).

7. In the expressive part of the reflex circuit the formed information is coordinated and realized as a signal to environment.

A further modification of the given information can occur according to the attitude of the acceptor of the signal.

We can see that both individual and environmental factors play an important role in transforming acoustic signals. The purpose of our contribution is to draw attention to the decisive role of feeling and to the individually variable activity of reflex processes through which acoustic signals are accepted and transformed.