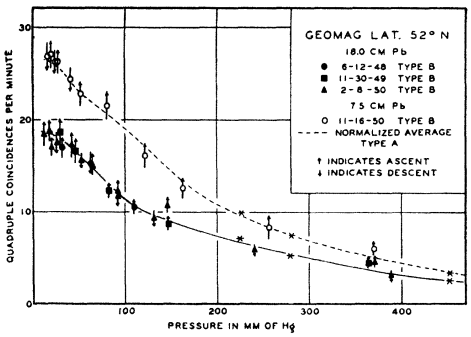

FIG. 1. Intensity *vs* altitude curves obtained with 7.5 cm and 18.0 cm Pb interposed in the counter train. The asterisks represent points obtained in a B-29 aircraft and atop Mt. Evans (see reference 3).

those for larger thicknesses only by applying the customary but nevertheless unsatisfactory normalization procedure to the data obtained by others. A direct measurement was subsequently undertaken, and a detailed investigation of the factors involved in the standardization between two different counter trains was conducted.[3]

The results are plotted in Fig. 1. Details regarding the quadruple-coincidence counter-train utilized in these experiments, ground counting rates, etc., are given in reference 3 under the designation Apparatus B. The dashed curve represents the average of data obtained with a different counter train designated Apparatus A. The normalization of the data is accomplished by the application of the geometrical factors ϕ_B/ϕ_A (Table V, reference 3) to the counting rates obtained with Apparatus A. Direct verification of the validity of this normalization was obtained by simultaneous operation of the two instruments at sea level, at mountain altitude, and in B-29 aircraft. the appropriate value of p in a $\cos^p\theta$ zenith angle distribution law was determined as a function of altitude from experimental data.[4]

Whereas the earlier comparison based upon the usual arbitrary normalization at sea level had indicated an absorption in 18 cm of Pb amounting to 40 percent near the "top of the atmosphere," the present results show that actually 29 percent of the primary particles are stopped in the sense defined above. A comparison of our data with those of Schein and Allen on the basis of a reasonable normalization procedure[3] is not inconsistent with this conclusion.

It is interesting to note the relative effects of (a) the 120 g/cm² Pb shield interposed in the counter train at the ceiling altitude and (b) an equivalent mass of superposed atmosphere, alternatively added to the initial 85 g/cm² of interposed Pb. The decrease in the observed particle intensity in case (a) is practically the same as that in case (b). This is indeed a striking consequence of a conspiracy of circumstances. Both meson decay and energy-loss considerations make the equivalent atmospheric path a considerably more effective stopping layer. On the other hand, owing to the multiple production of secondaries, geometrical considerations favor the air path from the point of view of the enhancement of the detectable particle intensity. Penetrating secondaries produced within a narrow cone by an incident primary particle are not detected individually in case (a), whereas they can be recorded in case (b). Furthermore, charged secondaries arising from neutral nucleons, which of course constitute a significant fraction of the primary cosmic-ray particles, cannot actuate the counter train in case (a), whereas they are observable in case (b). It is remarkable that in such a complex situation, the various competing processes provide almost exact compensation.

* Assisted by the joint program of the ONR and AEC.
[1] M. A. Pomerantz, Phys. Rev. **75**, 69 (1949).
[2] M. A. Pomerantz, Phys. Rev. **77**, 830 (1950), and subsequent as yet unpublished results.
[3] M. A. Pomerantz, Phys. Rev. **75**, 1721 (1949).
[4] M. A. Pomerantz, Phys. Rev. **75**, 1335 (1949).

Erratum: Resistivity and Hall Constant of Semiconductors

[Phys. Rev. **82**, 109 (1951)]

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IN a recent letter with the above title several misprints occurred. The denominator in Eq. (2) should be squared. The *Rnec* value for $\gamma=\xi=0$ should be $315\kappa/512$, in agreement with the value computed for this special case by Johnson and Lark-Horovitz.[1] The symbol ϵ should be used only for the electron or hole energy; other ϵ's should really be ξ's to be consistent with the notation of Fig. 1.

[1] V. A. Johnson and K. Lark-Horovitz, Purdue University Semiconductor Research, Sixth Quarterly Report, Signal Corps Project 112B-1 (unpublished), p. 6.

Energy Levels of a Spheroidal Nuclear Well

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(Received May 31, 1951)

RECENTLY Rainwater[1] has proposed a nuclear model in which the odd nucleon moves in a potential well of uniform depth and oblate spheroidal shape. It is proposed that such a model may explain certain large quadrupole moments. Using a perturbation method Feenberg and Hammack[2] have calculated the displacement of the nuclear energy levels produced by small spheroidal distortions of the potential well.

In the present note we present the results of calculations of somewhat larger distortions than those contemplated by Feenberg and Hammack. Although we have used the proper spheroidal wave functions, our calculation fails to be completely rigorous because we have used the boundary conditions of an infinitely deep well. The results of the calculations are shown in Figs. 1 and 2, where we plot the energy in the dimensionless units $(ka_0)^2$ against the eccentricity ϵ. Here k is the wave number and a_0 is the radius of the undistorted well. The eccentricity ϵ is here defined as $\epsilon=(a^2-b^2)^{\frac{1}{2}}/a$, where a and b are the semi-axes of the spheroid. One should note that this differs from the quantity $e=(a-b)/a_0$ defined by Rainwater. The curves are labeled with the quantum numbers l, m belonging to the undistorted nucleus. For $\epsilon\leq 0.1$ the results agree with the perturbation calculations of Feenberg and Hammack.

In the future we hope to improve our calculations by using the exact boundary conditions, and to examine the dependence of the

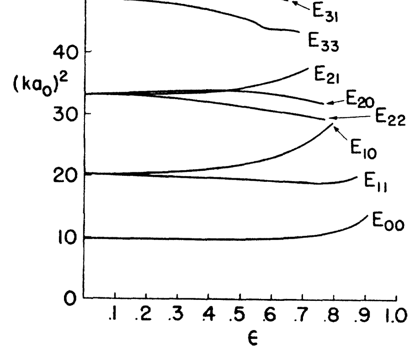

FIG. 1. Energy levels for $n=1$. Levels are labeled with the quantum numbers l, m of the undistorted nucleus.