ORIGIN OF LANGUAGE

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IN *Nature* of February 5, 1944, I gave a summary of my researches regarding the origin of the Ide. languages, as set out in my book "On the Primitive Speech of the Ide. people and their First Home" (published in Icelandic in 1943). I had come to a similar conclusion as Sir Richard Paget had propounded in his work "Human Speech" (1930), that a great part of human speech originated in the speaking organs' unconscious imitation of the gestures of the human body, especially the hands. I succeeded in explaining about 25 per cent of the whole Ide. material (about 2,200 constructed roots). I was interested to see whether my conclusions for the Ide. languages were confirmed or not in the Semitic group and undertook therefore a special examination of Hebrew, which is recorded in *Nature* of October 7, 1944, p. 466. Further researches were then made in an attempt to prove the gesture theory. In one of these, "On the origin of Ide. eu-", I undertook to examine all constructed Ide. roots, beginning with eu- (as *geu-*, *peu-*, *teu-*, etc.). Most of these roots have a common meaning, namely: to swell, become round, vaulted, curved.

In the diphthong eu-, especially in connexion with a guttural (*geu-*, *peu-*, etc.) we have to see primitive man's imitation of something round, vaulted, curved, etc., whereas the vowel i designates something high (or little) and the vowel a something flat. Studies of Ide. eu- gave the following result: of 196 Ide. roots constructed with eu- we see as follows: *Keu-* 25 roots, *geu-*, *greu-*, *gleu-*, (*gheu*), *ghreu-*, etc., 22, *sgau-* 10, or 57 altogether. These sounds represent a curved movement, and this is also the fact with roots constructed with r, l or n + eu or s + eu. Of these we have (s) l + eu- 22, (s) r + eu- 12, (s) n + eu- 10, s + eu- 8, altogether 52, and all these roots represent a curved movement, from the palate downwards, in a curved line forwards and upwards. Then we have many roots with labial + eu: *bheu* (*beu*) 19, *meu-* 7, *peu-* 14, altogether 40. Many Ide. roots beginning with a labial can have the meaning 'to swell' (that is, to become round). After coming to this conclusion—that the Ide. primitive man imitated the round, vaulted or curved form or movement with his speech organs, thus making the sound eu-, especially in connexion with a guttural, or r, l, n, s, and sometimes b or p (there exist also the combinations dental + eu or eu- followed by different suffixes)—I went on to examine how the Hebrew language, as representative of the Semitic group, expressed this idea of round, vaulted, curved. The diphthong eu- is not known in Hebrew, although many diphthongs existed in pre-Semitic, as many assimilations in Old-Arabic, Aramaic, Akkadic and Ethiopian show. The result of this examination was surprising. In Hebrew also most roots indicating round, or vaulted, are formed with a guttural followed by a vowel + v or labial or guttural. Thus we have: *gv-l* be moved in a circle, *gv-r*¹ to turn, *gv-s* a heap, *chv-g* make a circle, *chv-l* turn round, *gv-ph* be hollow, *kv-r* be round, make hollow, etc. By comparing these roots with the Ide. roots, it is seen that, just as in the Ide. languages, the gutturals are especially used in imitating that which is round, vaulted, etc. In Hebrew the g-roots total 90, and of these at least 41 designate to turn round,

be vaulted, enclose, be hollow, swell, devour, finish, and 10 to cut, and when we consider that many g-roots in Hebrew have an abstract meaning, it is evident that the overwhelming majority of these roots commencing with g-sounds in Hebrew are created to imitate something round, vaulted, hollow, etc.

In a third investigation I examined the names of parts of the human body in Ide. and in Hebrew, as it may be considered that many of these names date from the first period of man's attempt to speak. *Homo sapiens* must in the first period of speaking have described the surrounding world in a very simple way. He observed the shape or form of the things, that many things were rounded in shape, as the sun and moon, and that many hills and mountains had an oval or curved shape. He observed the arched form of different parts of the human body, as arms, knees and ankles.

In examining the names of parts of the human body we see that most of these describe the form or shape or the activity. A few examples may illustrate this. The lips have their names from their activity, movement or form: Latin *labium* from *lāb-*, as imitation of the sound by imbibing noisily. The belly has its name from the shape 'the vaulted, curved, swollen', or means 'the cut off' (cf. English belly from the root *bhelgh-*, which shows a movement from the lips backwards over the l-position to the back of the palate). Russian *čerēvo* 'belly' belongs to *šger-*, to cut, which shows a curved movement from the palate downwards to the e-position and then upwards to the r-position in imitation of a curved movement made by cutting with a primitive instrument such as a scythe. Thus the Russian name of the belly originally designates a cut-off part of animals by slaughtering and is later used for a part of the human body, as with many other names in different languages.

The most important words for arm and elbow (upper arm or lower arm) mean curved, vaulted (as in English elbow, the first part of which belongs to *elei-*, to bend, where *el-* represents a bent movement upwards) or to stretch out (as in Old-Indian *hasta*, from the root *ghasto-*, which represents a horizontal line, or outstretched from the palate, through the a-position forwards to the teeth) or to be straight (as in the root *steigw-*, represented in Armenian *t'ekn*, arm, shoulder, where the high vowel i with guttural represents the straight line).

The Ide. roots, from which names for the parts of human body are formed, are about 320 or a seventh of the whole material. Most of these have the original meaning of round, vaulted, curved, straight or flat. Those indicating round, vaulted, curved are either formed with the diphthong eu-, especially guttural + eu-, or these roots end with the sounds r, l often followed by a suffix, which is a later addition. Thus we have the roots *gel-*, *šger-*, *sgel-*, *elei-*, *uer*, *ker-*, *engu-*, *uengh-*, etc., and all these sounds are formed by a curved movement of the speaking organs. There are very few exceptions to this rule. The roots indicating flat are formed either with the vowel a as in *plāq-*, *pelāq-*, *pelā-*, or with a horizontal movement of the speaking organs as in *pet-*, *spē-*, *dhen-*, *lēp-*, *ghasto-*.

The roots indicating straight are formed either with the high vowel i as in *steigw-*, *reig-*, *reig-*, *dhrih-*, *pilo-*, or closed with r or l as in *ster-* stiff, *bhel-* to sprint, *keru-* stiff hair, *kel-* shaft, *er-* to lift.

Of the 320 roots from which names of parts of the human body are formed, I have been able to explain

274 or about 85 per cent which are in full accordance with the gesture theory.

Having come to these results, I went on to examine Hebrew to find out whether these rules prevailing in Ide. were also to be seen in the Semitic group, and I found the rules for Ide. fully confirmed.

Hebrew *gulgoleth* means head or skull. This form is undoubtedly a reduplication of the Hebrew root *gv-l*, which means to move in a circle (cf. Icelandic *kollr* head). Thus we have the same original meaning of the head as in many Ide. words for head, 'round', and we notice that the sound *gv-* has come into existence by a circular or, rather, a half-round movement of the speaking organs.

Hebrew *chek* means palate, belonging to the root *chnk*, which means to anoint the mouth of new-born children with date-juice. In Ide. we can compare *keg-*, *keng-*, *kek-*, *kenk-*, in Ags. *haca* hook, Russian *kogotb* a curved iron-nib, and thus we see an accordance with Ide. both in the form and the meaning. Hebrew *gab* means eyebrow, belonging to the root *gb-b*, which means to vault, be vaulted. In Ide. may be compared *gebh-*, *gep(h)* jaw, really 'the curved', and *geb (h)* branch, really 'the curved'.

Hebrew *qereb-* means intestines, chest, mother's life, formed in a similar way as Ide. *gwer(e)bh*, in Greek *βρέφος*, which means foster, embryo, and Ide. *gwelbh* mother's life, in Greek *δελφύς*, the original meaning in both groups being 'the vaulted'.

Hebrew *kaph* means the hollow hand, related to the Hebrew verb *kph-ph*, which means bent, curved, and it is evidently formed like *kap-* in Latin *caput*, which originally meant bowl, cup, in imitation of the curved line from the back of the palate downwards to the *a*-position and upwards to the lips.

Of 78 Hebrew names or parts of the human body, I have been able to explain 61 by means of the gesture theory, or about 80 per cent. This does not mean that the relationship between Ide. and Semitic is a proved fact; but only that the pre-Semitic *Homo sapiens*, like his Ide. counterpart, learned to speak by imitating with his speech organs the gestures of the hands, which was the chief means of communication before the period of the birth of language.

I have come to the conclusion that the third consonant in most Hebrew roots generally is a later addition to a primitive sound—a determinative, corresponding to the Ide. suffixes, because the movement of the speech organs is perfect without this addition, which only gives a fuller definition of what is contained in the first two consonants, or really a consonant+vowel+consonant. This becomes clear when we consider the nature of posture and gesture sounds. Posture sounds are the vowels *a*, *i* and *u* (and *e* and *o*), gesture sounds are all consonants. Two consonants with an interjacent vowel show a movement:

(1) From the palate forwards to the lips or teeth (thus we have guttural+vowel+labial or dental, for example, *gap-*, *kad-*).

(2) From the lips or teeth backwards to the palate (thus we have labial or dental+vowel+guttural, for example, *bheg-*, *dek-*); we could call these movements full movements.

(3) From the palate forwards to the *l*, *r*, *n*-position, as these sounds lie very near to one another (especially *l*, *r*) and are produced by lifting the tip of the tongue to the middle- or fore-palate (thus we have guttural+vowel+*l* or *r* or *n*, for example, *kél-*, *ker-*, *ken-*).

(4) From the lips or teeth backwards to the *n*, *r*

or *l*-position; thus we have labial or dental+vowel +*n* or *r* or *l* (for example, *bhel-*, *bher-*, *bhen-*, *dhel-*, *dher-*, *dhen-*). We could call these movements half-movements.

(5) From the *l*, *r* or *n*-position forwards to the lips or teeth, producing *l* or *r* or *n*+vowel+labial or dental (for example, *lāb-*, *lat-*, *rab-*, *reth-*, *nebh-*, *ned-*).

(6) From the *n*, *r*, *l*-position backwards to the palate, giving *n* or *r* or *l*+vowel+guttural (for example, *negh-*, *req-*, *leg-*), and these movements we could, of course, also call half-movements.

There are still other possibilities as, for example, guttural+vowel+guttural, labial+vowel+labial, dental+vowel+dental, *r*+vowel+*r*, and in the same way *l* and *n*. There is the possibility of double consonants at the beginning or ending of a root, and also the many possibilities with vowel+consonant.

From this point of view, and concluding that the third consonant in Hebrew generally is a later addition, we can compare a vast number of Ide. and Hebrew roots.

All these three special examinations, which I hope to publish fully in English, have confirmed the gesture theory as described in my book mentioned above and by Sir Richard Paget in various publications.

AVIATION AND SCIENTIFIC RESEARCH

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THE Congress de l'Aviation Française held recently in Paris has given French research workers an opportunity of showing the important role which aviation can take as an instrument in scientific research. A section called "The Application of Aviation to Scientific Research" was formed this year, and a comprehensive survey has been made from numerous reports of new conceptions with regard to various applications.

The fields of research from the point of view of aviation can be placed under three headings: the stratosphere; the atmosphere; and the surface of the earth.

The stratosphere is to the physicists, among others, the region in which cosmic rays are most readily observed. Nowadays it is no longer necessary to confine ourselves to observatories on mountains or small 'laboratories' in the form of sounding balloons. It is only the aeroplane that can remain at high altitudes with observers and a useful amount of apparatus for an appreciable time. French scientific workers consider that in the next few months it will be possible to study the nuclear phenomena of cosmic radiation at 14,000 m. (46,000 ft.) with a useful load exceeding two tons.

The atmosphere abounds with 'aerial plankton' and so is of great interest to naturalists. So long ago as 1920, scientific workers in the United States began to investigate this subject. In Europe, Lucian Berland devised a method of trawling which enables small organisms (insects, spiders) and vegetable matter and inorganic particles to be collected at 5,000 m. (16,500 ft.). The former are present because, being only moderately strong flyers, they are thus unable to resist the up-currents in the air. Studying these organisms will give insight into the distribution of various living organisms and the stocking of certain remote lands, especially oceanic islands.