measured in seconds per day, t_0 is immediately expressed in days, which is convenient. Scott's equation 1 agrees with my equation 6 to order e_0, while Fejer's equation 7 is a direct consequence of my equation 4.

The relative error in equation 6 is believed to be of order e_0. A correction of this form would be of some significance for Satellite 1957 Beta, with its long life and high initial eccentricity, and an attempt is therefore being made to evaluate it.

D. C. M. Leslie

Royal Aircraft Establishment,
Farnborough, Hants.
Jan. 16.

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Remanent Magnetization of Ancient Bricks

It has recently been suggested that, in the values of remanent magnetization of clay bricks fired in ancient times, there exists evidence of a secular decrease in the strength of the Earth's magnetic field[1,2]. It has been further suggested that the effect of such a change in magnetic field on the intensity of cosmic radiation incident upon the Earth would tend to falsify radiocarbon dating procedures based on an assumed constant intensity of cosmic radiation[3].

The conclusions based on the magnetization of ancient bricks have presupposed that this magnetization is proportional to the intensity of the Earth's magnetic field at the time the bricks received their original firing, provided that no high-temperature firings have intervened. In the procedure of E. Thellier[1,2,4], the magnetization, M, of the brick, as found, is measured at a standard temperature (60° C.). The brick is then fired at successively higher temperatures to 670° C., apparently in an inert atmosphere[2], and then allowed to cool from 670° to 60° in the present Earth's field, H'. The resulting magnetization of the brick, M', is then measured. The value of the Earth's field, H, at the time of the original firing, is assumed to be related to the above values by the equation :

$$H = H' M/M'$$

However, it has been shown in an earlier paper of E. Thellier[5] that the specific magnetization, σ, acquired by a given baked clay, when fired at 670° in a constant magnetic field of 13 gauss, can increase by a factor of 200 when the firing atmosphere is changed from nitrogen to illuminating gas. (Cf. Table 1, taken from ref. 5. T is the maximum firing temperature.)

It is proposed, therefore, that the apparently high value of remanent magnetization of ancient bricks can have been the result of the use of fuel-heated kilns during their original firing. The presence of incompletely burned products of combustion in such kilns could provide a reducing atmosphere comparable in effect to illuminating gas. This would tend to cause a higher value of magnetization to exist in the brick after cooling than would result from firing in an inert atmosphere.

Table 1. Specific Magnetization of Fired Clay ($\sigma \times 10^4$)

Temperature (° C.)	400°	580°	670°	870°
Oxygen	2·0	3·6	4·8	6·5
Nitrogen	2·6	4·5	10·0	570·0
Illuminating gas	520·0	4,750·0	2,000·0	86·0

If the possibility of the occurrence of such an effect has not been taken into account in the measurements of 'fossil' magnetization of ancient clays, the results may well lead to the deduction of an excessively high value of the magnetic field of the Earth at the time of the original firing.

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H. A. Atwater
R. T. Ellickson

Department of Physics,
University of Oregon,
Eugene, Oregon. Nov. 18.

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Abnormal Polarization of the Atmospheric Pulses reflected successively from the Ionosphere

While engaged in the determination of the direction of arrival of atmospherics by the conventional cathode-ray tube direction-finder, it was observed that, on occasions, for atmospherics of comparatively distant origin, there were elliptic patterns of gradually decreasing eccentricity and tilt-angle along with one or more linear responses, although when tested with the audio-frequency oscillations from a signal generator fed into the aerial system of the cathode-ray tube direction-finder, the fluorescent screen exhibited only the usual linear responses. It appears certain that these elliptic patterns are evidences of abnormal polarization of the atmospheric pulses reflected successively from the ionosphere, the linear responses being due to the direct (or ground-wave) atmospheric pulses. More than forty oscillograms showing the elliptic patterns and lines were recorded during the monsoon months of 1955. Usually the tilt-angle of the ellipses was found to decrease with the increasing order of ionospheric reflexion. A reversal in the direction of precession was noticed in few cases.

A typical record of the precessing ellipses with five or six straight lines bunched within a small angle along with the record of the wave-form of the atmospheric pulses simultaneously taken with the automatic atmospheric recorder[1] is shown in Fig. 1. The wave-form record reveals quasi-periodic pulses followed by a series of successive ionospheric reflexions. The distance of the lightning discharge yielding these records, as calculated from the observed time-interval between the successive reflexions, is about 500 km. The tilt-angle of the elliptic patterns was found to decrease from about 176° to about 167° and the phase-difference between the normal and abnormal components, as calculated from the observed ellipses, was found to increase steadily from about 40° to about 67° after six successive reflexions from the ionosphere.

It is suggested that the several straight lines, bunched within a small angle, were due to the