LETTERS TO THE EDITOR

GEOPHYSICS

Possibility of a 26- or 27-Month Periodicity in the Equatorial Geomagnetic Field

Stacey and Westcott[1] have presented evidence of an oscillation of somewhat more than two years in the geomagnetic field at one high latitude and three equatorial stations. The importance of this observation lies in its possible connexion with a large amplitude oscillation, of about the same period, in the winds of the equatorial stratosphere[2]. E. R. Hope, of the Canadian Defence Research Board, early this year, directed our attention to some Soviet literature[3,4] on the subject of long-period geomagnetic variations. In these investigations, analyses of geomagnetic data from a number of Soviet stations appear to yield an oscillation of somewhat greater than two years. This work has recently been described by Hope[5]. Our comments[6] accompanying Hope's note point out that the method of analysis may have been responsible for the apparent oscillation. The method of analysis used by Stacey and Westcott, at least in part of their paper (12-monthly minus 24-monthly running means), is similar to that used by Kalinin and Mansurov. In view of the possible implication of oscillations of about the same period in the geomagnetic field and in the equatorial stratospheric winds, a re-examination of the data was felt worth while.

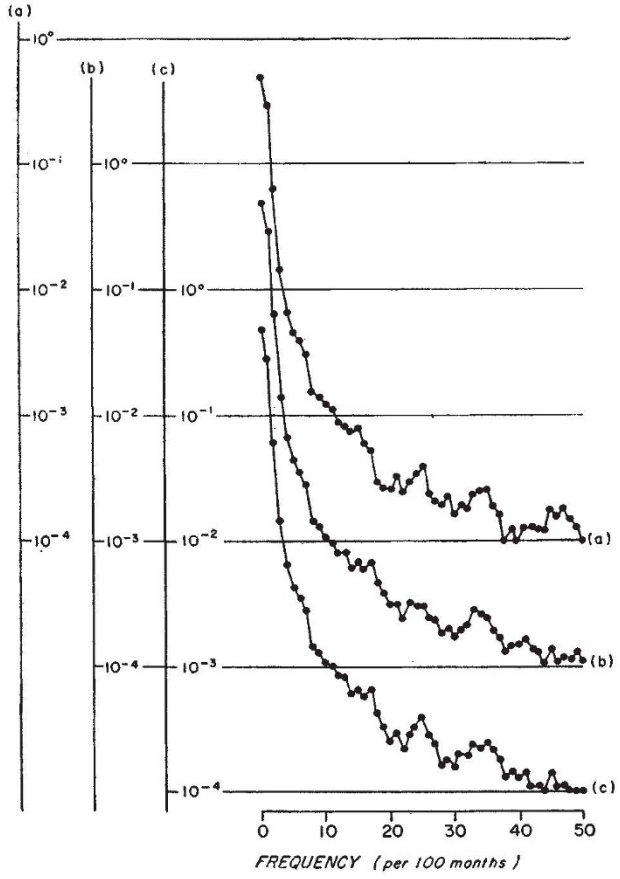

Fig. 1. Power spectra of the horizontal component of the geomagnetic field (H) at Huancayo; (a) monthly averages, (b) averages of H for the five international quiet days each month (H_q); (c) averages of H for the ten least disturbed days each month. The scales for each curve, (a), (b) and (c), are indicated on the left

Stacey and Westcott show power spectra[7] of the monthly mean values of H_q, the horizontal component of the geomagnetic field on magnetically quiet days, for the three equatorial stations. It is not clear whether there was any further processing of the monthly means before the power spectra were computed. In our analysis, power spectra are computed for Huancayo, using the raw data as published by the Carnegie Institution[8], covering the same period as Stacey and Westcott. The autocorrelation functions were truncated at 50 months. The results are shown in Fig. 1. This shows the fraction of the variance of the time series contributed by each frequency. The ordinate (fractional variance) is given on a logarithmic scale; the scale of the abscissa (frequency) is linear. The frequency is given in cycles per 100 months. Therefore a frequency of 4 corresponds to a period of 25 months and the annual period falls between frequencies 8 and 9. The three separate spectra shown in the figure refer to: (a) the monthly average values of H, the horizontal component of the geomagnetic field at Huancayo; (b) the averages of H at Huancayo for the five international quiet days each month (H_q); (c) the averages of H at Huancayo for the ten least disturbed days each month. The three spectra are essentially identical. However, they differ considerably from the spectrum of H_q at Huancayo shown by Stacey and Westcott, which contains a sharp peak at 12 months and an ill-defined peak around 30 months. There is no evidence, from our analysis of the raw data, of any peaks near these periods.

RALPH SHAPIRO
FRED WARD

U.S. Air Force Cambridge Research Laboratories,
Bedford, Mass.

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GEOLOGY

Historical Marine Levels in South Italy

IN *Nature* of January 21, 1904, there appeared an article on "Earth Movements in the Bay of Naples", by my father, Dr. Robert T. Gunther. This described his survey of historical marine levels along the Roman foreshore of Posilipo, in the Bay of Naples, extending into the Gulf of Pozzuoli. The implications of this work applied to the Italian coast-line as a whole. A subsidiary conclusion was that the fall of land level in the last centuries of the Roman Empire, increasing the swamps in the lower lying regions such as the Pontine Marshes and the Plain of Paestum, can have been responsible for the increase of malaria and so to the decline in the energy of the population.

In 1907 when Gunther was preparing the material for his book *Pausilypon* (Oxford 1914), an archæological reconstruction of the foreshore, he received a visit, on August 21, from Prof. G. de Lorenzo, professor of geology at Naples, and the day was spent visiting the sites on