was dealt with by Fraser Roberts who believes that it is a case of multifactor inheritance, there being a number of genes, any pair of which are able to determine idiocy or imbecility. The genetics of many other diseases like epilepsy and Pick's disease were also discussed. Interesting cases of linkage were brought to light, like that between tooth deficiency and hair colour, reported by Barbara Burks. Reports on a number of disorders and abnormalities were also made.

The phenomenon of growth, normal or abnormal, as examined by the genetical viewpoint offers interesting study and as observed by E. B. Ford, growth may be determined by a single pair of factors or by numerous ones which might affect growth by co-operation. It is also necessary to make a distinction between cell-growth and division on the one hand and body growth on the other and it is probable that the genetic

influence may affect the former directly and the latter only indirectly. The effect of the endocrine organs on general body growth is well known and any genetical influences on the former will produce consequent results on the latter. A study of cancers and tumours has shown that the growth of these comes under the influence, not only of genetical but also of environmental factors.

Wider aspects of genetical research and their bearing on general problems of evolutioonary biology were discussed in a special session. The observation that evolutionary change taking place not only under laboratory conditions but also in Nature must be investigated, was made by Dobzhansky. The bearing of taxonomy on evolutionary phenomena was stressed by J. S. Huxley who observed that the study of taxonomy was the study of evolution in action in the field.

B. R. S.

THE ANATOLIAN EARTHQUAKE OF DECEMBER 27, 1939

BY

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A DISASTROUS earthquake occurred in Anatolia at $5^h 27^m$ I.S.T. ($1^h 57^m$ Turkish Standard Time) on December 27, 1939. The shock was recorded as one of great intensity by the seismographs at the Indian Observatories and the tentative epicentre as determined on the basis of the data reported from Agra, Calcutta, Kodaikanal and Colaba is found to lie in the region of Lat. 40° North and Long. 36° East, that is about 40 miles to the southwest of Tokat in Asia Minor. From a long time Asia Minor has been known to lie in one of the two major seismic belts in the world and has been visited by destructive earthquakes. According to Davison,[1] there were 48 destructive earthquakes in this region during the nineteenth century alone. From 1900 to 1928 nine large shocks were recorded in the same area. After a lull of about ten years this region appears to have once again become active. On April 19, 1938, a disastrous earthquake occurred in this region and the epicentre as located on the basis of the Indian seismograms was at Lat. 40° N. and Long. 33° E. This shock

resulted in the complete destruction of ten villages; the number of victims exceeded 800. A slightly less destructive earthquake was also reported to have occurred on September 22, 1939, in the neighbourhood of Smyrna and the epicentre was found to be near Lat. 37° N. and Long. 26° E., about 100 miles away from Smyrna in the Aegian Sea. In this case, according to Reuter's news report, several villages around Smyrna were destroyed and more than 200 people killed. Another destructive shock, but less severe in its havoc, occurred in Anatolia, on November 23, 1939, but the Colaba records did not show clear phases. Sixteen villages were destroyed and 43 people were killed. These earthquakes were followed by the present catastrophic shock of December 27, 1939. According to the press reports so far received, fifteen provincial towns and ninety villages and hamlets were reduced to ruins and more than 39,000 people killed as a result of this earthquake. The shock was particularly severe in the agricultural regions between Tokat and Sivas, and in the districts of
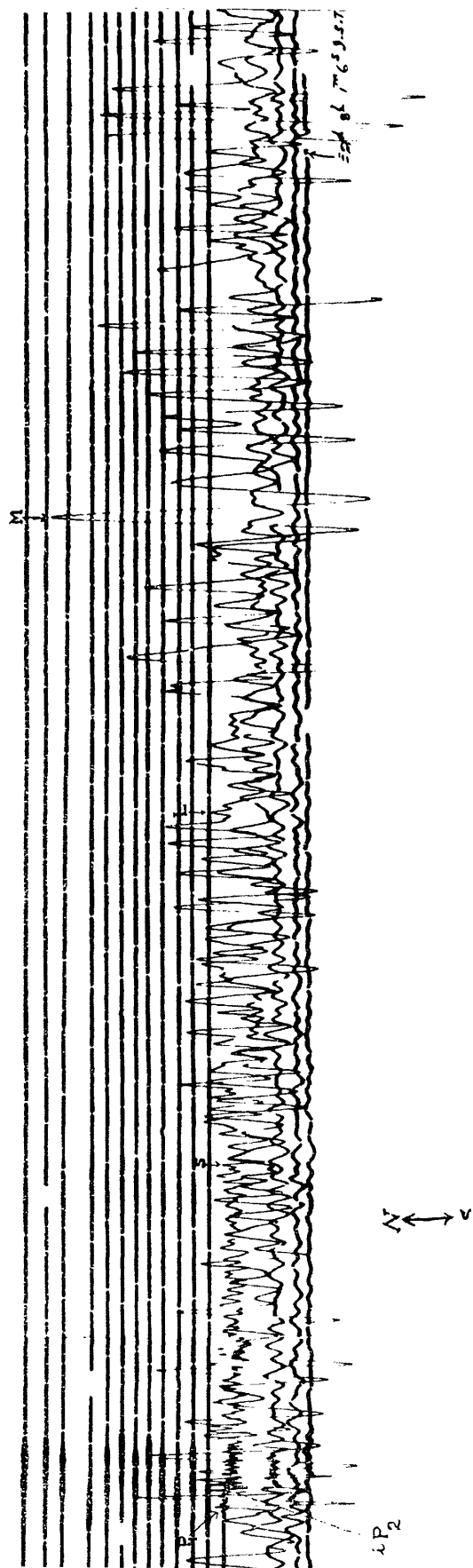
Fig. 1

Anatolian Earthquake, December 27, 1939. Colaba (Bombay). Milne-Shaw Seismogram (N-S) Component

Erzinjan and Kemakh every town and village is a heap of wreckage. The estimated total area that was severely affected by the shock is about 60,000 square miles.

The seismogram of this earthquake as recorded at Colaba by the Milne-Shaw seismograph (N-S component) is reproduced in Fig. 1. The first movements in the seismograms of the Colaba N-S and E-W components are very small as compared with the intensity of the shock. It is considered probable that the larger shock was preceded by a small foreshock with an interval of about 25 seconds between them. It is rather difficult to make any definite statement regarding the depth of focus of the shock until seismograms from other stations also are examined. It can, however, be said that the Colaba seismograms appear to show that the earthquake was not of abnormal depth. Considering the extent of the area affected it is probable that there were more than one shock with different epicentres along the same belt.

The magnitude and energy of the shock have been calculated from Colaba records only, following the method of Gutenberg and Richter.[2] The value of the magnitude comes to 7·1 and that of the energy of the earthquake, 10^{21} ergs. The other catastrophic earthquake in the year 1939 was the Chilean shock of January 25, 1939. The magnitude and energy of this earthquake were found to be 7·5 and 10^{22} ergs respectively.[3] Thus the energy released by the present Anatolian earthquake is about one-tenth that of the Chilean shock though in the matter of destruction of human life and property the former exceeds the latter. The magnitude and energy of this Anatolian earthquake is almost equal to those of the Baluchistan Quetta earthquake of May 31, 1935. But in loss of life, the Anatolian earthquake with a toll of above 39,000 lives almost ranks with the Messina-Reggio earthquake of December 28, 1908, which so far holds the record with the greatest death roll of over 47,000 as a result of the earthquake alone.

[1] *Earthquakes and Other Earth Movements*, by John Milne. Revised by A. W. Lee, 1939, p. 143.

[2] *Gerlands Beitrage zur Geophhsik*, 1936, **47**, 122–24.

[3] Savur, S. R., and Mukherji, S. M., *Curr. Sci.*, 1939, **8**, 156.