then erroneous assumptions in the theory must be sought first in the earthquake mechanism.

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[1] Graham, J. W., Buddington, A. F., and Balsley, J. R., *J. Geophys. Res.*, **62**, 465 (1957).
[2] Powell, D. W., *Nature*, **187**, 225 (1960).
[3] Stott, P. M., and Stacey, F. D., *J. Geophys. Res.*, **65**, 2419 (1960).
[4] Kern, J. W., *J. Geophys. Res.*, **66**, 3807 (1961).
[5] Grabovsky, M. A., and Parkhomenko, E. I., *Izv. Akad. Nauk, S.S.S.R., Ser. Geophys.*, **5**, 405 (1953).
[6] Stacey, F. D., *Adv. Phys.*, **12**, 45 (1963).
[7] Kapitsa, S. P., *Izv. Akad. Nauk, S.S.S.R., Ser. Geophys.*, No. 6, 489 (1955).
[8] Stacey, F. D., *Nature*, **200**, 1083 (1963).
[9] Stacey, F. D., *Pure and App. Geophys.*, **58**, 37 (1964).
[10] Breiner, S., *Nature*, **202**, 790 (1964).
[11] Moore, G. W., *Nature*, **203**, 508 (1964).

PHYSICS

Apparent Anisotropy Field of Continuous Magnetic Films subjected to Inhomogeneous Drive Fields

Mr. J. G. Edwards[1] has attempted to explain the high values of anisotropy field measured under strip line conductors by equating the total anisotropy torque with the total applied field torque. He states that the total stray field torque is always zero. It is easy to show that this is, in fact, not the case. Using Mr. Edwards's notation, the stray field for $l \to \infty$ is:

$$H_s = \int_{-\infty}^{\infty} 2Mf \frac{\partial (\sin\theta)}{\partial x'} \frac{dx'}{x' - x} \text{ in E.M.U.'s}$$

Hence the total or net torque:

$$T_s = Mfl \int_{-\infty}^{\infty} H_s \cos\theta \, dx$$

The distribution of H_s and $\cos\theta$ are shown schematically in Fig. 1. As

$$\int_{-\infty}^{\infty} H_s \, dx \propto \iint_{-\infty}^{\infty} \frac{\partial(\sin\theta)}{\partial x'} \frac{dx'}{x' - x} \, dx = \int_{-\infty}^{\infty} \frac{\partial(\sin\theta)}{\partial x'} \int_{-\infty}^{\infty} \frac{dx}{x' - x} dx'$$

is always zero, it is clear that $\int_{-\infty}^{\infty} H_s \cos\theta \, dx$ will not be zero unless $\cos\theta$ is independent of x. This is approximately true for small values of θ and, therefore, the theory, developed by Mr. Edwards for small values of θ only, is also approximately correct. For larger values of θ, contrary to Mr. Edwards's assertion, the net torque is not zero. Consequently, his statement that, however large the applied field, the magnetization beneath the drive strip could never quite reach the hard direction, is also incorrect. There is nothing inconsistent about the distribution where the magnetization is in the hard direction under the influence of a large applied field for $|x| \ll w/2$ so that in this region the torque is zero, whereas for $|x| \geqslant w/2$ the anisotropy and stray field torques are equal. The coupling between the two regions is provided by exchange in two very narrow strips at $x = \pm w/2$. In this case, the net stray field torque, far from being zero, is equal to the net anisotropy torque.

Furthermore, Mr. Edwards's observations cannot be said to be an explanation for the anomalously high values of effective anisotropy field unless the coupling causing the observed values of p can be accounted for. As the p values observed are very much higher than those that could be due to macroscopic magnetostatic coupling alone,

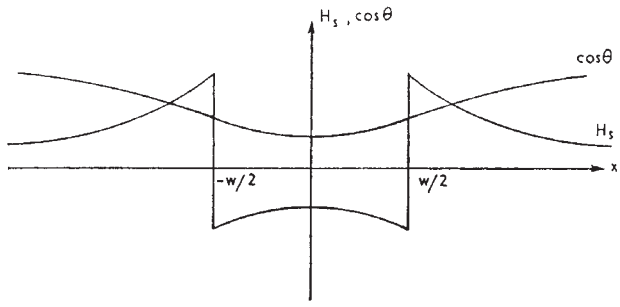

Fig. 1. The schematical distribution of H_s and cos θ indicating that, if

$$\int_{-\infty}^{\infty} H_s \, dx = 0, \text{ then } \int_{-\infty}^{\infty} H_s \cos\theta \, dx \neq 0$$

it would be more correct to say that the anomalously high values of anisotropy field and the anomalously high values of p are corollary observations, both still awaiting explanation.

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[1] *Nature*, **203**, 710 (1964).

I thank Dr. Bonyhard for his comments and agree that the net total torque caused by stray fields due to the film can never be zero. I was originally led to this erroneous conclusion in the search for a general theory independent of the nature of the coupling and by thinking that the dictum "action and reaction are equal and opposite" applied to any pair of forces. However, the analysis of the increase in effective anisotropy field still holds: it is merely necessary to introduce the limitation that $\cos\theta \simeq \cos\theta_0 = 1$, already used to integrate equation (4), when equating equations (1) and (4). So long as changes in $\cos\theta$ are small over the range of the stray fields the balance of torques can still be used.

Whether the propagation provides an explanation of the anomalously high values of effective anisotropy field is a question of scientific philosophy. The experiments have shown that there is a strong correlation between the observed increase in anisotropy field and the propagation distance, and on the basis of a balance of torques one can be predicted from the other. At present, due to purely mathematical difficulties, we cannot be certain what values of propagation constant could be due to macroscopic magnetostatic coupling alone, but given that the propagation does occur we can 'explain' the anomalously high values of effective anisotropy field. This seems to be an advance in our understanding of the problem, albeit a small one.

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Radon Content of Rainwater

In recent years, interest has been renewed in the measurement of the radon content of the atmosphere[1-4]. In most cases, samples of air were drawn through fine grain filter papers and the activity of the filter-paper samples, corresponding to radium *A*, *B* and *C*, was afterwards estimated by a suitable Geiger–Müller counter and scaling system. It was, however, found that the filter