(*a*) The andesitic dykes in the neighbourhood of Allen Crags and Angle Tarn.

(*b*) The dykes of the spherulitic and felsitic group on Yewbarrow and High Fell.

(*c*) The dioritic ('bastard granite') bosses of Peers Gill, Lingwell Crag, and Bursting Knotts, with their associated dykes.

(*d*) The Eskdale Granite, with the granite-porphyry dyke running from Great Bank to Wasdale Head and thence to Kirkfell Crags.

(*e*) The dolerite dykes, having a general north-west to south-east trend.

The dykes of series (*a*) bear a very strong petrological resemblance to the Borrowdale volcanic rocks, into which they were intruded. Furthermore, they are weathered to much the same extent and have developed the same secondary minerals, among which epidote is conspicuous. They appear to the author to be of Borrowdale age, and roughly contemporaneous with the lavas and ashes into which they are intruded. The spherulitic and more acid series (*b*) are considered to be also of Borrowdale age, though probably somewhat later than the andesitic series. The rocks of the dioritic group (*c*) are considered to be the holocrystalline and hypabyssal equivalents of the Borrowdale Lavas, and the author is of opinion that they also are of Ordovician age.

The Eskdale and Wasdale Granites (*d*) are much more acid, and show little sign of alteration except that due to weathering and dislocation. They are undoubtedly intrusive into the Borrowdale Series, but seem to be pre-Triassic. Thus the intrusion is probably Devonian, like the neighbouring granite of Shap, which, with the exception of its large phenocrysts of orthoclase, is not dissimilar to some of the varieties of the Eskdale granite. The basic intrusions (*e*) have only been examined where they come into proximity to the granite. They may well be connected with the great Tertiary basic flows of Antrim, as has been suggested by Mr. Harker.

The granite becomes progressively more and more acid as its margin is approached, until in some places the percentage of silica amounts to 96·16. This is explained by the assumption that the magma as a whole was more acid than the eutectic mixture of quartz and orthoclase, and that consequently the excess of silica separated in the marginal portions, which were the first to solidify.

December 2, 1908.—Professor W. J. Sollas, LL.D., Sc.D., F.R.S., President, in the Chair.

The President announced that a Special General Meeting would be held on Wednesday, February 10, 1909, in order to consider the result of the vote of the Fellows on the question of the Admission of Women into the Society.

The following communication was read:—

"The Geological Interpretation of the Earth-Movements associated with the Californian Earthquake of April 18, 1906." By Richard Dixon Oldham, F.G.S.

At the time of the San Francisco earthquake movement took place along a fault, known as the San Andreas Fault, which can be traced for a distance of about 200 miles. A remeasurement of the primary triangulation in the region shaken by the earthquake revealed considerable displacement, increasing in amount as the fault is neared, and of such nature that places to the east of the fault were shifted southwards while those to the west of it were shifted northwards. The author points out that the extent and peculiar distribution of these displacements negative the supposition that the fault was the cause—it must rather be regarded as a consequence of, or an incident in, the earthquake, this word being used to denote the disturbance in its entirety.

He also considers that the displacements cannot be explained in a satisfactory manner on the supposition that they are the result of strains affecting the crust of the earth as a whole, but may be explained by the difference in character and behaviour of the materials composing the greater part of it, where pressures are great enough to produce the phenomena of solid flow, and of those in the outer skin, where the pressures are not great enough to produce any material difference in the behaviour of rocks from that which we associate with solidity, as experienced at the surface of the earth. The surface-displacements constituting the earthquake, as ordinarily understood, arise from disturbances in the outer skin; but in great earthquakes, like the one dealt with in the paper, these may be the result of more deep-seated disturbances affecting the whole crust of the earth. A distinction is drawn between these two forms of disturbance, and the term bathyseism is proposed for the deep-seated disturbance: the wave-motion which impresses itself on distant seismographs and constitutes the teleseism or world-shaking earthquake being the product of the bathyseism.

The deep-seated cause, or bathyseism, of the San Francisco earthquake is regarded as the result of a widespread strain, of the nature of a shear, such as might have been produced by displacements approximately parallel to the general direction of the coastline, and by forces which must have been very different from those concerned in the formation of the San Andreas Fault. This fault cannot, consequently, be regarded as the cause of the earthquake, nor the earthquake as an incident in the growth of the fault.

Mr. W. Whitaker called attention to specimens of impressions of salt-crystals from a local sandstone in the Keuper Marl at North Curry (Somerset). Pseudomorphs of salt-crystals were well known, but, so far as he knew, the occurrence of impressions, not filled in (and which might be taken as arrested pseudomorphs), had not been hitherto recorded in this country. The only notice of such that he knew of was from America, in 1842. Now that this occurrence was recorded, probably other examples would be noticed.