Chart) respectively, on the adaptive processes of the plant organisms. The Voltziales and other transition Conifers, the Ginkgoales, the Cycadales, the Bennettitales and the true ferns may be said to have evolved during the critical phase in the Permo-Carboniferous while the Lepidodendrales, the Calamariales, the Sphenophyllales and the Cœnopteridales faded out completely (II, B, in Chart).

The third major revolution (III, in Chart) which was initiated in the Pleistocene was mainly responsible in breaking up the more generalised floras into the complex pattern of plant association which exists to-day (III, C, in Chart). It was then that the second peak of floral differentiation (botanical provinces) took place, the first having occurred in the Permo-Carboniferous.[7] But it should be noted that the Pleistocene revolution which may be considered to be still in progress, "began far too recently for us to observe more than the beginnings of its effects on plant evolution".[6] Thus, except during these three phases of major geological revolutions (late Pre-Cambrian, Permo-Carboniferous and Pleistocene), evolution in the plant kingdom may be said to have progressed slowly during the intervening periods creating no spectacular changes probably because the hereditary characters of the germ cells remained comparatively stable in the absence of any markedly violent environmental changes like extensive glaciation, large-scale mountain-building, regression of sea-level, etc. Such physical factors might have generally determined the basic patterns along which the plant kingdom developed through the ages.

It is indeed a fascinating suggestion put forward by Umbgrove[4,7] that the more or less equal intervals of about 250 million years between each of the three major revolutions and the accompanying spurt in plant evolution, probably represent the time required for a full rotation of our galactic system! It is becoming increasingly apparent that in order to make as complete an appreciation as possible of the factors that influenced organic evolution we shall have to look beyond the confines of the earth

We are grateful to Dr. M. S. Krishnan, Director, Geological Survey of India, for his keen interest in the work.

1. Jacob, K., Jacob, C. and Shrivastava, *Curr. Sci.*, 1953, **22**, 2, pp. 34-36. 2. —, *Nature* (in the Press). 3. Jacob, K. and Jacob, C., Symp. "Organic Evolution," *Bull. Nat. Inst. Sci. Ind.* (in the Press) 4. Umbgrove, J. H. F., *The Symphony of the Earth*, 1950, 11, The Hague. 5. Arnold, C. A., *An Introduction to Paleobotany*, 1947, 367, New York. 6. Stebbins, Jr., G. L., *Variation and Evolution in Plants*, 1950, 557, New York. 7. Umbgrove, J. H. F., *The Pulse of the Earth*, 1947, The Hague.

"JET STREAM" UNDER STUDY

STUDIES recently completed by Dr. Vincent J. Schaefer, of the General Electric Company, U.S.A., show that winds in the "jet stream" blow at speeds ranging from 80 to more than 200 miles an hour at altitudes of 20,000' to 50,000'. These winds often double the speed of high-flying aircraft. It is found that the "jet stream" shifts about over the northern hemisphere as the seasons change. It moves often from south-west to north-east, but occasionally veers to the west, north-west or north. Sometimes two or more streams may be identified. In summer, the speed of the winds in the stream decreases to about half of the tremendous winter-time speeds.

Other indications of the proximity of the major axis of the stream include gusty winds at the ground level; persistent cool, crisp air; generally blue skies with visibility unlimited, and rapid changes in the amount of sky covered by clouds. When the "jet stream" is nearby, the coverage of the sky by clouds often changes from one-tenth of the sky to nine-tenths and back again in less than an hour.

Scientists believe that this air corridor may be responsible for many unusual weather conditions for which there has previously not been any adequate explanation. Thus, for example, the stream can quickly carry extremely cold air from the north to warm southern areas and can convey tropical air masses to the north in the space of a few hours Many floods, droughts and persistent hot and cold spells are also attributed to its influence.

In the past there has been no way to locate the "jet stream" quickly in order to warn aircraft or to study its probable effects on the weather. Dr. Schaefer's studies have now shown that its location and the direction of its winds could be determined by carefully co-ordinated observation of cloud formations by weather stations located in different parts of a country.

Four "specific and rather spectacular" cloud types are visual indicators of the location of the high-speed wind stream. There are cirrus streamers, high cirro-cumulus clouds, alto-clouds and billowing alto-cumulus clouds that often extend from horizon to horizon, with parallel waves running at right angles to the direction of the air flow.