

current series at the New York Academy of Medicine on January 20. Dr. Link will speak on "The Anti-coagulant from Spoiled Sweet Clover Hay."

DR. WALTER SYMMINGTON MACLAY, head of the Mill Hill Emergency Hospital, London, recently described the work of the Mill Hill Relocation Center to the staff and students of the Medical Branch of the University of Texas at Galveston. Army psychiatrists from camps in Texas also attended. Dr. MacLAY lectured on the rehabilitation methods used and showed a motion picture of the center in operation.

At the five hundred and forty-second regular meeting on January 6 of the Entomological Society of Washington the presidential address was delivered by Dr. R. W. Harned. The program was as follows: "Medical Entomology in Wartime," by F. C. Bishopp; "Agricultural Entomology in Wartime," by S. A. Rohwer, and "Extension Entomology," by M. P. Jones.

As already announced in *SCIENCE*, the American Physical Society, the American Association of Physics Teachers and the Electron Microscope Society of America will meet at Columbia University on January 14 and 15. At this meeting there will be a joint symposium on Training Programs for Army and Navy Personnel in the Field of Physics; the retiring presidential address of President A. W. Hull, of the Physical Society; the Richtmyer Lecture and the presentation of the Oersted Medal of the Physics Teachers; thirty invited papers of the Electron Microscope Society and a number of contributed papers.

IN accordance with the recent decision of the council the next meeting of the Society of American Bacteriologists will be held on May 3, 4 and 5, at the Hotel Pennsylvania, New York City. To aid in the national transportation problem, groups which are distant from New York City will be urged to send representatives who will attend the sessions and report to their groups. The scientific program will feature contributed papers and panel discussions on wartime problems and recent research in the various fields of bacteriology and immunology. Inquiries relating to the program should be addressed to Dr. L. S. McClung, Indiana University, Bloomington, who has been appointed chairman of the program committee. Abstracts of papers contributed by members must be received on or before February 14.

THROUGH the Ophthalmologic Section of the National Research Council, at the request of Sir W. Stewart Duke-Elder; Williamson-Noble of Great Britain; Lieutenant Colonel Derrick Vail, the consulting ophthalmologist to the American Expeditionary Force, and a number of other prominent American ophthalmologists, it has been decided to produce a work of two or more volumes covering a review of the literature of ophthalmology during the war years. The first volume will cover the period starting with the beginning of the war in 1940 until January 1. The next volume will continue until the time after the cessation of hostilities when there will be a free exchange of literature. Dr. Meyer Wiener, of Coronado, Calif., will appreciate the receipt of works for review in these volumes on, or pertaining to, ophthalmology, or of interest to the ophthalmologist.

## DISCUSSION

### THE ORIGIN OF LANGUAGE

It is reported that Dr. E. L. Thorndike has recently published in *SCIENCE* his new theory of the origin of human speech. Unfortunately, under present conditions, scientific journals from overseas are difficult to obtain in England, but it is stated that, according to the new theory, speech arose from the "babbling" of primitive men and that meanings became attached to the individual sounds by "luck"; also that the various unrelated languages of mankind were all developed in the same way.

How can this theory (if correctly reported) account for the fact that many simple sounds are found to bear closely related meanings in nearly all the language groups, or the fact that, when a single sound is found to bear many different meanings (in the same language), these various meanings are found, in many instances, to be related to one another? The relation, in this case, is that they represent different natural

ways of construing the same hand- (or mouth-) gesture.

Thus, the sound (or word) *ku* is the result of a sudden release of a tongue-to-throat closure, formed far back in the mouth, and a projection of the rounded lips—so as to form an elongated tube through which the voice flows. According to the gesture theory, this mouth gesture would be related to an originating hand-gesture from which the mouth-gesture was derived by unconscious sympathy of movement between man's hands and his mouth. The originating hand-gesture, in this case, might be one in which the two slightly cupped palms were held together, pointing forward, with the balls of the two thumbs touching (so as to form a closure), and the two hands were then moved suddenly forward.

This sign and the related mouth-gesture which produces the sound *ku* (or the closely allied sounds *gu* or *hu* or *xu*—where *x* stands for the German *ch* in *ach*) might be expected to bear any of the following panto-

mimic meanings: To project (*e.g.*, as in shooting with a blow-pipe); to move or push forward—or flow or pour—or even to push *back* something in the way, or something coming towards the signer; to reach or point forward; to be elongated or extended horizontally; to enclose, a long hollow or enclosure; to be empty (*i.e.*, considering the function of the cupped hands, or the walls of the mouth cavity, as containers); to be full (*i.e.*, considering the volume enclosed by the hands or mouth as containing walls).

It will be seen that, from the sign language aspect, the same hand-gesture or mouth-gesture may be expected to bear many different meanings, and that some of these may be direct opposites!

As a test of the gesture theory, a study was made of the various underlying meanings of 37 archaic Chinese words beginning with *ku*, *kü*, *yu* and *xu*<sup>1</sup> and of 51 Bohemian words beginning with *ku*<sup>2</sup>. The results may be summarized as follows. In archaic Chinese, the various underlying meanings were found to be related to the following interpretations of the originating mouth-gestures:

Interpretation	Number of instances
To flow (as through a tube), pour out .....	18
To project, point towards .....	15
Hollow .....	16
Empty .....	8
Enclosure .....	9
Extended hand (or hands)—offering or receiving money .....	4
Tube .....	4
Elongated in time (antiquity) .....	3
Elongated hollow ( <i>cf.</i> English Coombe) .....	3
Projecting and rounded .....	3
Forward motion .....	2
Lying flat (horizontal) .....	1
Repelling .....	1
Onomatopoeic (?) .....	1
Of doubtful gestural significance .....	6

In Bohemian the symbolism was not so imaginative as in archaic Chinese. There were no examples of the interpretations "empty," "tubular," "elongated in time" or "elongated hollow," "lying flat" or "repelling," as found in archaic Chinese. On the other hand, there were examples of all the 7 remaining types, and two cases of onomatopoeia. The numbers in parentheses refer to the number of instances. Thus, "sing (choir)" (1), eject (2) are comparable to archaic Chinese "pour" or "flow"; "project up" (3), "point" (2), "sight" (1), "bundle" (1) are comparable to "project," "point upwards." The Bohemian word for "bundle"—*kukure-se*—may be compared

with Japanese *kukuri* (sheaf of corn), the *ku* gesture being reduplicated to indicate a plurality of projecting elements forming the bundle or sheaf. The remaining interpretations include "hollow" (7), "enclosure" (1), to which must be added "grasp" (1), "heap or lump" (2), "offering or taking money" (1), "projecting and rounded" (6) and "forward motion" (4). There were 9 meanings of which the gestural origin was not recognizable.

It will be seen, therefore, that over 50 per cent. of the Chinese underlying meanings of words beginning with *ku*, *kü*, *yu* and *xu* are found in connection with words beginning with the similar mouth gesture (*ku*) in Bohemian speech. Such a correlation could surely not occur if the meaning of the words were due to chance.

The gesture theory was put to the test by the late Dr. R. R. Marett, D.Sc., F.B.A., Rector of Exeter College, Oxford, in 1929, when he challenged the present writer to "divine the correct interpretation" of a number of words in an unknown language by a study of their originating mouth gestures. A list of words (with their phonetic values only) was supplied by Professor Soothill (professor of Chinese at the University of Oxford) and the first 10 of these were studied by the present writer, from the point of view of the mouth gestures which produced them. They each yielded about 10 meanings. This list of "divined interpretations" was sent to Professor Soothill, who, in return, sent his list of the principal meanings of the selected words.

The two lists were then submitted to Dr. Marett, who recorded his conclusions in a Preface which he afterwards wrote to the present writer's little book, "This English" (Kegan Paul, London, 1935). He there says: "Sir Richard Paget registered over 50 per cent. of hits that were more or less on the target, some of them undoubted bulls." Dr. Marett himself had estimated the chances of a correct interpretation, by luck, at one in the hundred.

Both Dr. Marett and Professor Soothill are now dead, but Dr. Marett informed the present writer (in October, 1942) that Professor Soothill had also been satisfied that "there was something in the method" and that he also had confirmed the success of the experiment.

R. A. S. PAGET

#### ACTION OF CLARASE UPON PENICILLIN

IN a recent issue of SCIENCE<sup>1</sup> there appeared an article by the writer entitled "Sterility Test for Penicillin." Since the statement was made in a footnote that additional studies would be published on this subject, numerous inquiries have been made as to when this material would appear in print. Inasmuch

<sup>1</sup> SCIENCE, 98: 413, November 5, 1943.

<sup>1</sup> "Analytic Dictionary of Chinese," B. Karlgren, Paris, 1923.

<sup>2</sup> "Slovník česko-Anglický Sepsal," Karel Joněš, Chicago, 1890.