to St. Kilda and its islands, has in a generation colonised the north coast and the east coast to Flamborough Head. These and other changes in the balance of life illustrate the accommodation of living things to changing conditions and hence successful colonisation; and, on the other hand. the failure to accommodate and consequent elimination.

In his second line of evidence, Prof. Ritchie referred to examples of the plasticity of living forms. "Put broadly, Creationism emphasises the immobility of living forms, Evolution emphasises their plasticity." He pointed out that in a relatively short time Scotland has impressed its mark upon domestic animals: among horses it has bred the Clydesdale, among cattle Aberdeen-Angus, Ayrshires, Galloways and Kyloes, among dogs Skye terriers and others, among sheep Cheviots and Highland blackfaces—surely sufficient evidence of the plasticity of living forms that evolution demands. Granted that this plasticity can be made apparent by man's efforts, what evidence is there that it plays a part in natural processes? Prof. Ritchie believes that Scotland demonstrates better than almost any other country the evolution of life in progress. The former fauna was entirely obliterated in the ice age, and the new fauna flocked into the country from Europe. But all the animals are not exactly as they were; changes have been taking place, revealed by the intense examination of modern zoologists. The red grouse of Scotland is clearly different from the willow grouse of the Continent; it is a different species. Of the one hundred and fifty-nine different species of birds which breed in Scotland, thirty-two show characters which distinguish them from their closest relatives on the Continent. Others—and thirty-one of these are named—are distinct geographical races which, although differing from their continental relatives, are not different enough to be regarded as distinct species. Of the fifty-six different species and races of mammals which breed in Scotland, thirty are different from the most closely related continental forms; and of these, specialists have regarded eight as distinct species and twenty-two as geographical races.

Prof. Ritchie illustrated his argument by particular reference to the St. Kilda house-mouse and the St. Kilda field-mouse, both regarded as distinct species, and remarked that it is reasonable to suppose that these are the direct descendants, slightly modified, of the original migrants from the common fauna of Europe.

"In the fauna of St. Kilda and in the thirty-two distinctive birds and thirty distinctive mammals of Scotland we are looking upon the modelling from old species of new species and of geographical races, which we regard as the incipient stages of new species.

"In the changes taking place in the balance of life, in the plasticity of animal form, and in the formation of new races and species. not in the distant past of geologists, but in recent times, we are looking in Scotland upon evolution in its course."

The Mechanics of Mountains.*

THE earth's upper crust in the continents appears from seismology to consist of three layers, an upper one of granitic constitution, about 10 km. thick; an intermediate one about 20 km. thick, the properties of which fit tachylyte; and a lower one probably of dunite, extending half-way to the centre of the earth. Above the granitic layer is the sedimentary layer, with an average thickness of probably about 2 km., but considerably thicker in special regions. The outflow or inflow involved in maintaining isostatic compensation is in the lower layer, but at a smaller depth than 50 km.

The mechanical properties of the outer crust indicate that the crustal shortening in a major epoch of mountain formation should be of the order of 40 km. The actual height and extent of the great ranges correspond to a shortening of about 60 km. This estimate is arrived at by considering what elevation would be produced if the light upper layers were compressed by a given fraction of their original length and enough outflow in the dense lower layer took place to restore isostasy.

This estimate is much less than the horizontal movement observed in the field, and the only possible explanation is that the horizontal movement is a surface phenomenon almost confined to the sedimentary layer, and caused by the crustal shortening, but not equivalent to it.

Prolonged deposition of sediments leads to an obstruction of the normal outflow of heat from the earth, and hence to an increase of temperature and a reduction of strength through a depth of the order of 100 km., thereby localising the yield when the stresses due to contraction of the interior become too great for the strength of the outer crust to withstand. The immediate result of a local failure would be a local elevation so high that the heated sediments would proceed, as a secondary effect, to flow out horizontally under gravity and give a series of flat folds closely resembling the observed nappes. Explanations of 'back-folding' and of the gneissic core of a great mountain system appear to follow naturally.

Emphasis is laid on the importance of recognising the intermediate layer in discussions of the mechanics of geological processes. Isostatic readjustment can take place by horizontal outflow in this layer as in the lower layer, though much more slowly, and this process may play an important part in the formation of geosynclines and the levelling of old mountain systems.

* Substance of a lecture by Dr. H. Jeffreys, F.R.S., on "The Mechanics of Mountains", at the Geological Society of London, on Dec. 31, 1930.

Sinkage of Logs.

THE sinkage of logs during the river journey to the pulp-wood mills is a matter of considerable importance owing to the loss thereby incurred. The question has formed the subject of research by Prof. G. W. Scarth, Botanical Department, McGill University, and Mr. E. C. Jahn, associate professor of chemistry, School of Forestry, University of Idaho, the work being assisted by funds contributed by the Canadian Pulp and Paper Association. A paper on "Sinkage Studies—I." has now been published (*Can. Jour. Research*, vol. 2, June 1930). Experiments were made with logs of jack pine, spruce, poplar, balsam, and birch.

The distribution of water in floating logs (in a lake) was found to be similar to that in living trees. It was noted that the sapwood of these species became wet all round whilst the heartwood was relatively dry, becoming wetter in the order of the species given above; the heartwood in birch became as wet as the sapwood. The rate of radial penetration of water into logs of these species increased in the order, birch, jack pine, spruce, balsam, poplar; the penetration

taking place very slowly, even into the sapwood. Narrow outer rays and density of the wood diminish the rate of penetration. The advantage of a large proportion of relatively dry heartwood depends more on the initial buoyancy it confers than on the greater resistance to penetration it may possess. In air-dry logs penetration of free water is also very slow; saturation of the cell walls precedes it at a greater rate. The gas in floating logs is surrounded by water and can only escape in solution. There appears to be evidence that more gas may be liberated by fermentation of storage material in the parenchyma cells.

The problem as to whether escape of gas or penetration of water is the leading factor in determining the rate of sinkage of cut logs has been studied by Mr. R. D. Gibbs, of the Department of Botany, McGill University, and published under the title "Sinkage Studies—II." (*Can. Jour. Research*, June 1930). The species investigated were balsam, jack pine, birch, and poplar. In freshly cut softwoods, possibly excepting balsam, the water content is fairly uniform, very high in the sapwood but low in the heartwood. In birch the water content was higher in the centre than near the outside, whilst the reverse was the case in poplar. In jack pine the heartwood contained about 12 per cent water, the sapwood 52 per cent. Generally the heartwood contains more gas than the sapwood, and consequently the greater the proportion of heartwood in a log the better its floating properties. In the jack pine the heartwood contains 60 per cent of gas and the outer layers of wood about 23 per cent. Wood and density values vary considerably. Consequently, even by allowing for the variation of density across a log, the errors in measurement are scarcely reduced. In order to reduce error, standardised lots of logs should be examined, and seasonal and other measurements should be restricted to these lots.

The results of this investigation, when it has been carried further, are likely to have a wider application than to Canada alone, and they must therefore be regarded as of high value.

University and Educational Intelligence.

CAMBRIDGE.—It has been announced by the vice-chancellor that the treasurer has received a cheque for 5000 dollars "as a grant toward Dr. Eric K. Rideal's new department of colloids". No condition is attached to this gift, except that the donors do not wish their names to be published.

Mr. G. U. Yule, of St. John's College, has been appointed reader in statistics. Miss M. M. O'Reilly, of Girton College, has been appointed assistant curator of the Museum of Archæology and Ethnology.

The vice-chancellor has given notice that the Montague Burton professorship of industrial relations has been established, and that a meeting of the electors will be held on Feb. 27. Candidates are requested to communicate with the vice-chancellor on or before Feb. 14.

Sir Walter Thomas Layton has been elected to an honorary fellowship at Gonville and Caius College.

EDINBURGH.—The University Court at its meeting on Monday, Jan. 26, received, with much regret, intimation from Prof. A. Robinson, professor of anatomy, of his intention to retire at the end of the current academical year. Dr. C. H. O'Donoghue was appointed director of studies to students taking combined degrees in medicine and science. Leave of absence for the summer term of 1931 was granted to Prof. G. Barger, in order to enable him to deliver a course of lectures in the University of Heidelberg. It was announced that the Right Hon. Winston Churchill would deliver the Rectorial Address on Thursday, Mar. 5. Mr. M. Davidson was appointed lecturer in the Department of Engineering, to give a course of lectures and laboratory work in the subject of heat engines for second-year students. The Court received, with gratification, intimation of the gift to the University Department of Geology, by Mrs. Currie, of the valuable collection of minerals formed by the late Dr. J. Currie.

OXFORD.—On Jan. 27 a decree was passed by Congregation authorising a grant towards the expenses of a projected Oxford University Expedition to Baffin Island in the summer of 1931. This expedition will have similar objects to those of the recent expedition to Spitsbergen. Another decree authorised the Curators of the University Chest to receive sums not exceeding £500 per annum for the purposes of a scheme of research in economic ornithology; the scheme to be carried out by the Department of Zoology and Comparative Anatomy.

NOTICE is given by the Royal Society that applications for the government grant for scientific investigations must be made on special forms, returnable to the Clerk to the Government Grant Committee, Royal Society, Burlington House, London, W.1, by, at the latest, Mar. 31.

IN 1926 a Commission was set up which inquired into and advised on the system of technical education in relation to the requirements of trade and industry in the Irish Free State. It stressed the necessity for a sound organisation of continuation schools and classes, the object of which was to link the work of the primary school at age fourteen years with that of the technical school at age sixteen years, when young people normally enter employment. The Vocational Education Act imposes upon newly appointed vocational education committees the duty of establishing and maintaining such continuation schools and classes. A memorandum has been issued by the Department of Education with the view of assisting the committees in their task ("Vocational Continuation Schools and Classes in the Irish Free State": Messrs. Eason and Son, Booksellers, Lower O'Connell Street, Dublin). Since out of approximately 120,000 young persons between fourteen and sixteen in the Free State, 45,000 are in primary and secondary schools, the task of the committees is to provide suitable education for the remaining 75,000. Although the memorandum is confined to the subject of continuation schools and classes, it specifically stresses the fact that it conveys no suggestion of diminished activity in technical education. On the contrary, the anticipation is that provision of organised continuation classes will lead to an increased demand for technical education. The memorandum is divided into two parts, the first of which recapitulates the relevant sections of the Vocational Education Act with which the committees must deal. It indicates that obligatory attendance will not become operative until the necessary order is made: careful and complete organisation is, however, the necessary preliminary to the making of that order. In developing their schemes the committees are to secure information on the occupations open to young people in their area, the conditions of entry into these occupations, the forms of skill and knowledge helpful to beginners, and the attitude of employers, employees, and parents to vocational education. By this means definite and reliable advice will always be available. Suggestions for organisation of rural education, the use of existing technical schools, and the gradual provision of new buildings are given. The second part of the memorandum deals with the details of organisation and curricula.