

scheme should make calcium cyanamide readily available in Great Britain, and the destructive action of this material upon parasites, ranging from viruses and fungi to wireworms, leather jackets, etc., should provide an important problem for parasitology.

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<sup>1</sup> Copisarow, *J. Soc. Chem. Ind.*, **62**, 173 (1943).

<sup>2</sup> Copisarow, *NATURE*, **151**, 139 (1943).

<sup>3</sup> Rotini, *Chim. e l'Ind.*, **22**, 7 (1940). Schmalpus, *Bodenkunde und Pflanzenernähr.*, **20**, 362 (1940). Vlasjuk, *Compt. rend. Acad. Sci. U.S.S.R.*, **23**, 181 (1940). Leeper, *J. Australian Inst. Agric. Sci.*, **7**, 161 (1941). Nieschlag, *Bodenkunde und Pflanzenernähr.*, **23**, 350 (1941).

<sup>4</sup> Hunter, *NATURE*, **150**, 578 (1942).

<sup>5</sup> Dhar and Pant, *NATURE*, **153**, 115 (1944).

## Origin of Indo-European Languages

PROF. ALEXANDER JÓHANNESSON, whose article appeared in *NATURE* of February 5, is, I believe, the first philologist of high academic standing who has systematically studied the sounds of speech from the point of view of the gestures of articulation which produce them, and has thus discovered for himself the pantomimic structure of human speech. His conclusions coincide generally with my own, which were originally drawn from the acoustic study of speech sounds.

There are, however, a few items in Prof. Jóhannesson's statement which seem open to question. He considers the Indo-European *R* sound as "originally cacuminal, hard and vibrating". I would have suggested that the Indo-European *R* was more probably produced by a backward curvature of the tongue tip, so as to produce a sound like the Wessex 'burr'. Its pantomimic meaning would be to bend or bend back, surround, cover, draw back, as in rake (heap up), ramp, rape, rim, ring, rend, ream, rib, reef, reel, rest, roost, rick, ride, rig (bind), rob, roll, roof, room, rope, round, rug, rump.

As to the vowels: *E* (as in men) is the result of a mid-height tongue posture; the pointing at oneself in ego is, I suggest, due to the *EG* gesture. I do not think that *EU* represents a 'circulating movement'; it is rather a forward movement (*U*) at mid-height (*E*).

Prof. Jóhannesson considers *S* as primarily an imitation of sounds in Nature. I would suggest that the *S* gesture generally denotes extension to a fine point or edge or limit. Thus, *SK* denotes extension from a forward point (*S*) to a backward point of closure (*K*); hence, skin, skim, skein, skid, scalp, skull (with hollow *U*), scoop. *SL* denotes sliding back or down; for example, slant, slip, slide, sleek, sleep, slope, slum, slump. *SM* denotes a sliding action towards a forward (lip) closure *M*, as in smear, small, smooth. *SN* is an in-drawing gesture, commonly associated with in-breathing through the nostrils, as in sneeze, snore, snout; or an inward or upward movement, as in snug, snag (projecting point). *SP* denotes drawing to a terminal point or fine edge, as in spear, spire, spout, spit, spade, spoon, spur, and asp, wasp, wisp. *STR* represents an elongated fore and aft movement, as in strong (extended hand drawn up towards the shoulder and terminating with a clenching of the fist), straight, stream, string, strand, strake (of timber), stretch, etc. *SW* is a forward motion, as in swell, swim, swift, swirl, swoop, swoon.

As to the symbolism of abstract ideas, I would suggest that in speech—as in sign language—the original meanings of all gestures have been concrete,

and that the corresponding abstract interpretations have come later. It was the poetical faculty in man that enabled him to express his hitherto inexpressible sensations by concrete gestures, so that a shrinking gesture such as that of fear, fright, could be used to express the inclination to shrink, or the full-mouthed gesture 'good' to represent anything that was felt to be satisfying.

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Two of Prof. Jóhannesson's works—his "Grammatik der urnordischen Runeninschriften" and his "Íslenzk tunga í fornöld"—are well-established handbooks for the Germanic philologist. But, in his recent article in *NATURE*<sup>1</sup> (and more fully in the Icelandic work to which he there refers), he has embarked for more unconventional regions. There is, in fact, no doubt that Prof. Jóhannesson has contravened that ancient and famous minute of the Société de Linguistique which prohibited discussion of the origin of language. There was—and always will be—a sound basis for that excellent minute, and for a simple reason. In all languages known to us—whether ancient (like Sumerian) or modern (like modern English)—we observe that, for the great majority of words, the connexion between sound and sense is random; thus there is no reason known to us why, in English, the word for "7" should begin with *s* and that for "10" with *t* rather than vice versa. We may suppose that, in the very distant epoch when language originated, either the sound-sense relation was random or it was not. But the linguistic changes which must have operated in the long period intervening would certainly have quickly reduced a non-random sound-sense relation to a random one, similar to that which we have in known languages.

Therefore to accept Prof. Jóhannesson's theory is to disbelieve in the heterogenizing effect of continuous linguistic change, and to do this would be to go against all that we know of language. There is implicit in Prof. Jóhannesson's views the suggestion that reconstructed Indo-European preserves an original non-random sound-sense relationship (cf. his remark in para. 4: "The roots beginning with dentals have a similar meaning, as the first man either pressed his teeth together . . ."). Reconstructed Indo-European is usually attributed to the third millennium B.C. and was presumably the language of a people at a fairly high level of civilization; thus long vistas of masking sound-change must separate its dentals from the original state of affairs envisaged by Prof. Jóhannesson.

Two special points call for comment. In his third paragraph Prof. Jóhannesson offers some discussion of ablaut; it is, at the least, remiss of him not to have taken cognizance of the views of Kuryłowicz, who succeeded, in the years before the War, in tracing the history of the Indo-European vowels to an earlier stage than had been reached up to that time. On p. 172 Prof. Jóhannesson says that "Philology must become a scientific study". To most philologists the question whether philology is a science or an art will scarcely seem important, but admirers of the great masters of scientific philology—Brugmann, de Saussure and, above all, Meillet—will find it hard to condone the implication that these men were at fault in their method.

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<sup>1</sup> *NATURE*, **153**, 171 (1944).