conclusion arrived at by Randall and Webb to account for the discrepancies found for the mean life of this state.[6]

There exists the possibility that the photograph plate characteristics may vary for the triplet lines in such a manner as to weaken the spread of the line 5461 A in comparison with the lines 4047 A and 4358 A, since the green line is nearer to the less sensitive portion of the plate. Exact intensity measurements were not obtained, however the difference in shape of the line 5461 A in comparison with the other lines of this triplet appears too great to be accounted for by errors of this kind.

This work was done in the laboratory of the Bartol Research Foundation.

THE VARIATION OF THE COSMIC-RAY INTENSITY WITH AZIMUTH.*

BY

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Bartol Research Fellows.

We have measured the intensity of the cosmic rays at an angle of 30° with the vertical in the magnetic N., S., E., and W. azimuths using three G.M. counters as a telescope. The point of observation was the roof of the Bartol Research Laboratory in Swarthmore, Pennsylvania, latitude 40° N. The apparatus was protected from the weather by a covering of $\frac{1}{2}$ mm. thick sheet iron but was not otherwise influenced by absorbing material. The three counter tubes were arranged with their axes horizontal and perpendicular to the direction of observation. They were 12 cm. long, 4 cm. in diameter and were spaced at 10 cm. between adjacent centers. The circuits were arranged for recording triple coincidences and a previous observation had shown that the number of accidental coincidences was less than 0.1 per cent. of the real ones at this separation. Our results up to the present time are given in Table I with the statistical probable errors indi-

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[6] For further discussions see Morozoroski, S., *Zs. f. Phys.*, **68**, 278, 1931; Frisch, R. and Pringsheim, P., *Zs. f. Phys.*, **67**, 169, 1931.

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cated. The barometric pressure at the middle of each run is also included.

TABLE I.

Direction.	Date.	Duration of Run, Minutes.	Barometer.	Number of Coincidences.	Coincidences per Minute.
E.	7–21	1040	759	939	0.90±0.02
W.	7–22	1380	756	1253	0.90±0.02‡‡
N.	7–23	1495	754	1445	0.97±0.02
S.	7–24	1370	760	1373	1.00±0.02
E.	7–25	1447	762	1207	0.83±0.02
W.	7–26	1418	760	1175	0.83±0.02
N.	7–27	1432	760	1244	0.87±0.02

The results show that the intensity is about the same in the E. and W. azimuths but the cosmic rays are from 5 to 10 per cent. more intense in the magnetic meridian than perpendicular to it. There is possibly a greater intensity towards the S than towards the N. Unfortunately the data show a variation of the counting rate with time which is probably instrumental but we believe the variation with azimuth cannot be accounted for in this way. These measurements are preliminary to a more complete investigation which is now in progress.

We wish to acknowledge the coöperation of Dr. E. C. Stevenson.

AN INTERPRETATION OF COSMIC-RAY PHENOMENA.*

BY

THOMAS H. JOHNSON.

Schindler's data on the transition effects of the cosmic rays have been interpreted on the assumption that the equilibrium between the primary radiation and its secondary corpuscular rays is different in different media. The ionization behind any thickness of absorbing materials, assumed to be proportional to the flux of secondaries, is calculated in terms of the absorption coefficients, $\nu(m)$, of the primary radiation and the production and absorption coefficients, $\beta(m)$ and $\mu(m, m)$, respectively, of the secondary rays, these coefficients being characteristics of the media. A comparison with the data