In our experiments, rocks which were shown by torque-meter experiments[5] to have anisotropies less than about 2 per cent were cooled under directed stresses up to 1,000 kgm./cm.^{2} in the Earth's field. Within our measurement error of 2°–3° we found that the thermoremanent magnetization after release of stress coincided with the field direction. Quite different results were obtained with anisotropic rocks; for example, in a rock with approximately 60 per cent anisotropy which was cooled under stress, thermoremanent magnetization was induced at angles between 5° and 60° away from the field direction. It is important to note, therefore, that although Hall and Neale have reported more accurate measurements of the directions of such magnetization in rock specimens, they were using specimens with appreciable intrinsic anisotropies, such that the magnetization acquired in the absence of stress differed from the field direction by as much as 4°. According to Stacey's[5] analysis, this implies intrinsic anisotropy of at least 13 per cent, which can scarcely be described as 'slight'; a limit of 10 per cent was suggested[5] as acceptable in rocks used for palæomagnetism.

Further experiments are needed on the interaction of stress and the intrinsic magnetic anisotropies of rocks. It may be necessary to impose a more stringent limit than hitherto on the anisotropy, which is acceptable in rocks used for palæomagnetism.

P. M. STOTT
F. D. STACEY

Department of Geophysics,
Institute of Advanced Studies,
Australian National University,
Canberra, Australia.

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FROM the results of our pressure experiments[1] and more recent measurements of susceptibility anisotropy it appears that this parameter is of negligible importance in the production of thermoremanent pressure effects.

The scatter of thermoremanent magnetization directions mentioned in our previous communication is a maximum for the coarse-grained Ob Lusa dolerite rock type. A group of ten finer-grained contact specimens from the Ob Lusa dolerite dyke show a scatter of only ± 1·5° about the mean direction (the ambient field direction), while showing a pressure-induced rotation of moment six times larger than that of the coarser specimens. It is these latter specimens that show a maximum scatter of ± 4° about the ambient field direction.

Measurements of susceptibility anisotropy at low fields have been made at Cambridge on all the specimens used in the investigation. Anisotropies of 1 per cent or less between axial values of initial susceptibility were found for all the rock types employed with the exception of that having pyrrhotite as a magnetic component.

J. M. HALL

Applied Geophysics Department,
Imperial College of Science and Technology,
London, S.W.7.

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ASTRONOMY

Holistic Approach to Selenology

THE proximity of exploration of the surface of the Moon demands a critical review of present selenological hypotheses. I wish to point out a defect inherent in modern selenological thought and to stress that there is a need for more information before developing contemporary theories more fully.

Theories of the formation of lunar craters may be divided into two classes: extrinsic (that is, impact—favoured by Baldwin and Urey) and intrinsic (that is, igneous—championed by Jeffreys and Spurr). Broadly speaking, the extrinsic hypotheses appeal to macroscopic features (for example, predominant circularity, the depth-diameter relationship, and the near-random distribution of craters) while the intrinsic theories appeal more to the finer features (including crater chains, summit craterlets, and crater polygonality).

The limitation to both approaches is that neither (in the first instance) distinguishes between primary and secondary features of the lunar surface.

Primary features are the large-scale structures as seen immediately after they were formed, and by secondary features I mean the alterations to the primary structures during their later life (this includes the effects of stress systems and erosion).

Consideration of the lunar grid system shows that large-scale stresses have been applied to the lunar surface during its history, and the effects of these stresses have been to obliterate information pertinent to the origin of the craters. In addition, completely new types of feature have arisen (for example, rill and valley systems) and some of these have been erroneously interpreted as primary features. Thus when one accepts the fact that the valleys radial to the Mare Imbrium are nothing more than a slightly more prominent element of the general grid system the collision hypothesis for the origin of this Mare loses considerable weight.

I would suggest, therefore, that the need at the present time is for a more expiscate approach. Many details of the lunar surface found recently do not fit in comfortably with any existing theories of crater formation, nor indeed with present ideas on secondary activity. We can only attempt to construct a complete theory when we have realized more of the properties of the features with which we are dealing.

BRIAN WARNER

University of London Observatory,
Mill Hill Park,
London, N.W.7.

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PHYSICS

Use of a Different Type of Fluorescent Material as an Optical Maser

THE recent interest in the development of infra-red and optical maser systems has involved a number of different basic principles[1–3]. This communication is concerned with an alternative concept which utilizes the Stokes's shift associated with absorption and emission bands created by point defects in solids.