1953 (*2*). The authors of the new proposal are E. Amaldi, C. D. Anderson, P. M. S. Blackett, W. B. Fretter, L. LePrince-Ringuet, B. Peters, C. F. Powell, G. D. Rochester, B. Rossi, and R. W. Thompson.

The proposed new nomenclature provides two types of *generic* symbols to indicate the classification according to mass and according to phenomenon of decay, in addition to the usual *specific* symbols or "Christian names" to designate each individual type of particle.

Mass Categories

There are three mass categories demarcated by the π-meson mass and the nucleon masses. This grouping is suggested empirically as discussed in the first part of this article and has been more or less anticipated in previous usage.

L-meson: Any particle with mass equal to or less than that of the π-meson. This category thus includes the π-meson, μ-meson, and any other lighter meson that may be discovered. The name "light meson" is suggested for particles in this group.

K-meson: Any particle with mass intermediate between that of the π-meson and the proton. Thus the τ-meson is an example of a K-meson. The name "heavy meson" is suggested for this group.

Y-particle: Any particle with mass intermediate between that of the neutron and the deuteron. (The proposal suggests that this definition might be revised if fundamental particles heavier than deuterons are discovered.) The name "hyperon" is suggested for particles in this group.

It should be noted that the mass categories defined here exclude the ordinary nucleons (neutron and proton).

Phenomenological Categories

The new phenomenological categories extend and make more precise the phenomenological distinction already in use (V-particles, S-particles).

V-event: Any phenomenon that can be interpreted as the decay in flight of a K-meson or a Y-particle. Subdivisions: V^0-event, decay of a neutral particle; $V^{\pm}$-event, decay of a charged particle.

S-event: Any phenomenon that can be interpreted as the decay at rest of a charged K-meson or Y-particle.

Specific Symbols

The distinction between generic symbols and specific symbols is emphasized by the use of Latin letters for the former and Greek letters for the latter. This usage of the Greek letters is then identical with most previously well-established usage (for example, γ, μ, ν, π). It is not proposed, however, to change the accepted symbols for the proton (p) and the neutron (n). It is proposed to use the capital Greek letters for hyperons in order to distinguish them from mesons and other particles.

The new particles that have been given specific symbols to date are listed in Table 1.

References and Notes

* Assisted by the U.S. Office of Ordnance Research and by a grant of the Frederick Gardner Cottrell fund of the Research Corporation.

1. *Physics Today* **6**, 24 (1953).
2. See the report on the Bagnères Congress by M. M. Shapiro, *Science* **118**, 701 (1953).

James Rollin Slonaker, a Worker in Vision, Nutrition, and Activity

THE death of James Rollin Slonaker in Palo Alto on 3 January 1954, at the age of 87, marked the end of a long career as a teacher and researcher at Stanford University.

Dr. Slonaker's interest in biology, which led him finally to a professorship in physiology, began early in life. He was born in Farmland, Indiana, on 17 June 1866, and as a young boy he studied the nesting habits of birds. He earned his way through school, then taught all grades in a one-room house, making the fires himself and trudging 4 miles each way from home. In 1889 he graduated from the Indiana State Normal School, at which time he became principal of the high school and superintendent of schools in Elroy, Wisconsin. After 2 years he entered the University of Wisconsin, and in 1893 he was awarded the B.S. degree; a fellowship in biology then enabled him to go to Clark University, where he received the Ph.D. degree in 1896.

At Clark University, Dr. Slonaker studied with Clifton H. Hodge, a noted naturalist and authority on the structure of the eye. Dr. Slonaker spent the first 5 years after receiving his doctorate as assistant professor of zoology at Indiana University. One of his most promising students there was George Daniel Shafer, who later joined him as a member of the Stanford physiology faculty where they were always the closest of friends.

The first paper published by Dr. Slonaker was entitled "A comparative study of the point of acute vision in the vertebrate" [*Am. Naturalist* (1 Jan. 1896)]; this paper was typical of a series of 11 papers on the comparative anatomy and physiology of the eye that he published before 1921. About half of these

papers were written while he was on the faculty of Indiana University. As a result of this interest in the vision of birds, a great friendship developed between Casey Albert Wood, a specialist in the subject, and Dr. Slonaker. Dr. Wood often visited him at Stanford.

Between Indiana and Stanford, he spent 2 years at the University of Chicago as research assistant and associate in neurology. In 1903 he came to Stanford as assistant professor of physiology. He was promoted to associate professor in 1925 and to professor in 1930. At Stanford, Dr. Slonaker was known as a meticulous, straightforward, and clear teacher, and he was noted for his patience in guiding young researchers.

A later major interest of Dr. Slonaker was the one that brought him much renown: the relation of diet to the activity of the albino rat. His 45 articles on this subject cover the period 1907–39 at Stanford. One of the principal measurements of activity that Dr. Slonaker made was the distance run by the albino rats. He developed a cylindrical wire cage that rotated on a central horizontal axle on which the food and nesting boxes were swung. The rat could run at will, causing the cage to rotate and operate a counting device. When the rat was tired, it could retire to the food or nesting boxes. Astonishing distances were run by the animals —as much as 38 miles in 24 hours. The greatest activity occurred at night, and it was modified by the sex of the animal, oestrous cycles, age, diet, and so on. These observations led to a tremendous research program involving about 50 rotating cages and a large colony of inbred albino rats under a carefully controlled nutritional regimen. The work was supported by research grants. A series of studies on the effects of high-protein diet was also made. As the importance of this study to an understanding of sexual phenomena became apparent, the National Research Council's Committee for Research on Sex Problems gave its support to the investigation, and a series of papers on "The effect of different amounts of sexual indulgence in the albino rat," as well as studies of the effect of high-protein diet on longevity, gestation, fecundity, and so on, were published in the *American Journal of Physiology*.

The inbred strain of albino rats widely known as the "Slonaker-Wistar strain" had its origin in a pair carried by Dr. Slonaker in the Pullman from the Wistar Institute in Baltimore to California.

The "Slonaker activity cage" became a common tool, and it is still used in physiological and psychological research. This piece of apparatus was in line with Dr. Slonaker's interest in the development of apparatus and the construction of it by his own hand. Many fine pieces of laboratory equipment were made on the beautiful jeweler's lathe that he built from scratch. He spent many hours in the basement shop of the Physiology Department, building apparatus and printing laboratory syllabuses with his own hand press. Because of his interest in equipment, Dr. Slonaker organized the School of Biological Sciences supply room and shop, which has been a great asset to the several departments involved.

The later years of Dr. Slonaker's active career were devoted to the completion of his researches on the activities of the albino rat, and the working up of his accumulated data extended several years beyond his retirement in 1931. His last published paper appeared in 1939 in the Stanford University Biological Sciences Series in the form of a 67-page article on "The effect of different percentages of protein in the diet of six generations of rats."

Dr. Slonaker was a member of Phi Rho Sigma, Sigma Xi, the California Academy of Sciences, the American Physiological Society, and the American Association for the Advancement of Science, and he was past president of the Western Society of Naturalists. Most of his slides on the nesting habits of birds and on the structure of the eye of birds, moles, and so forth, were given to the California Academy of Sciences.

Dr. Slonaker had several outside interests, one of which was a 30-acre apricot orchard at Los Altos, which he developed by his own work and supervision. He operated the necessary horse-drawn, and later tractor-drawn, implement himself, and he directed the groups of workers seasonally employed to handle the fruit.

Another interest was the collection of the records for "A history and genealogy of the Slonaker descendants in America since early 1700." The genealogy was a hobby of his for 25 years and finally, when printed in a 732-page book in 1941, included 1500 relatives.

On 24 March, 1897, he married Marion Estey Stratton in Worcester, Massachusetts. Mrs. Slonaker survives him and still lives in Palo Alto. There they raised their three children—Clifton, Emily, and Marion.

Each afternoon, promptly at 4 o'clock, Dr. Slonaker went to the Faculty Club where for many years he was treasurer. There he engaged in a round of tennis or a game of cards. He thus became acquainted with most of the faculty and was well liked by all for his sense of humor and his quiet dignity. Dr. Slonaker was a tall, slim, aquiline-featured man who retained to an advanced age much of his strength and all of his faculties, and even worked in his garden to the day of his death.

J. Percy Baumberger
Department of Physiology, Stanford University