Effect of disuse of Olfactory sense.

The sense of smell is not used much by the higher Apes or by Man, because the assumption of the erect posture enables the eyes to be employed to great advantage; as the use of vision increases so that of olfaction diminishes.

A modification is found in the larynx of such animals with an important bearing on voice. In animals with a keen sense of smell the epiglottis is in contact with the soft palate, in order to ensure that inspired air shall pass through the nose and thus keep up the activity of the olfactory sense. In animals which do not rely on the sense of smell this contact of epiglottis and soft palate is no longer required, and in Orang-utans (Simia satyrus), Chimpanzees (Anthropopithecus troglodytes), Gorillas and Man there is a gap of varying size between the two.

The result is that respiration can be carried on and that sounds can escape through the mouth. This enables the tongue, cheeks and lips to be brought into use for the alteration in quality of sounds during phonation.

The possibilities of varying the range of sound is thus enormously increased, with great advantage to the species concerned. It is only in Man that sufficient intelligence has been acquired to enable full use to be made of the possibilities so provided for purposes of speech.

Conclusion.

In a brief summary it is impossible to describe all the factors concerned in modifying the larynx during the course of evolution. Sufficient has been said to emphasise the point that the organ appeared for respiratory reasons and has been changed in structure for purposes of specialised respiration, for olfaction, prehension, and also for deglutition.

These modifications have provided various species with organs of differing adaptability as regards phonation. It depends much more however on the necessities for the use of sound, rather than on the anatomical structure of the larynx, as to of what use is made of voice by different animals.

Mammals have no need to evolve a specialised vocal organ because the mammalian larynx happens to fulfil its vocal requirements in almost every instance. In the case of birds however the evolution of what is in many cases a high order of social life has called for some better means of vocal expression than is possible with their reptilian type of larynx; consequently they have evolved a true vocal organ or syrinx.

No discussion.

Hereafter a special Meeting of the Internationale Arbeitsgemeinschaft für Phonologie took place.

WEDNESDAY 6th JULY.

President: Professor C. E. PARMENTER; Secretary: Dr. F. HOGEWIND.

16. Professor R. H. STETSON, Oberlin: *Breathing Movements in Speech.*

The syllable is produced by the movements of breathing, and the functions of the consonants in the syllable and the changes of the consonants are dependent on the movements of breathing. Therefore the production of the puffs of air from the chest, the chest-pulses, which constitute the syllables, is important.

The chest is not like the bellows of an organ which maintains a constant pressure. Rather it is like the hand bellows with which one blows the fire.

When the fire bellows is inflated the volume is large but the pressure is zero. The arms and hands holding the fire bellows maintain the fixation. So the large muscles of the chest and abdomen maintain the fixation when the chest is inflated and the volume of contained air is large but the pressure is zero.

While the arms flex slightly to maintain a slight rise in pressure, a rapid group of puffs may be made by repeated movements of the hands from the wrist; during this group of rapid puffs there will be a slight rise of the pressure level within the fire bellows but at the close of the group it will fall to zero.

Thus in speech the large muscles of the chest and abdomen contract against each other, to make single accented puffs, and to maintain a slight rise of pressure during a series of puffs, the syllables. This series of rapid puffs is made by the intercostals which correspond to the hands working at the wrist to make rapid puffs with the fire bellows.

Tracings made of the sub-glottal air pressure in tracheotomized subjects; tracings made of the sub-glottal pressure in patients speaking with an artificial larynx; tracings made from normal subjects with negative-pressure applicators on the body wall; all confirm this. And most important of all, the actual contractions of the large muscles, and of the intercostals, can be demonstrated by simultaneous action-current records made with a multiple-element oscillograph.

Discussion:

Dr. A. SCHMITT: Es wäre wichtig, die gezeigten Kurvenbilder noch genauer studieren zu können, weil sie für das Problem der Silbe so besonders wichtig sind. Wo sind sie oder werden sie veröffentlicht.

Professor R. H. STETSON: An article dealing with this subject has been published in Archives néerlandaises de Phonétique Expérimentale Tome 3, 1928. There a large number of curves have been reproduced.

17. Drs. H. D. BOUMAN, Amsterdam: *Action Current Studies of Speech Movements.*

This paper is a report of experiments done with Prof. R. H. STETSON in the Psychological laboratory of Oberlin College, Oberlin (Ohio) U.S.A. To get some more precise idea about the coordination of the muscles involved in the formation of the breathpulse, a method was developed to record the contraction of the individual respiratory muscles. The most accurate way to record muscle contractions in human beings, is by means of the electric phenomena that accompany muscular contraction, i.e. by means of action-currents.

The action-currents were lead off through the skin, by means of zinc electrodes wrapped in bandage. The bandage was soaked in saturated salt solution. For the electrical recording system the stringgalvanometer was not considered entirely satisfactory.

First because of the difficulty that arises, when the action currents of several muscles have to be recorded simultaneously, second because of the inertia of a stringgalvanometer. We used a Westinghouse nine-element-oscillograph, so that we could be assured of a distortionless recording up to 10.000 cycles per sec. The sensitivity of this oscillograph is low compared