

Physics. — *Magnetic storm and variation of cosmic rays.* By J. CLAY and E. M. BRUINS.

(Communicated at the meeting of February 26, 1938.)

During the magnetic storm of January 24—26 we observed the variation of cosmic rays in our recording instruments with ionization chambers of 40 l. with 45 Atm. argon. The chambers I and II were under a shield of 110 cm *Fe* and instrument III under 12 cm *Fe*.

In fig. 1 we see the situation of the three ionization chambers. The iron wall in the foreground in front of the chambers is taken away, to be able to see the chambers on the photograph.

We found a very considerable variation of the intensity of the rays during the storm. It was a disadvantage that in the same period the barometer changed so much, as it is always difficult to give the exact correction for this variation, because it is not the same in different cases. It may be on account of this that our correction is not quite the correct one, but the differences will not be more than 1 or 2 %.

The most remarkable result in this case is now in contrast ¹⁾ with the storm of 26/4 '37, that we find in all three chambers an increase before the usual decrease, which is found in most cases correlated with magnetic storms, and secondly that also the instruments under 110 cm *Fe* are influenced.

In the instrument under 12 cm *Fe* there was at one moment an increase of about 3 % and then after that suddenly a decrease of about 9 %, a difference from the undisturbed value of 6 %.

The influence on the ionization in the chambers I and II is different, as we see in fig. 2. The scale on the left gives the value of the potential applied to the central electrode in order to compensate the ionization charge in one hour, but as the values of these capacities are not the same, the potentials also are different. In reality the ionization charge is nearly the same. Now the question is not yet solved how it is possible that the sensitivity of II to the magnetic variations is larger than that of I. We find a similar difference in the sensitivity to barometric variations.

We interchanged the instruments I and II and found that the sensitivity is correlated with the place and not with the instrument. The variations of I and II can be read from graph 2.

The variation in instrument I was small, only a very small maximum of 0.3 % above and a minimum of 2.4 % below the mean value.

¹⁾ J. CLAY and E. M. BRUINS, *Physica*, 5, 111 (1938).

The variation of instrument II, a maximum of 2.3% and a minimum of 3.3%. The maximum of all three instruments was at 25 Jan.

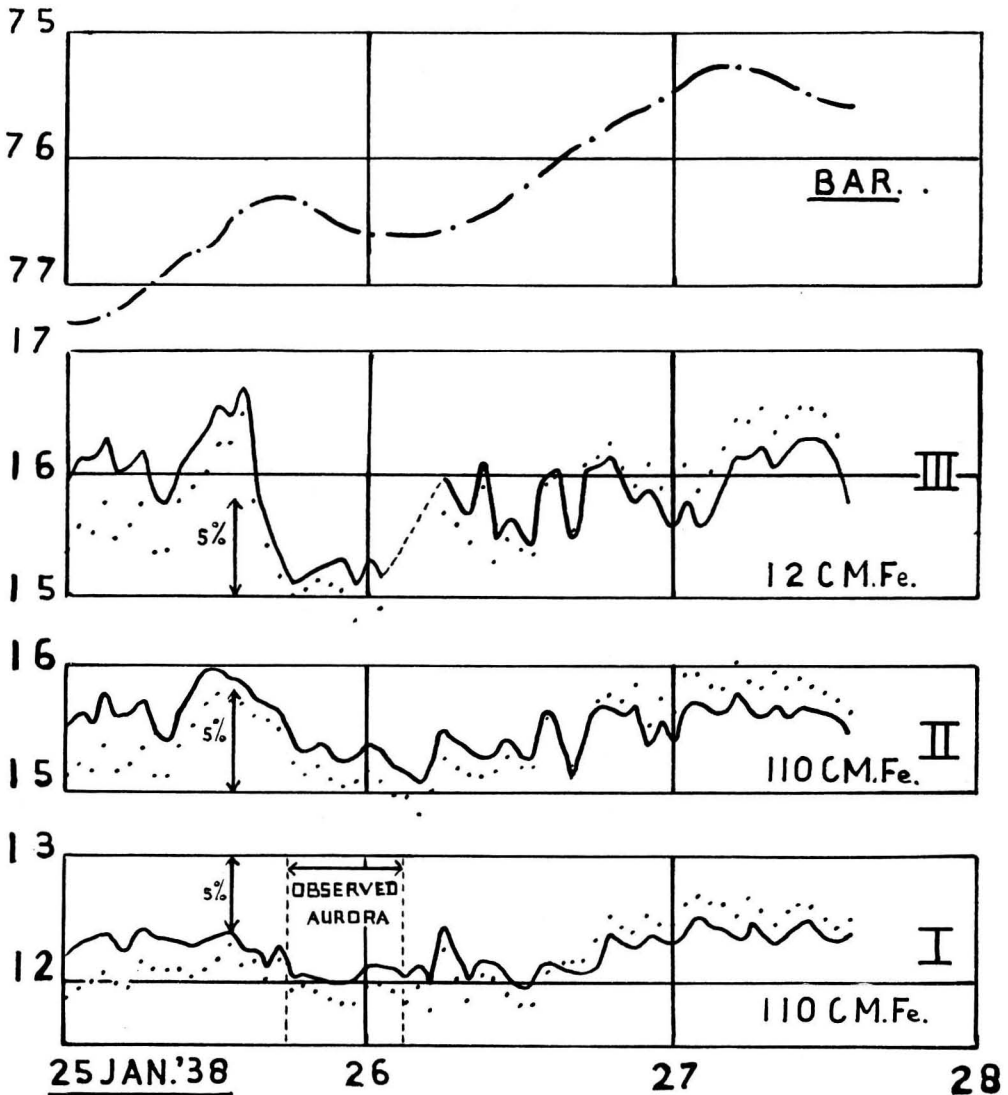


Fig. 2. The variations of cosmic-ray intensities during the magnetic storm of Jan. 24—26. The points in the graph are the recorded values; the full line gives the corrected values.

12 h. M. G. T. and the minima between 25 Jan. at 18 h. M. G. T. and 26 Jan. 4 h. M. G. T.

At these moments the barometer was the same, so that we have a good chance that these differences were not affected by influences of barometric changes. When we shall have collected the results of the magnetic observations during the same period, we will discuss the correlation and the causes.

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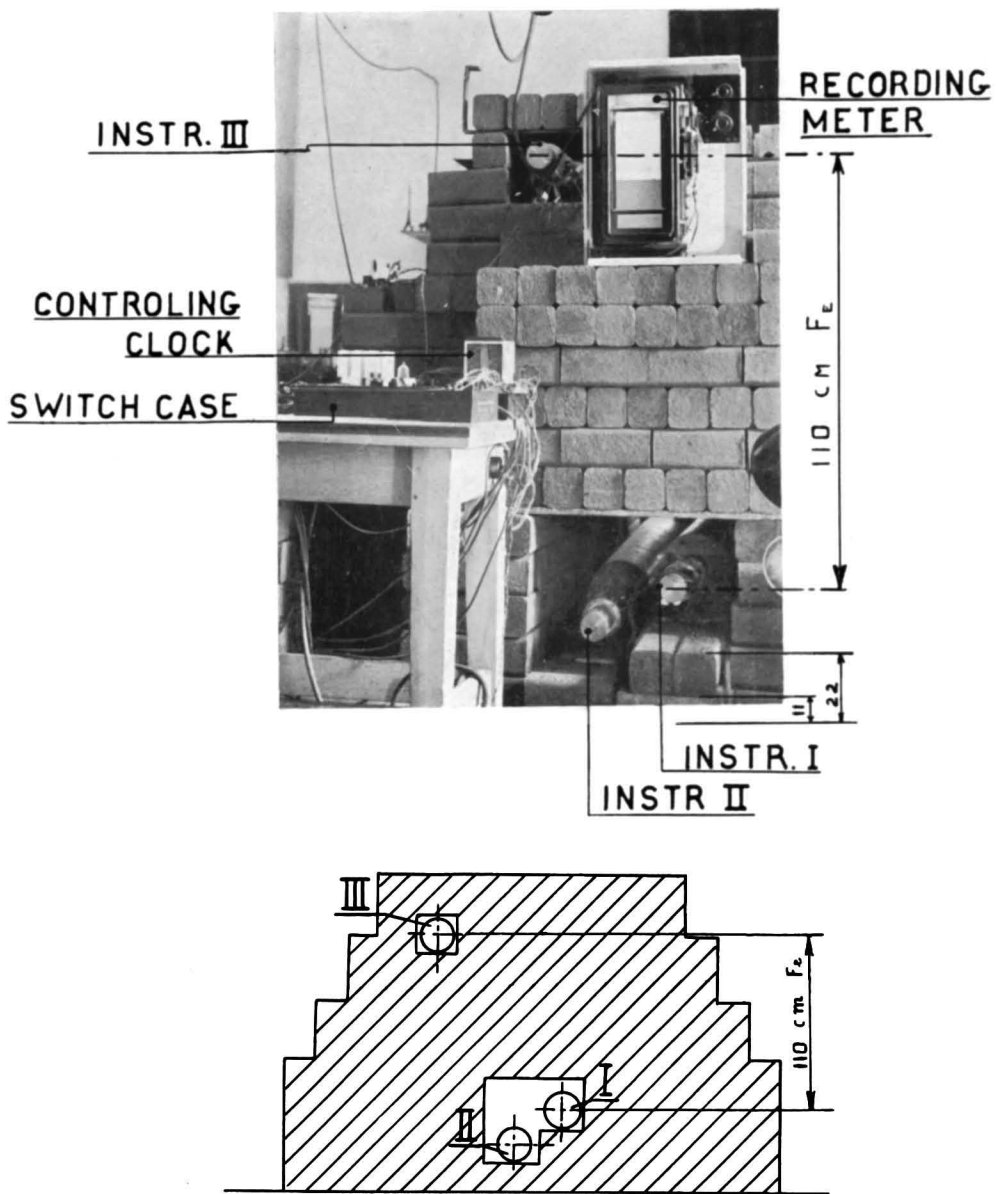


Fig. 1. The recording ionization instruments, under their iron shields.