There are two grounds in this for interest. One is that a sorting out of this kind implies that the atmosphere is no longer being stirred effectively; that the limit of air movements which may be connected with weather below has been reached. The other is in relation to the past and present history of the atmosphere; since the lighter a gas is the more readily must it escape from the earth.

"Electro-Jet"

Evidence for such a sorting out has been sought, but not confirmed, at lower latitudes. In the First Churchill measurements, a census of the atoms and molecules present in the air at different levels was taken with a mass spectrometer. There is an element of interpretation in such measurements, admittedly. The conclusion, cautiously expressed, is that at the latitude of Fort Churchill (58° 40′ N.) the gases of the atmosphere appear to be well mixed up to about 100 kilometres (about 62 miles), but that above this there is a beginning of separation under gravity.

The summary of American measurements that has been quoted covers also other forms of research. One that is of interest, and to some extent related, is an attempt to confirm from magnetic stations at ground level the existence of the so-called equatorial "electro-jet". The effects observed in magnetic storms are thought to be connected with great electric currents, of perhaps several hundred thousand amperes, circulating high in the atmosphere. Two of these currents are thought to circle the North and South Magnetic Poles. A third, round the magnetic equator, is thought to become narrowed at local noon, so that the density of current is increased, the effect at ground level being then greater.

A chain of stations has been set up in the Pacific and South America to test the reality of the "electro-jet". The data that are being collected at all stations will need to be analysed and compared before any firm conclusions are drawn. Meantime, early data from one station, Koror, in the Western Pacific—are said to show that the electro-jet exists.

EFFECT OF TERRESTRIAL MAGNETIC FIELD ON COSMIC RADIATION

THERE is an appreciable difference between the characteristics of the terrestrial magnetic field obtained, on the one hand, through the study of cosmic rays and, on the other, by the measurement of the magnetic field on the earth's surface.

This is the conclusion which the Soviet scientists have arrived at, after the initial sorting out of the findings of research done with the first Soviet artificial earth satellites, Academician Topchiev, Scientific Secretary of the Presidium of the USSR Academy of Sciences, has declared.

An analysis of the number of cosmic ray particles at different latitudes and longitudes has shown that the lines of uniform intensity of cosmic rays do not coincide with geomagnetic parallels.

A study of the measurements of the intensity and variations of the intensity of cosmic rays, done with the second Sputnik, has made it possible to determine the dependence of the number of particles on altitudes.

Academician Topchiev announced that increases of cosmic ray intensity of up to 40% had been observed in the interval altitudes of 225 to 700 kilometres. This phenomenon is believed to be mainly due to the reduction of the effect of the terrestrial magnetic field on cosmic radiation at great altitudes.

Along with this, observations have established that there are fluctuations of cosmic ray intensity which are probably associated with the state of outer space closer to earth. On one occasion a steep increase (50%) of the number of cosmic ray particles has been observed. This has, possibly, been caused by a new phenomenon, to wit, the generation of cosmic rays of very low energies on the sun which are intensely absorbed by the earth's atmosphere.