

the seasonal outbreak should be looked on mainly as a reimportation of the disease from these larger centres or as an independent development of a local focus dormant during the off-season. If the former were the case, we might expect a larger incidence in the villages near the main lines of communication, and taking the Amritsar district as the area for investigation and the railways as the means of communication, Dr. Greenwood finds that in districts containing large centres, villages near a line of railway are, in fact, subject to a higher rate of plague epidemics than villages not so situated, while in districts purely or mainly agricultural, proximity to railways does not increase the liability. The greater liability in the former case is probably due to increased opportunity for personal intercommunication rather than to transport of merchandise, and he concludes that in districts favourably situated for such intercourse the spread of plague can be better explained on the hypothesis of reimportation than on that of recrudescence. The second paper bears on the problem of what circumstances determine the extent of an epidemic when plague has once shown itself, and why the mortality-rates in infected villages are subject to the variations actually observed. Dr. Greenwood is fully alive to the necessity of caution in accepting statistical conclusions based on the material at his disposal, and we give the barest indication of his results in saying that the rate of plague mortality is seen to depend on three factors: the length of exposure to infection, the number of inhabitants, and the situation of the village.

Besides some observations on the breeding of *Mus rattus* in captivity, and a summary of some recent observations on rat fleas, the report includes an interesting account of plague as it occurs in Eastern Bengal and Assam. This province has suffered from the present epidemic to only a limited extent, and the report, which is liberally illustrated by photographs, attributes this freedom chiefly to the scarcity of rats in the Bengali houses, a scarcity due both to the habits of the people and the structure of their houses. Two important papers by Dr. Rowland are sent from the research laboratory of the Advisory Committee, dealing respectively with a possible improvement in the preparation of plague-serum and with some of the problems connected with plague-vaccine. From the second of these it appears that it may prove practicable to obtain a vaccine of low toxicity, but undiminished immunising power, a result which if confirmed has a theoretical as well as practical significance not confined to plague only, but affecting the general question of immunity in infectious disease.

#### FOUR MAMMAL SURVEYS.

FOUR papers which have recently reached us serve to show the energy and vigour with which the collecting of mammals is being carried on in various parts of the world. If continued at the same rate for a few years longer, such surveys ought to go a long way towards completing our knowledge of the mammalian fauna of the globe, so far at least as external and cranial characters are concerned.

The first of the four papers is a report on the progress of the Indian mammal survey now being carried on under the supervision of the Bombay Natural History Society, in the Journal of which for October, 1911, the report is published. Collecting has been carried on in Kandesh and the Berars, where about 150 skins have been obtained. Apparently none of these represents new forms, thereby bearing testimony to the thorough manner in which collecting (for the most

part amateur) has been previously carried on in this part of the country. Interesting results in regard to the geographical distribution of species and the occurrence of local races are, however, expected in the future.

To vol. iv., parts iii. and iv., of the Journal of the Federated Malay States Museums, Mr. C. Boden Kloss communicates an account of the results of a recent visit to the Trengganu Archipelago in search of mammals and other vertebrates. The chain of small islands, of which Great Redang and the Perhentians are the chief, runs at a distance of from seven to twelve miles from the coast of the Malay Peninsula in a nearly parallel direction for about thirty miles. The only previous visit of naturalists to the archipelago appears to have been made by the members of the Skeat expedition in 1899. During an eighteen days' cruise Mr. Kloss obtained thirteen mammals which he regards as representing new forms; all these were named in the *Annals and Magazine of Natural History* for January, 1911.

The penultimate number of the Proceedings of the Zoological Society for 1911 contains the fourteenth report by Mr. Oldfield Thomas on mammals from eastern Asia, collected with the aid of funds furnished by the Duke of Bedford. This particular fasciculus deals with mammals from Shen-si, the most interesting of these being the golden takin (*Budorcas bedfordi*), to which reference has been previously made in these columns, but the whole survey, despite the fact that no strikingly new forms were discovered, has vastly increased our knowledge of the mammal fauna of Eastern and Central Asia. It is, therefore, a matter for regret that it is not to be continued, at all events for the present.

The fourth paper, "Notes on the Mammals of the Lake Maxinkuckee Region," by Messrs. B. W. Evermann and H. W. Clark (Proc. Washington Acad. Sci., vol. xiii., pp. 1-34), is of a totally different type from the above, dealing solely with the habits and environment of the mammals met with during a zoological survey of the region, and is an excellent sample of the best class of American work of this nature. Particular interest attaches to the reappearance of the opossum in the district, from which it had long been absent.

R. L.

#### TREASURY GRANTS TO UNIVERSITIES AND UNIVERSITY COLLEGES.

THE report of the Advisory Committee on the distribution of Exchequer grants to universities and university colleges in England, appointed by the President of the Board of Education last June, has now been published [Cd. 6140]. The committee as then appointed consists of seven members:—Sir W. S. McCormick (chairman), Prof. J. A. Ewing, C.B., F.R.S., Sir William Osler, F.R.S., Miss Emily Penrose, Sir Walter Raleigh, Sir John Rhys, and Sir Arthur Rücker, F.R.S., with Mr. G. M. Young as secretary.

The report states that in framing its recommendations for the distribution of the Exchequer grant, the committee has chiefly had regard to three factors—the needs of the several colleges, the amount of local support received by each, and the volume and quality of their work.

For the purpose of the present report the members of the committee have visited all the colleges coming within their purview except Nottingham, in considering which the committee had before it the report of the recent inspection conducted by the Board of Education. As a result of the visits to the various institutions, the committee says that the colleges gener-

ally are animated with a true university spirit and that the policy of their governing bodies is actuated by true university ideals. The committee does not imply that even among the stronger institutions all are equally efficient or have reached the same stage of development, but it rarely found occasion to think that where weaknesses existed the colleges were unaware of them or would be backward in applying the right remedy when circumstances permitted. The committee assures the Board of Education that in its opinion most of the colleges are fully competent to exercise that "freedom in organising" and "carrying out their important national and international functions" which it is the policy of the Board of Education to secure for them.

The committee recommends that the grant available be distributed in the following proportions :—

	£
University of Birmingham ... ..	13,500
University of Bristol ... ..	7,000
University of Durham : Armstrong College ...	8,500
University of Leeds ... ..	12,500
University of Liverpool ... ..	15,500
University of Manchester ... ..	17,500
University of Sheffield ... ..	7,000
University College, London ... ..	16,000
King's College, London ... ..	9,500
King's College for Women ... ..	2,000
Bedford College, London ... ..	7,000
London School of Economics ... ..	4,500
East London College ... ..	5,500
Nottingham University College ... ..	5,700
Reading University College ... ..	5,500
Hartley University College ... ..	2,400
Total ... ..	£139,600

These grants have been calculated on a total of 149,000*l.*, and the committee recommends that the balance (9400*l.*) of the present grant, together with the balance of 2550*l.* from the previous year's Exchequer grant, be reserved pending consideration of a superannuation scheme to be reported on later and be regarded as applicable to the institution of such a superannuation scheme and to other contingencies.

A number of general recommendations concludes the report. The committee recommends, among other matters, that subject to unforeseen contingencies the grants be fixed for a period of five years as from April 1, 1911, and that the grants be regarded as strictly maintenance grants to meet annual expenditure on teaching and research of a university character and standard.

FIORDS IN RELATION TO EARTH MOVEMENTS.<sup>1</sup>

FIORDS have been a powerful influence on modern life, for the existing facility for intercourse oversea is the difference between modern and mediæval Europe which penetrates most deeply into all departments of life and work. The Roman Empire was held together by its roads, and as its conquerors from the wide plains of the east were neither sailors nor roadmakers, Europe was resettled on national instead of on imperial lines. While Europe thus fell naturally into independent States, the most efficient of all means of international communication was being developed on the shores of Scandinavia; for owing to the fiords travel overland there was even more difficult than through the forest-clad plains of Central Europe. In Norway the fiords were the only

<sup>1</sup> Abridged from a lecture delivered to the Midland Institute of Birmingham on January 22, by Prof. J. W. Gregory, F.R.S.

practicable highways, and they, with their labyrinth of smooth waterways, their tidal currents, which carried boats to and fro independent of wind or oar and their unfailing supplies of food, fuel, and skins, attracted men to the sea as much as the barren highlands repelled them from the land.

The poverty of their own country having driven the Norsemen to the sea, the wealth of the more fertile southern coast-lands tempted them to the career of piracy which made the berserkers the terror of the shores of western Europe. These pirates, however, amply repaid their debt by their contributions to modern seamanship, made in consequence of the geographical conditions of the Norwegian fiords. Eva Nansen's song contains a true statement of the influence of the fiords on the Norwegian race :—

Our mother, weep not! it was thou  
 Gave them the wish to wander;  
 To leave our coasts and turn their prow  
 T'wards night and perils yonder.  
 Thou pointed'st to the open sea,  
 The long cape was thy finger;  
 The white sail wings they got from thee:  
 Thou canst not bid them linger!

The white sails of the Norse and Danish Vikings, amongst other things, carried the name fiord far and wide. It is found on the Irish coast, for example, in Wexford, which is said to be derived from the Danish Weis-fiord, and in Waterford from Vadre-fiord; and the name is now accepted as a technical term in general geographical nomenclature.

The word fiord is used in Norwegian for any arm of the sea, including various types of gulfs, bays, and straits. But the name is adopted in international geography for arms of the sea of a special kind. A fiord in this restricted sense is a long inlet which extends far inland between steep parallel walls; it usually consists of long straight reaches, which are bent and receive their tributaries at sharp and regular angles. Its walls are high, as fiords are restricted to mountain regions.

Fiord districts combine the features of mountain and coastal scenery. Many authors have been impressed by a sense of the monotony of fiord scenery, owing to the constant repetition of the same form; it is, however, popular from the easy access to it along smooth waterways, the especial beauty of the cloud forms and the colour effects, which do not pass with the flash of a tropical sunset, but last for hours in the prolonged twilight of most fiord areas. The charm of fiord countries is, moreover, enhanced by the survival, owing to the special geographical environment, of primitive conditions of rural life.

The origin of fiords has given rise to prolonged controversy. The difficulty of the problem is due to the peculiar combination of geographical characters. The fiords are clearly valleys, of which the lower ends have been drowned by the sea. Sea-drowned valleys are of three main kinds.

The most familiar kind is that of ordinary river estuaries, which have been submerged by subsidence of the land. Such estuaries have gentle, rounded slopes and curved shore lines; they are typically funnel-shaped, as they increase seaward, both in width and depth. The Firths of the Tay and Forth, the estuaries of the Thames, Severn, and Humber, and Bantry Bay in south-western Ireland are examples of such drowned valleys. They are well illustrated in north-western Spain, where they are called rias, and this term "ria" has been adopted as the technical name of this kind of drowned valley.

The members of the second group are known as "fiards" from their typical representatives in south-