were used to steer the beam onto the 1.5 in.×4 in.×5 in. long target.

[4] Blumenfeld, Booth, Lederman, and Chinowsky, Phys. Rev. **102**, 1184 (1956).

[5] We are grateful to R. Sternheimer for computing the energy spectrum of K mesons emitted at 68° under various assumptions as to the collision mechanism. These calculations yield similar spectra, all of which peak near 100 Mev. See Block, Harth, and Sternheimer, Phys. Rev. **100**, 324 (1956).

[6] For example, one member of a Λ^0 parity doublet may have a long lifetime. See T. D. Lee and C. N. Yang, Phys. Rev. **102**, 290 (1956).

[7] Collins, Fitch, and Sternheimer (private communication).

[8] Kadyk, Trilling, Leighton, and Anderson, Bull. Am. Phys. Soc. Ser. II, **1**, 251 (1956). For a recent summary see Ballam, Grisaru, and Treiman, Phys. Rev. **101**, 1438 (1956).

[9] Examples of this decay mode have been reported by Slaughter, Block, and Harth, Bull. Am. Phys. Soc. Ser. II, **1**, 186 (1956). A particularly clear event has been observed by the Ecole Polytechnique group. We are indebted to J. Tinlot and B. Gregory for this data and for helpful discussions on anomalous V^0's.

[10] R. Serber (private communication).

Evidence for a Long-Lived Neutral Unstable Particle*

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During a systematic search for K^- mesons in a pellicle stack exposed to a channel of negative particles from the Berkeley Bevatron, four unusual events of the following nature were found: an unstable particle originated in the emulsion from a small star which was produced by a neutral particle. The channel was at 90° to a target bombarded by 6-Bev protons and defined a momentum of 280 Mev/c.

Since the events were of an unusual nature, each one will be described separately.

Event 1.—A $_{\Lambda}He^4$ hyperfragment originated from a star which also consisted of a π meson of 42±12 Mev, two short recoil tracks, and a proton of 16.6 Mev. The star was produced by a neutral particle. The hyperfragment decayed from rest into a π^- meson, a proton, and a He^3 recoil. The binding of the Λ^0 particle was found to be 1.8±0.6 Mev.[1] A drawing is shown in A of Fig. 1.

Event 2.—A negative K meson of 14 Mev was produced in a star which in addition had a low-energy electron and a nucleonic particle of 115 Mev. The K^- meson produced a star from rest consisting of a π meson, a hyperfragment which decayed nonmesonically, and nucleons. The nucleonic particle from the primary star left the stack and therefore the direction of its motion could not be established. However, the kinetic energy of this particle was not sufficient to produce a K^- meson if it were an incident Σ^- or Ξ^- hyperon; therefore we assume that it was an outgoing particle. This event is shown in B of Fig. 1.

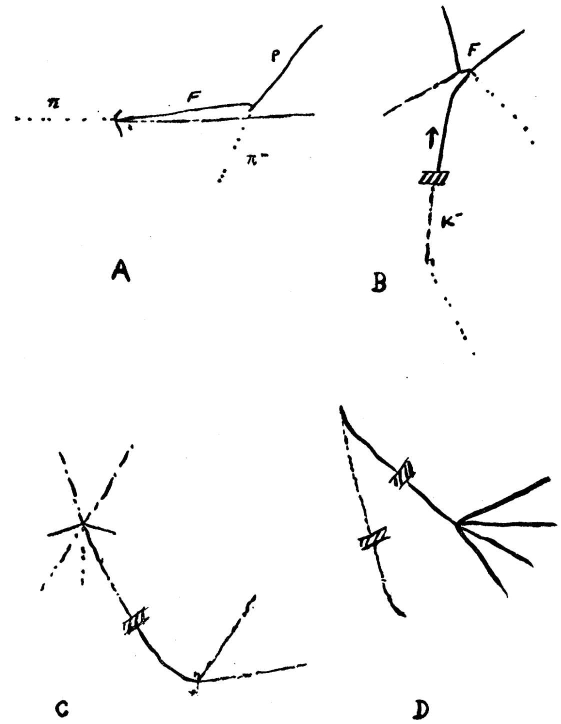

Fig. 1. Drawings of four events which were found in a pellicle stack as shown. A $_{\Lambda}He$ hyperfragment was produced in A, a K^- meson in B, probably a Σ^- hyperon in C, and a hyperfragment or a Σ^- hyperon in D.

Event 3.—A track, 730 microns long, from a seven-pronged star, has a two-pronged star associated with its ending. The primary star was produced by a neutral particle and has a visible kinetic energy of 160 Mev. The connecting particle had a charge of one and appeared to have stopped. The two nuclear particles from the secondary star had a total charge of two or three. In addition there are two tracks of low-energy electrons indicating that the connecting particle was captured. A mass measurement along the connecting track gave $(2200\pm750)m_e$. These facts indicate that the secondary star was produced by a Σ^- hyperon or possibly a Ξ^- hyperon or a K^- meson. A drawing of this event is shown in C of Fig. 1.

Event 4.—One particle from a small five-pronged star, which had no incoming particle, appears to have stopped and produced a one-prong star. The prong was most likely due to a proton of 9 Mev. The range of the connecting track is 230 microns. Gap counting showed that the secondary star was not the result of a scattering. Also it is possible to exclude the absorption of a slow π^- meson as its cause. The event is interpreted as a nonmesonic hydrogen hyperfragment decay or the capture of a negative hyperon or K meson. The event is shown in D of Fig. 1.

It is very improbable that these four events were produced by fast neutrons since the ratio of these events to energetic neutron stars in the stack is large ($\sim$1/10). Also the flux of energetic neutrons at 90° to the target is expected to be small. They cannot be cosmic-ray events because their tracks can be followed through the stack, which was in a disassembled state both shortly before and after the machine exposure. These events can be interpreted as the nuclear interaction of a neutral unstable particle of the same "strangeness" as that of the K^- meson and the Λ and Σ hyperons.

The total energy in event 2 is too high to have been due to a neutral K from the charge exchange of a K^- meson in the beam. Furthermore, the expected number of such events, if due to charge exchange, is less than one per 20 cc of emulsion, whereas the density of these unusual events is probably greater than one per cc of emulsion.

Also it seems unlikely that the events could have been due to neutral θ's which were produced in the deflecting magnet because they would have had to have lived about 20 mean lifetimes.

These events can be explained by assuming that long-lived neutral K mesons were produced at the target with about the same frequency as the K^+ mesons. A small fraction of these neutral K mesons could have penetrated the shielding (about two feet of brass) between the plates and the target and then interacted in the pellicle stack. The lifetime of these particles must have been at least 10^{-8} sec. The existence of a long-lived neutral K meson was predicted by Gell-Mann and Pais.[2]

The authors are indebted to Dr. E. J. Lofgren for making possible the exposures to the Bevatron. Discussions with Dr. George Snow were stimulating and helpful.

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[1] This hyperfragment has been described in detail (event 90) by Fry, Schneps, and Swami, Phys. Rev. **101**, 1526 (1956).

[2] M. Gell-Mann and A. Pais, Phys. Rev. **97**, 1387 (1955). Dr. G. A. Snow has pointed out the possibility of a long-lived τ^0 meson [Phys. Rev. **103**, 1111 (1956)].

Errata

Angular Distribution of Disintegration Products from the $O^{16}(d,p)O^{17}$, $Be^9(d,p)Be^{10}$, and $Be^9(d,t)Be^8$ Reactions, MIRA K. JURIĆ [Phys. Rev. **98**, 85 (1955)]. Values for A_2 in Table I should read:

E_d Mev	0.58	0.76	0.84	0.98	1.05	1.14	1.26	1.4
A_2	−0.10	−0.19	0.04	0.03	−0.18	−0.23	−0.16	−0.10.

The corresponding A_2 curve in Fig. 5 is correct. The author is indebted to Dr. B. Koudijs of the Physics Laboratory of the State University of Utrecht (Netherlands) for pointing out this error.

Concept of Temperature and the Overhauser Nuclear Polarization Effect, CHARLES P. SLICHTER, [Phys. Rev. **99**, 1822 (1955)]. Lawrence H. Bennett has kindly called the author's attention to an error in the rotation operators. The symbol $\hbar$ should be replaced by t. Fortunately, the error arose in transcribing formulas, so that the correction does not change the results. The author wishes to thank Dr. Bennett for pointing out the correction.

Effect of Point Imperfections on the Electrical Properties of Copper. I. Conductivity, F. J. BLATT [Phys. Rev. **99**, 1708 (1955)].

Effect of Point Imperfections on the Electrical Properties of Cooper. II. Thermoelectric Power, F. J. BLATT [Phys. Rev. **100**, 666 (1955)]. In a private communication to the author, Dr. A. Seeger has reported results obtained by him and Stehle on the resistivity due to vacancies in copper.[1] Although their method and calculated phase shifts are in rather good agreement with the author's a discrepancy existed in the final results; this discrepancy has been traced in large part to an arithmetic error by the author. In I the value $\Delta\rho = 1.33$ μohms/atomic percent should read $\Delta\rho = 1.53$ μohms/atomic percent. This error also influences slightly the results reported in II, increasing the calculated change in thermoelectric power due to vacancies by about 10%. The author is very grateful to Dr. Seeger for informing him of results prior to publication and thus being instrumental in the detection of the error.

[1] H. Stehle and A. Seeger (to be published).

Decay of Ca^{49} and Sc^{49}, D. W. MARTIN, J. M. CORK, AND S. B. BURSON [Phys. Rev. **102**, 457 (1956)]. Reference 4 should read:[4] O'Kelley, Lazar, and Eichler, Phys. Rev. **101**, 1059 (1956), instead of [4] O'Kelley, Lazar, and Eichler, Phys. Rev. **102**, 223 (1956).

Free-Radical Quenching of Positron Lifetimes, STEPHEN BERKO AND A. JOSEPH ZUCHELLI [Phys. Rev. **102**, 724 (1956)]. The third sentence of the fourth paragraph of page 725: "Since the resolving time of the coincidence circuit used was long compared to the annihilation lifetimes, Pond's data yields the integrals of the time delay curves as measured by the fast-coincidence method" should read "Pond's data yield the integrals of the time delay curves as measured by the fast-coincidence method; one would obtain the same information by making the resolving time of the lifetime-measuring coincidence circuit long compared to the annihilation lifetimes."