without communication. How it arises is a fascinating problem, but to discuss it would make far too long an interruption of our present task.

Let us turn rather to some possible criticisms. First it will be said that the speech which I have derived from babble by luck is a pitifully small, crude affair in comparison with the speech of any known group present or past. This criticism is true. Even after a dozen or more words had been used purposively hundreds of times by a third of the family group and understood after a fashion by two thirds of the group, the use and understanding would be nowhere nearly as clean-cut as that of a modern man or child. A person could use words more or less appropriately in certain situations in the sense that the use of the word was much more appropriate on the average than saying nothing, or than saying some other word of those in his active vocabulary. He could understand words in the sense that what he did to the total situation including the word was on the average different from what he would have done if some other word had been there, and better than what he would have done if no word had been there. But when the imperfect appropriateness of a speaker's uses was combined with a hearer's inadequate understandings, a perfect result could not be expected. If the speaker went much beyond the regular routine uses, he would arouse misunderstanding, neglect or perplexity. The group's linguistic activities might be clumsy as well as extremely narrow.

It will be said that the evolution of any language worthy of the name from such crude beginnings is problematic. This criticism also is true, but it is not very damaging. The problems are no harder than the problems of the evolution of mechanical tools from their crude beginnings. The evolution of a vocabulary of two hundred names of acts, objects and events from a vocabulary of twenty is a problem, though a rather easy one.[4] The evolution of a language that can mean qualities and relations as well as objects and events is a further problem. The evolution of a language that can by sounds ask questions, distinguish orders from statements and date events has further problems. Refinements of meaning, as by our adjectives and adverbs, and abbreviations of speech, as by our pronouns, involve further problems.

I have not solved these and other problems. But I think they are all soluble. If the facts which I have related account for how men came to use articulate words with the purpose of influencing other men, to understand such words and to cooperate in the speaker-hearer relation, they can fairly be said to account for the origin of language, but to leave us with many problems of its development.

A third possible criticism is that the babble-luck doctrine should have produced dozens, maybe hundreds of different languages of this beggarly sort. Origin from miscellaneous babble would cause a multiplicity of primeval languages unless one family group got so great a head start that its language spread to all other tribes before they had invented any languages of their own, which is unlikely. I see nothing objectionable in this. It seems to me sure that any continuing group of intelligent human beings would in time get a language from "babble and luck" if they did not get it earlier from neighbors or visitors who already had it. In many cases they would get it so. Inter-group learning would be of the same general nature as the intra-group learning.

A fourth possible criticism is that hundreds of generations seem to be required to get even this beggarly language if the group has no aid from outside. This seems to be really an argument pro rather than con. Surely the notion that primeval men who were wordless got words as quickly as modern men got Mohammedanism or Christianity or steam engines is fantastic. The length of time from selecting and using flints that were sharp to chipping flints to make them sharp, and the length of time from chipping them roughly to chipping and polishing them in the elegant neolithic styles are both reckoned in many thousands of years.

Whatever may be the value of this account of the origin of meaningful speech, one thing is certain. The human animal's miscellaneous play with his vocal apparatus and the articulate sounds he thereby produces and the associations he makes of these with things and events independently of, and especially contrary to, his linguistic environment deserve much more attention from psychology and linguistic science than they have hitherto received.

OBITUARY

CHARLES FREDERICK MARVIN

DR. CHARLES FREDERICK MARVIN, former chief of the United States Weather Bureau, died in the early morning of June 5, 1943, at Doctors Hospital, Washington, D. C., of heart failure following a recent operation. He was born at Putnam (now Zanesville), Ohio, October 7, 1858, son of Charles F. and Sarah A. (Speck) Marvin; and was educated at the public

[4] One generation having reached the linguistic status I have described, the second generation can learn from it and spend most of its linguistic activity in adding its inventions to the parental stock. The custom of naming things and acts by sounds may, after a certain number of such sound-meaning connections has been reached, become a conscious deliberate habit. Some early linguist may then devote his spare time to naming every person in the group, every animal that frequents the locality, and every tool or weapon that he uses.

schools of Columbus, Ohio, and the Ohio State University, which awarded him the degree of M.E. in 1883 and of Sc.D. (honorary) in 1932. From 1879 to 1883 he taught mechanical drawing in this university and instructed in its mechanical and physical laboratories. In 1884 he was appointed a junior professor in the Office of the Chief Signal Officer of the U. S. Army, where he remained until the establishment of the Weather Bureau in 1891. After this date and through several administrative changes, he served as "professor of meteorology" until 1913, when, following the recommendation of the National Academy of Sciences, President Wilson appointed him chief of the Weather Bureau, a position he held until his retirement in 1934, after 50 years of service.

Dr. Marvin's services to the Weather Bureau and to meteorology naturally had to do with several branches of this science. His principal contributions were in the designing, construction and standardizing of meteorological instruments of many kinds; and in guiding the policies of the Bureau during the early stages of its transition into an important influence in the present era of aeronautical expansion. The leadership of the Weather Bureau was his responsibility during troublous times; his inherent qualities of judgment and stability played their part in his administration of the Bureau's affairs.

Above all, his interest in improving the exactness of meteorological measurements stood out. For nearly every weather element—wind direction, wind velocity, barometric pressure, evaporation, cloudiness, precipitation (both rain and snow), duration of sunshine, intensity of sunshine, temperature, humidity—he developed one or more measuring and automatically recording devices, either original or modified, and designed to improve meteorological observations and records for a variety of public uses. One of his most important contributions in this connection, and also one of his earliest, was the experimental evaluation of the constants in humidity equations and the construction of humidity tables; it is from these tables that one can read off at once the current humidity of the air as soon as he knows the simultaneous readings of a properly exposed dry thermometer and an adequately ventilated wet thermometer—information valuable on its own account, and vital to the forecasting of the coming weather of the next few to 24 hours.

Of all the meteorological instruments, however, the Robinson cup anemometer, to measure the velocity of the wind, seemed to fascinate him most. He worked on it, effectively, and wrote about it, from early in his career with the Weather Bureau until years after his retirement. Another of the studies and one of particular significance in early systematic investigation of the upper air was the design and construction of kites and kite instruments.

Besides these distinctly meteorological contributions, he found time and energy to devote to other practical and important interests—notably the design and building of seismographs and the reform of the calendar. One of his seismographs was in operation at the Central Office of the Weather Bureau in Washington, D. C., for many years, and when finally dismantled was one of the best mechanically recording seismographs then in use anywhere. His work with calendar reform, devoted and constant though it was, found the inertia of public conservatism in this subject too great to be overcome by logic. Dr. Marvin was a member of a number of scientific societies, among them the American Geophysical Union; the American Meteorological Society (president, 1926); the Washington Philosophical Society (president, 1903); the Washington Academy of Sciences, and the National Advisory Committee for Aeronautics.

In 1928 he was knighted by the King of Norway to the Order of St. Olaf, first order, in recognition of the aid given by the Weather Bureau to Raold Amundsen during his Arctic explorations; and in 1934 was a U. S. delegate to the League of Nations at Geneva.

He was a member of the Cosmos Club of Washington, D. C.

Dr. Marvin was three times married: to Nellie Limeburner, June 27, 1894, died February 27, 1905; 2d, to Mabel Bartholow, November 8, 1911, died February 8, 1932; 3rd, to Sophia A. Beuter, November 12, 1932, died February 3, 1943. He is survived by two daughters, Mrs. E. Parks Norwood, of Tucson, Arizona, and Mrs. Claud Livingston, of Kenwood, Md., and one son, Charles F. Marvin, Jr., of Washington, D. C., all children by his first wife; and by six grandchildren.

W. J. HUMPHREYS

U. S. WEATHER BUREAU,
WASHINGTON, D. C.

RECENT DEATHS

DR. KARL LANDSTEINER, emeritus member of the Rockefeller Institute for Medical Research, died on June 26 at the age of seventy-five years. Dr. Landsteiner was Nobel Laureate for Medicine in 1930.

DR. STANLEY E. COULTER, emeritus dean of the School of Science of Purdue University, died on June 26 at the age of ninety years.

DR. JAMES MCGIFFERT, head of the department of mathematics at the Rensselaer Polytechnic Institute, Troy, N. Y., died on June 18 at the age of seventy-five years. He had been a member of the faculty since 1892.

DR. GILBERT A. YOUNG, since 1912 until his retirement with the title emeritus in 1942 head of the