examples are the sulphides of lead and mercury and the chromates of lead and barium. These and similar salts were precipitated inside the fibre by impregnating the scoured fibre with an aqueous solution of a suitable salt of the metal and then transferring the fibres to the appropriate reagent. The treated cotton was soaped and boiled, or combed repeatedly, in order to remove surface deposits.

The X-ray diffraction pictures of the treated fibres showed powder patterns of known lattices of the salts (Fig. 1). The diffraction rings were somewhat diffuse, indicating that the linear dimensions of the crystallites were of the order of a micron or less. At present, the size and shape of the crystallites are being assessed from the measured line breadths.

In the case of a few salts, such as lead iodide and lead chromate, the powder patterns indicated that there was preferred orientation of a crystal axis parallel to the fibre axis. This result is in contrast to the random orientation which has been reported for metal deposits. Ramachandran and Ambady in a recent paper report the production of highly oriented deposits of inorganic salts on collagen. The nature of the preferred orientation of adsorbed materials on cotton and the conditions under which the effect is best obtained are now under study.

ATIRA, T. RADHAKRISHNAN, Ahmedabad-9, B. K. VAIHYA, December 5, 1956.


SOLAR FLARE EFFECT ON THE COSMIC RAY MESON INTENSITY AT GULMARG

Cosmic ray meson telescopes have been in operation at Gulmarg, Kashmir (altitude 9,000 ft., geomagnetic latitude 23° 5' N.) for the last few months at the field station of the Physical Research Laboratory, Ahmedabad. Each telescope measures a triple coincidence rate of 3 G.M. counters each of length 2 ft. and diameter 1½ in. The separation between the counters and their orientation are such that the semi-angles of each telescope in the east-west and north-south planes are 5° and 56° respectively. About 8 cm. of lead are interposed in between.

On 23rd February 1956, there was a big solar flare of magnitude 3. The flare was associated with increase in cosmic ray intensity at various latitudes and numerous reports have appeared from observing stations all over the world. Sarabhai et al.¹ have reported an average increase of 6% at Trivandrum, Kodaikanal and
Ahmedabad during the hour following the flare. At the time of the solar flare, three telescopes were in operation at Gulmarg. The rate of each telescope was only about 700 counts per hour and the standard deviation was rather large (about 4%). It was observed, however, that all the three telescopes recorded increases in cosmic ray intensity on 23rd February 1956. To reduce the statistical errors, data from the three telescopes have been combined and the hourly values for the period February 21-25 have been plotted in Fig. 1 (a). In spite of the large fluctuations in the ground level of cosmic ray intensity, an increase of about 10% (± 2%) is clearly seen during the interval 8 a.m. to 12 noon on 23rd February. Fig. 1 (b) gives the moving averages of the hourly values of cosmic ray intensity for three consecutive hourly values, the average thus centred at the middle hour. The increase on the morning of 23rd February stands out prominently in Fig. 1 (b). Its magnitude is about 8% (±1%) and the hour of onset of cosmic ray increase seems to be about 10 a.m. (±1 hr.). No corrections of any kind have been applied to the data.

The implications of increases of this type at stations in low latitudes have already been discussed by Sarabhai et al.1 Forbush2 has since reported a 18% increase of ionisation at Huancayo which is almost on the geomagnetic equator but was outside the impact zone at the time of occurrence of the flare on 23rd February 1956. He has also reported a 50% increase in ionisation at the high latitude station of Godhavn (Geomagnetic latitude 80° N.). There is, therefore, a complicated mechanism for storage and scattering of cosmic primaries of solar origin and the estimate of the mean energy and yield of the primaries made by Sarabhai et al.1 would require re-examination.

The authors are grateful to the Atomic Energy Commission of India for financial support of the present work. Thanks are due to Prof. V. A. Sarabhai for helpful discussions.

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THE FORMATION OF CLAY-HUMUS COMPLEXES IN SOILS AND THEIR SIGNIFICANCE IN SOME INDIAN SOILS

The fact that the inorganic clay and humus exist in intimate combination in soils has been shown by Demolin and Barbier1 and Mattson2 from measurements of cation exchange capacity, by Sideri3 using optical, by Myers4 using viscometric and by Sedletsky5 using X-ray methods. In the case of the clay-humus complexes involving protein, it has been shown by Ensminger and GiesKing6 that this complexing renders proteins more resistant to proteolytic enzyme-action. Tiulin7 has developed a method for fractionating the clay-humus colloids from a soil by partial dispersion and flocculation. Atkinson and Turner8 have used this method successfully on Canadian soils. They had both shown that the fertility of a soil is indicated by the proportion of their first group of complexes in it, being higher for the chernozems than for podsols. This was also correlated with the crop yielding power of the soils. It is of interest to know if this is true of the soils of this country and if this proportion can be increased in efforts to raise their fertility. The purpose is to test this, taking a black cotton soil from Padegon (Bombay State) and an acid hill (Cinchona) soil from Munsong (West Bengal) as the nearest analogues to the chernozems and podsolic soils studied by earlier workers and to find out the constituents of the clay that will be needed to form the fertile group of complexes.

Three groups of complexes were quantitatively separated from surface 0-8 in. samples of the two soils mentioned above, as well as composted mixtures of F.Y.M. with either montmorillonite, illite, kaolinite and freshly precipitated oxides of aluminium, iron and silicon by the methods of Tiulin7 as modified by Atkinson and Turner.8 45 g. of the separated clay mineral (size of particles <2 μ) or