WILLIAMS, G. E., 1966*a*. Palaeogeography of the Torridonian Applecross Group. *Nature, Lond.*, **209**, 1303–1306.
—— 1966*b*. Planar cross-stratification formed by the lateral migration of shallow streams. *J. sedim. Petrol.*, **36**, 742–746.
WILSON, G., J. WATSON, and J. SUTTON, 1953. Current bedding in the Moine Series of north-western Scotland. *Geol. Mag.*, **90**, 377–387.

G. E. WILLIAMS.

DEPARTMENT OF GEOLOGY,
UNIVERSITY OF ADELAIDE,
SOUTH AUSTRALIA.
10th April, 1967.

GEOPHYSICAL INVESTIGATIONS ON THE BOUNDARIES OF THE MOUNTSORREL GRANITE

SIR,—We would like to comment on some points raised in the paper by D. Davies and D. H. Matthews (*Geol. Mag.* **103** (6), 534–547, 1966). The authors state that " Spink and Strauss (1965), on the evidence of the regional gravity gradient . . . postulated that a fault runs somewhat as shown in Text-fig. 1 ". However, the gravity gradient referred to by us (1965) is not regional, but is a local gradient of about 6·7 milligals per mile over a distance of 1·2 miles. The regional gradient to the east of this steep zone, from about 1 mile S.E. of Loughborough to the vicinity of Widmerpool, is about 1·5 milligals per mile over a distance of 6·8 miles. The local gradient across the postulated Loughborough Fault is thus over four times as great as the regional gradient to the N.E. The gradient across such significant faults as the Boothorpe Fault, which separates the Leicestershire and South Derbyshire Coalfields, is about 4·1 milligals per mile over about 1·2 miles at a point where the throw is known to be about 1,500 feet. The steep gradient in the vicinity of Loughborough cannot thus be lightly dismissed. We have also suggested (1965) that faults similar to, but opposite in throw to the Thringstone Fault (which lies along the eastern boundary of the Leicestershire Coalfield) may be present to the N.E. of Charnwood Forest, from structural considerations.

Falcon and Tarrant (1951), on the basis of the regional gravity pattern, suggested the presence of an Upper Carboniferous basin across the area of the gravity low centred upon Stanton on the Wolds, and this agrees with some geological evidence available from boreholes near Wysall and Widmerpool (Spink and Strauss, 1965, p. 584). It is generally agreed that Carboniferous Limestone is present below the Upper Carboniferous, and the Geological Survey (1956) use a specific gravity of 2·65 for the Carboniferous Limestone as against 2·7 for Charnian rocks and the Mountsorrel intrusion. With such small differences in density there is no need to assume the presence of ". . . relatively dense Charnian and igneous rocks (directly) beneath the Triassic and Jurassic rocks of the Soar Valley ". The authors do not indicate the manner in which regional gradient has been corrected; if this gradient is in fact the steep gradient to which we have referred, its removal would presumably cancel the effect of the Loughborough Fault. In that case the remaining vertical " step " down shown by the authors' survey, may well be a minor fault as referred to in their paper, but could also represent an erosion feature or a fault scarp, and is not necessarily related to the Loughborough Fault. Minor faulting can be seen in the quarry at Mountsorrel. There is evidence that some projecting rock masses in the Midlands, such as at Breedon, are not affected by Triassic faulting (Kent, Joysey, and Taylor, in Spink and Strauss, 1964, Ford (personal communication), and Spink (1965). In the case of the

Mountsorrel granodiorite, which has been dated at 400 million years (1963), appreciable differential erosion may have taken place.

It would, therefore, appear that the authors' survey does not throw any light on the existence of the Loughborough Fault and hence on the possible presence of productive Coal Measures to the east of Loughborough. A seismic profile across the postulated Loughborough Fault would have been of interest and it is regrettable that this was not carried out while the apparatus was available in the vicinity.

REFERENCES

FALCON, N. L., and L. H. TARRANT, 1951. The gravitational and magnetic exploration of parts of the Mesozoic covered areas of south-central England. *Q. Jl geol. Soc., Lond.*, **106,** 141–70.

GEOLOGICAL SURVEY U.K., 1956. *Gravity Survey Overlay Map* (4 miles to 1 inch), Sheet 11.

MENEISY, M. Y., and J. A. MILLER, 1963. A geochronological study of the crystalline rocks of Charnwood Forest, England. *Geol. Mag.*, **100,** 507–523.

SPINK, K., 1965. Coalfield geology of Leicestershire and South Derbyshire: The exposed coalfields. *Trans. Leicester lit. phil. Soc.*, **59,** 41–98.

—— and P. G. STRAUSS, 1964. The possibility of the existence of a concealed coalfield between the Leicestershire and Derby-Nottinghamshire Coalfields. *Proc. geol. Soc., Lond.*, No. 1617, 86–91.

—— —— 1965. A possible coalfield East of Loughborough. *Mining Engr.*, **58,** 581–590.

K. SPINK,
MINING DEPARTMENT,
NOTTINGHAM REGIONAL
COLLEGE OF TECHNOLOGY,
BURTON STREET,
NOTTINGHAM.

P. G. STRAUSS,
N.C.B., GEOLOGICAL OUTSTATION,
NOTTS. AND N. DERBYS.
COALFIELD,
SHERWOOD LODGE,
ARNOLD, NOTTS.

7th March, 1967.

SIR,—Although I agree with Messrs. Spink and Strauss that there is a danger of eliminating a " local " anomaly by incorrect application of a regional gradient, I do not feel that we are guilty of this. The Gravity Survey Overlay Map is necessarily based on much larger station spacings than those we used and the impressive feature in Text-fig. 5 of the paper is the clustering of gravity contours in the square East 55–56, North 16–17. The regional gradient removed (which Messrs. Spink and Strauss rightly point out we neglected to mention) is $-2 \cdot 4$ mgal per mile to the north-east and this appears satisfactory on both sides of the contour cluster. This value is much nearer the $-1 \cdot 5$ mgal per mile mentioned to the north-east of this region than the $-6 \cdot 7$ mgal per mile which Spink and Strauss believe us to have glossed over. Thus, rather than " lightly dismissing " the Loughborough Fault we have isolated it rather precisely, or at least have found evidence of a fault coincident with " Lowe's Postulated Fault ".

As to what lies to the north-east of the Fault, and the size of the throw, we can, subject to maintenance of the sharpness of the gravity anomaly change, vary density and throw at will. We would not like to comment on the possible existence of Upper Carboniferous beneath the Soar Valley as we have as yet little information on the geophysical characteristics of that region. A detailed seismic survey was indeed planned but the River Soar, characteristically, was in flood while the equipment was available. The suggested thickness of 600 feet of Trias in the vicinity made by Spink and Strauss (1965) is certainly not wildly in disagreement with our step model of a 280-foot throw. Whether

https://doi.org/10.1017/S0016756800048822 Published online by Cambridge University Press

Upper Carboniferous or plunging Charnian rocks underlie the valley we cannot as yet say—even seismic velocity determinations may not easily differentiate Millstone Grit from Charnian rocks.

REFERENCE

SPINK, K., and P. G. STRAUSS, 1965. A possible coalfield East of Loughborough. *Mining Engr.*, **58,** 581–590.

D. DAVIES.

DEPARTMENT OF GEODESY AND GEOPHYSICS,
MADINGLEY ROAD,
CAMBRIDGE.
21st March, 1967.

REVIEWS

PHYSICAL GEODESY. By W. A. HEISKANEN and H. MORITZ. pp. ix + 364, and numerous diagrams. W. H. Freeman and Co., San Francisco and London, 1967. Price 100*s*.

A sub-title for this book might read " mathematical basis for the study of the Earth's gravity field ". The book is mathematical throughout. After a chapter on general theory of potential, the authors deal with the gravity field near the Earth's survace, gravity reduction methods, isostasy, the determination of the form of the Geoid surface, etc. There are chapters on height, geopotential, and the application of astronomical observations. Two chapters deal with the gravity field outside the Earth and the use of satellites, and there is a chapter on statistical studies of the accuracy to be expected in various processes applied to gravity observations.

Most of the contents of this book will have appeared in other texts, reports and papers, but it is very useful to have a comprehensive mathematical framework inside one cover, classified into suitable themes, not mixed up with descriptions of instruments, observational procedures, or geophysical interpretation techniques.

There are just a few places where the meaning could be a little more sharply defined, but in general the style of writing is simple and straightforward, both in the text and in the mathematics.

J. E. J.

THE PRECAMBRIAN GEOLOGY OF SOUTH WEST AFRICA AND NAMAQUALAND. By HENNO MARTIN. pp. xvii + 159, 18 figs. and 11 plates. The Precambrian Research Unit, University of Cape Town, 1965. Price R. 3.00 ($4.25).

This slim volume gives a detailed systematic account of the Pre-Cambrian stratigraphy of the substantial areas of South West Africa and Namaqualand adjacent to it south of the Orange River. To one with no knowledge of the area but who has struggled to understand the stratigraphical relationships of the different formations, this volume with its logically arranged text and clear tables provides a definitive account based on detailed descriptions with full

https://doi.org/10.1017/S0016756800048822 Published online by Cambridge University Press