

II-3B-22. Review of Some Statistical Studies

L. BIERMANN

Institut Für Astrophysik, Max-Planck-Institut, München, Germany

A number of papers presented during the first ordinary session dealt with the statistical aspects of the high energy particle radiation of the sun and its connection with the wave radiation in the optical and the radio frequency range. Preprints of these papers being available, I would like to draw attention, in the present session, only to one or two specific results. Since the occasional large increases of the cosmic ray at sea level were recognized to be due to solar flares, one tried to find at least a statistical increase of the cosmic ray intensity during the larger solar flares. Work reported to this Conference by Anderson, Chasson and Maeda on one hand, by Wilson and Nehra, on the other hand revealed that no such correlations would be found for stations with geomagnetic cut-off energy of more than 1 Gev, while at Sulphur Mountain, where the magnetic cut-off energy is only 400 Mev, a small but definitely positive correlation was established. This indicates, that

during solar flares charged particles are much more often accelerated to energies in the some 100 Mev range than to more than one or two Gev, in accordance with the direct evidence from the observation of individual events from balloons obtained during the last few years.

Another result of Wilson and Nehra was the following: Their measurements indicate that the apparent source of the particles lies in the average about 60° west of the sun in the ecliptic plane. For the events of May 4, and during Nov. 1960 this was found in a different more direct way by McCracken in paper 3B-14, a result which is of considerable interest for the physics of interplanetary space. It may be remarked in this connection that in general sea level stations at high latitude are more useful for investigating the directional properties of cosmic rays because there the disturbing effect of the "Nullbahnen" is absent.

II-3B-23. Review of Recent High Energy Solar Particle Events Including November 12, 1960

Hugh CARMICHAEL and J. F. STELJES

*Deep River Laboratory, Atomic Energy of Canada Limited
Ontario, Canada*

The eight cosmic-ray increases caused by high energy particles from the sun that have been observed during the years 1959, 1960 and 1961, are illustrated and deductions regarding the propagation and storage of the particles in interplanetary space are reviewed.

Fourteen high energy emissions of particles by the sun have now been observed. By high energy we mean that the effects penetrated the earth's atmosphere to sea level.

The dates of these 14 events are indicated in Fig. 1 in relation to the last two cycles of sunspot activity. Several comparatively small events increase the number observed