in the north-east. The position of the anomaly to the west of the present gabbro outcrop was explained by thrusting to the east of the surface layers. Dr I. Pringle (University of Cambridge) showed that the gabbros have an age of 530 ± 35 million years, similar to those of some of the Aberdeenshire gabbros.

Discussing sedimentation, Dr H. G. Reading (University of Oxford) described the sedimentary succession of the autochthon, in which he and his colleagues were able to recognize a gradual change in the depositional environment—from fluvial in the late Pre-Cambrian, through shallow marine interrupted by glacial advances in the Eocambrian, to a dominantly deepwater geosynclinal environment in the Lower Palaeozoic. The Cambrian sedimentation was heralded in the upper part of the Eocambrian by the sudden appearance of trace fossils indicating an abundance of organisms dwelling on the sea floor.

EARTH SCIENCE

Separate Approaches to Rift

from a Correspondent

FELLOWS of the Royal Society, the Royal Astronomical Society and the Geological Society of London met at the Royal Society in London on January 14 to discuss the East African Rift Valley. In his introduction, Professor R. M. Shackleton (University of Leeds) summarized the great variety of problems that has both stimulated and resulted from recent multidisciplinary interest in the rift system. They concern the relationships between the present rift and pre-rift events and structures and the degree and rate of depression, elevation and extension. And there are other problems—what is the nature of melts and magmas giving rise to the volcanic rocks? How do they vary in time and space? What is the condition of the upper mantle below the rift, and how does the system relate to mid-oceanic ridges, continental margins and continental drift? One of the aims of the meeting was to initiate dialogue between geologists and geophysicists, who often limit their ideas within their respective vocabularies. In this respect the success of the meeting was small. It resolved itself into two series of monologues corresponding to the morning and afternoon sessions.

Professor B. C. King (Bedford College, London) outlined the basic pattern of the East African Rift. The subsequent contribution, from Mr G. R. Chapman (Bedford College), dealt with a specific area in greater detail. The feature is some 4,000 km long and of a fairly constant width of 30–80 km. It differs in several respects from oceanic rifts. Sometimes, as in the western rift, little volcanicity is involved in the structure, and basement rock crops out even in the centre of the troughs. No dilation contributes to widening, and faulting produces an average extension of only 0.005–0.25 cm per year. This estimate contrasts with those for mid-oceanic rifts which vary from one to several centimetres per year. Dr L. A. J. Williams (University College, Nairobi) and Dr J. B. Dawson (St Andrews University) provided details of volcanicity in Kenya and Tanzania respectively.

Dr W. W. Bishop (Bedford College) indicated to the volcanological and geophysical contestants the impor-

tant role of sedimentary stratigraphy, palaeontology and dating methods in setting up an effective time scale. This is a requirement for any interpretation of rift history and evolution.

On the geophysical side Mr W. T. C. Sowerbutts (University of Newcastle upon Tyne) presented interesting results from four long gravity profiles across the rift system, from the Congo Basin to the Indian Ocean. A broad regional negative Bouguer anomaly extends for 1,000 km from the western to the eastern rift. Superimposed on this, in the western rift, is a narrow zone of negative anomaly, the location and steep gradients of which suggest that the infilling sediments are the principal cause. A similar situation is found in the eastern rift, but its character precludes a similar explanation. Bodies of low density material are postulated to extend from the upper mantle into the lower crust. This would account for both the regional Bouguer anomaly and volcanicity.

The hypothesis was substantiated in a more detailed gravity survey by Mr R. C. Scarle (University of Newcastle upon Tyne) along the south Kenya Rift. This reveals a narrow positive Bouguer anomaly corresponding to the axis of the volcanoes. It is suggested that a basic intrusion is involved, about 20 km wide and reaching to within 1 km of the surface. The positive anomaly was found by Dr M. A. Khan (University of Leicester) to underlie the rift volcanoes further north. It increases steadily in value towards Lake Rudolf. Dr R. F. King (University of Birmingham) reported attempts using seismic methods to elucidate the deeper structure. Results from a refraction line monitoring shots in Lakes Rudolf and Hannington suggest a layer of material at a depth of about 20 km with an irregular upper boundary.

Obviously greater exchange of information and ideas between geologists and geophysicists is needed. Geologists should look into the deeper origins of the surface details; and geophysicists, while having their heads in the mantle, would do well to keep at least a few toes on the ground.

CONTINENTAL DRIFT

Support from Sediments

from our Geomagnetism Correspondent

THERE are some curious differences between the rocks off the east and west coasts of North America. For one thing, there is a gross disparity in quantity—the volume of sediment and volcanic rocks overlying the crystalline basement of the Atlantic continental slope and rise and oceanic crust up to the mid-Atlantic Ridge is about 10^7 km³, or about five times greater than that within 2,000 km of the Pacific coast. Then there are differences in the proportions of the various rock types. Most of the material off the Atlantic coast is derived from the continent, with volcanic rocks playing only a minor part. The rocks on the Pacific side, on the other hand, are largely volcanic in origin. Thus there is at least six times as much sediment off the Atlantic coast as off the Pacific coast.

According to Gilluly (*Science*, **166**, 992; 1969), all these features, and many more, can be explained if North America is drifting westward—and conversely, their successful explanation in this way supports the