

exists. Problems of interspecific and intergeneric hybrids are the concern of both the cytogeneticist and the taxonomist, as is also the determination of phylogenetic relationships. The taxonomist has to evaluate the characters he uses, making some of generic, some of specific, and some of varietal value, and so on. In *Lolium*, genetical research shows that height has little value as an indicator of relationships and specific distinctness, since a plant two inches high may be a sib to a plant twenty inches high. In the genus *Dahlia*, corolla colour definitely characterizes two groups of species and the wide colour range shown by the garden *D. variabilis* is, in agreement with other evidence, a witness to its origin as a hybrid between species of the two groups. Such examples of recent research illustrate the help the taxonomist may expect from the biochemist and cytogeneticist in his attempts so to classify plants that the classification is not only widely useful but also indicates relationships.

In return for such help the taxonomist can assist his colleagues not only by identifying their original material on the basis of 'alpha' taxonomy, but also by indicating problems which are recognized as unsolved by the older methods. Prof. J. R. Matthews gave examples of closely allied species which were probably derived from a common ancestral stock but which have now a different geographical range. Cytogenetic research on such plants as *Ranunculus Flammula* and *R. reptans*, *Caltha palustris* and *C. radicans*, *Primula farinosa* and *P. scotica*, combined with other methods of investigation, might lead to the formulation of general views regarding the influence of isolation in speciation. Knowledge of the origin of the geographical race or subspecies may well give us a more complete knowledge of the origin of species.

The results of modern lines of work are beginning to influence taxonomic thought by making taxonomists consider the logical basis of their classification. There seems a general agreement that 'alpha' taxonomy (based essentially on morphology) should be maintained for the present. Subsidiary classifications, often based on a very limited and deliberately abstracted number of attributes are, however, essential for special purposes and especially for deductions from correlation of attributes. Such a classification as that of Turesson, which was ably advocated in the discussion by Dr. J. W. Gregor, has a considerable value both as a means of stating and comparing the results of eco-genetical research and as a guide in the practical application of such research to agriculture. Such special classifications, however, cannot replace a more general one, and exactly how far they can be combined with morphological criteria to lead to a practical and logically sound classification is a matter for continued experiment. As Dr. Turrill said: "by trials and errors this 'experimenting taxonomy' will enable, one hopes, orthodox relatively stabilized taxonomy to incorporate new data and so to advance, gradually and cautiously, from an alpha position towards a far-off omega perfection of the classification of all biological knowledge".

The formation of the Association for the Study of Systematics in Relation to General Biology (see NATURE, July 24, 1937, p. 163 and Aug. 7, 1937, p. 211) was cordially welcomed at several sectional meetings of the British Association. It has evidently awakened considerable interest amongst biologists and should do much to stimulate and co-ordinate research into the many problems of equal importance to taxonomists and their colleagues in other branches of biology.

Obituary Notices

Prof. Albert Heim, For. Mem. R.S.

THE news of the death on August 31 at the age of eighty-eight years of the veteran geologist Albert Heim, though not unexpected, comes as a sad shock to many admirers. A very great man has gone, and a treasured connexion with the early days of Alpine structural interpretation has at last been broken. As a student, Heim came under the spell of Arnold Escher von der Linth, an open-air researcher, a great talker, but no writer. Heim loved the mountain side no less, but fortunately he was an artist, excelling with both pen and pencil; and in his early publications he preserved in truly glorious fashion Escher's discoveries, enriched by numberless observations of his own. Heim's technical skill was such that he

himself engraved the copper plates of many of the illustrations that adorn his text.

The great drama of Heim's scientific life had its origin in one of Escher's favourite ideas, the 'double fold' of the Glarus. In 1841 Escher argued for the existence of 'colossal overshoving' of older rocks to younger in the Canton of Glarus. He wanted to make the displacement involved as small as possible, and, as the cover of older rocks was discontinuous, he presently imagined that he could explain their situation by postulating two shoves from opposite directions, each with rather less than half the magnitude required if the shove were single. Heim adopted this theory in his classic "Untersuchungen über den Mechanismus der Gebirgsbildung", published in 1878;

and he maintained it for many years in face of slowly developing opposition.

We may recall Marcel Bertrand's paper unifying the movement in 1884, Suess's conversation with Heim in the same sense in 1892, and Schardt's one-way interpretation of Pre-Alpine tectonics in 1893. Schardt's revolutionary ideas led on to Lugeon's synthesis of Swiss Alpine structure considered as a whole, published in 1902. Lugeon was a pupil of Heim's, and while his masterpiece was passing through the press he received a noble letter from his old professor, in which the latter confessed that he now favoured Bertrand's interpretation and expressed joy at the new vision that had come.

The marvel of Heim's career is that it began in early youth and culminated in old age. When only twenty-four years old, Heim succeeded to the chair of geology at the Polytechnic in Zurich, and in the following year to that at the University of the same town, and held both posts until 1911; and yet, in 1919-22, he produced his three-volume "Geologie der Schweiz", the finest national text-book that is ever likely to be written.

Heim was keenly interested in many aspects of geology besides tectonics. Here there is only room to mention his work on glaciers, of the erosive powers of which he did not have a high opinion.

Heim became a member of the Swiss Geological Commission in 1888, and directed its activities from 1894 until 1925. With C. Schmidt he published a very valuable map of Switzerland on the scale 1:500,000. He received honorary doctorates from Bern, Oxford and Zurich, and was elected a foreign member of the Royal Society of London. He has left a distinguished son, Arnold, called after Escher, who was truly helpful to his father during the latter half of his long life's work. E. B. BAILEY.

Lord Rothschild, F.R.S.

IN Lionel Walter Lord Rothschild, who died on August 27 at the age of sixty-nine years, a scientific worker has passed away of whom it may justly be said that he was better known at home and abroad than any other contemporary zoologist. It was inevitable that a Rothschild deeply interested in biology and possessing large zoological collections which he was indefatigable in increasing for the benefit of science, should inspire the imaginative Press of many lands to publish fanciful reports, which gave him a publicity often very embarrassing and inundated him with offers of collections and service and with requests for help. But he would have gained high distinction in science without a family name already world-famous. His interest was so intense and so wide, his ever-ready support of science so valuable and his scientific publications so important, that he held a high place of honour in zoology and was elected an honorary fellow by many foreign scientific societies. Entomologists, ornithologists, herpetologists and mammalogists all claimed him as one of their own.

Being of delicate health as a boy, Rothschild was educated at home and then spent some years at Bonn and Cambridge, following all the time his great love for natural history. The boyhood collections of Lepidoptera and Coleoptera increased to such an extent that in 1889, when he became of age, he built a cottage at Tring for the safe housing of the collections, and soon after a public museum in which were exhibited mounted specimens of all classes of animals. Following family tradition, he entered the bank of Messrs. N. M. Rothschild and Sons to study finance, which left him little time for the supervision of the growing collections. In 1892, on the recommendation of Dr. Albert Günther, he put Mr. Ernst Hartert, the ornithologist, in charge of the collections, and six months later entrusted the Evertbrates to the care of the writer of the present lines. It became the definite policy gradually to build up in the research department collections of birds and Lepidoptera as complete as possible, and to increase the public department as resources permitted.

In 1888, Rothschild had bought a collection of New Zealand birds from Sir Walter Buller, and he became so interested in the faunæ threatened by the spread of the white race that he sent a bird-collector to the Sandwich Islands, took up the study of the giant tortoises restricted to the Galapagos and Mascarene Islands, and of marsupials, and supported all measures for the protection of animals and plants by the creation of Nature reserves. His reputation as a zoologist was established before he was thirty years of age. In 1898, the University of Giessen conferred upon him the degree of Dr.phil. and in 1899 he was elected a trustee of the British Museum. He gave up finance in 1908 and then could devote himself entirely to science and to civic duties. From 1899 until 1910 he represented Mid-Buckinghamshire in Parliament, and in 1911 he was elected a fellow of the Royal Society in recognition of his services to the natural sciences. He travelled a good deal in Europe and North Africa, but being a bad sailor never visited the tropics. On the death of his father in 1915 he succeeded to the title.

At the time of Lord Rothschild's death the buildings of the museum had an aggregate floor-space of nearly an acre and a half. The public department now contains more than 2,000 mounted mammals, among them 13 gorillas, 25 chimpanzees, 24 echidnas, more than 200 marsupials; among the 2,400 mounted birds there is a magnificent series of 62 cassowaries, the great auk and other extinct species. The research department lost in 1932 the collection of 280,000 bird skins, which a sudden heavy call on his finances compelled Lord Rothschild to sell; the large collection of eggs contains the best series in museums of eggs of birds of paradise and two great auk eggs; but the greatest asset is the collection of some two million Lepidoptera invaluable for the study of geographical variation and other problems of evolution. The collections were placed with great liberality at the service of scientific workers, who always found a cordial welcome at Tring. The museum is left to the trustees of the British Museum.

KARL JORDAN.