lit by native hunters, the fauna is very poor; oddly enough, Homoptera and Diptera with a high flight-power make up the greatest part of the fauna. Coleoptera are scarce; apart from two species of Pæderus, which appear to follow man everywhere in those parts, we found only a few Carabidæ, Chrysomelidæ, Curculionidæ and Clavicornia. We could discover neither Amphibia nor reptiles.

Above 3,500 m. nothing grows but lichens and mosses, and the fauna, except for a brachypterous crane-fly, is practically nil. Running water is very scarce on Mt. Cameroon, and the aquatic fauna is poor. I could find no plankton at 3,200 m. and, from 1,500 m. upwards, we saw neither dragon-flies nor caddis-flies. This paucity of the aquatic fauna has already been noted for many volcanic lands, for example, by Aubert de la Rüe in the New Hebrides.

On Mt. N'Lonako, the rain forest rises to 1,700 m., the upper range of the mountain being covered by grass prairie. The fauna is much more important than on Mt. Cameroon, both in the forest and above it, and the aquatic fauna is well represented by Gyrinidæ, a number of dragon-fly nymphs and some aquatic Hemiptera.

On Mts. Manengouba and Bambouto, as already stated, the forest is restricted to broken up patches, completely isolated in the grass fields. The terricolous fauna is rich, with a great number of Carabidæ (Agonum, Stenaptinus, Scarites), Scarabæidæ (Distellopalpus, Heliocopris); beating the bush and sweeping grass give an ample collection of Rhynchophora and Malacodermata; the Chrysomelidæ are scarcer than in the lower forest zone on Mt. Cameroon, and the Galerucinæ are particularly rare, but the Halticinæ seem much more numerous. Owing to the breaking up of the forest many grass-field animals extend to much greater altitudes on Mt. Bambouto than on Mt. Cameroon. This is especially true for all the lizards and the toads. The aquatic fauna is quite important on these two mountains, though aquatic Hemiptera are much scarcer than on the lower table-lands of East Cameroon. On both these mountain ranges the earth layer is very thin, and on Mt. Manengouba I found huge quantities of larvæ of a Cetoniine (*Dymusia cyanea*) living under the stones, on the bare rock. Many of these larvæ appear to be drowned by the heavy rains.

From a bio-geographical point of view, it is interesting to recall that many East African species or groups of species have been found on the Cameroon mountains. Such East African affinities are much clearer in the case of the fauna of Mt. Bambouto than they are in that of the fauna of Mt. Cameroon itself. In fact it appears as if the fauna of the upper ranges (above 2,000 m.) of Mt. Cameroon had been completely destroyed by the lava-flows which built the summit of the mountains, probably (B. Gèze, *C.R. Soc. Géol. France*, **15**, 219; 1939) during the Quaternary. The fauna which is to be found there now is derived from the local lowland fauna. The upper ranges of Mt. Cameroon give us a splendid natural field for the study of segregation, species formation and Cuénot's theory "des places vides", the more so as the upper alpine region is separated from the upper limit of the forest by a thousand-metre zone with a very steep slope on which animal life cannot thrive. Unhappily the frequent prairie fires prevent the normal faunal reconstruction. From the fact that the lower slopes of Mt. Cameroon, from 100 m. to 1,800 m., have a fauna with distinct East African affinities, it must be admitted that this part of the mountain is much older, as old in fact as Mts. Bambouto and Manengouba. The East African character of the fauna and flora of Mt. Cameroon, without any reference to Mts. Manengouba and Bambouto, had been pointed out already by the late G. L. Bates for the birds and by Hutchinson and Dalziel for the flowering plants.

OBITUARIES

Prof. Alfred Fowler, C.B.E., F.R.S.

PROF. ALFRED FOWLER, emeritus professor of astrophysics in the Imperial College of Science and Technology, London, and late Yarrow research professor of the Royal Society, died on June 24.

Alfred Fowler was born at Wilsden, Yorks, on March 22, 1868—the seventh consecutive son of Hiram and Eliza Fowler. The family removed to Keighley about 1876, where Alfred attended various local schools. In 1880 he obtained a scholarship for the Trade and Grammar School, Keighley, from which in 1882 he proceeded to the Normal School of Science (later Royal College of Science), South Kensington, through the aid of a Devonshire exhibition. This terminated after one year, but he continued at the College as a 'teacher in training', and in 1885, at the early age of seventeen, obtained a first class associateship in mechanics. He then became assistant to Prof. (afterwards Sir) Norman Lockyer, and received some remuneration as teacher in training, supplemented by small allowances from the Solar Physics Committee. Among his pupils were many who afterwards achieved distinction—notably

Sir Richard Gregory and Mr. H. G. Wells. In June 1888, a new post of demonstrator in astrophysics was created, and Fowler was elected to fill it.

From this time until Lockyer's retirement from the College in 1901, the two men were closely associated in researches in astronomy and spectroscopy, the full significance of which became clear only after the development of atomic theory had given an interpretation of the origin of spectra. It was then seen that the classifications of stellar and laboratory spectra made on empirical grounds at South Kensington, and in the making of which Fowler took a much more active part than was generally realized at the time, provided invaluable information on the physical conditions in the sources of luminosity, and they became the foundation of the extraordinary progress in this branch of science which has been going on for the last twenty-five years and is still one of the most prominent characteristics of both theoretical and experimental research. Spectroscopy at that time found its chief, and indeed almost its only considerable, application in astronomy, and Fowler was active in day and night astronomical observation not only at South Kensington and at Westgate-on-Sea, where Lockyer had established an observatory, but also in eclipse work in various parts of the world. During his association with Lockyer he went to the eclipses of 1893, 1896, 1898 and 1900 in West Africa, Norway, India and Spain, respectively, and later he visited Spain again in 1905, made important visual observations at the partial eclipse of 1912 at South Kensington, and set out for the eclipse of 1914 in Russia, but was forced to return on account of the outbreak of war.

In 1901, when Lockyer retired from College work and a definite separation was made between the College and the Solar Physics Observatory, Fowler was appointed as assistant professor of astrophysics, and owing to reduced astronomical equipment and the rapid development of the great American observatories, he tended more and more to concentrate on laboratory spectroscopy. His astronomical knowledge and interests, however, still exercised an important influence on his work, and with studies of the series spectra of the elements he associated such outstanding discoveries as the identification of the TiO bands in the spectra of red stars, of MgH and other bands in the spectra of sunspots, and of the CO bands in the spectra of comets' tails. His work on the spectra of hydrogen and helium at once became of fundamental importance with the advent of the Bohr theory in 1913, and from that time onwards he was a leader on the experimental side in the collaboration between theory and observation which has led to the present detailed knowledge of the outer structure of atoms. He was elected a fellow of the Royal Society in 1910, appointed professor of astrophysics in the Imperial College in 1915, and in 1923, when the Yarrow research professorships of the Royal Society were established, he was elected, with Prof. G. I. Taylor, as one of the first holders of the title. He continued to work at the Imperial College and to direct spectroscopic research there until his retirement in 1934.

Of the many services which Fowler rendered to science on the side of administration and organization, it is impossible to give an adequate account in a brief space. In addition to services on the Council and committees of the Royal Society and Royal Astronomical Society (of which he was secretary from 1912 until 1918, president from 1919 until 1921, and foreign secretary from 1931 until 1936) he was, among other things, a member of the Board of Visitors to the Royal Observatory, Greenwich, a fellow founder and president from 1935 until 1937 of the Institute of Physics, a member of the Executive Committee of the National Physical Laboratory and of the Advisory Council of the Department of Scientific and Industrial Research, and, after his retirement, a member of the governing body of the Imperial College. With Fowler, these were no mere formal offices, but responsibilities which he discharged with a thoroughness and strong commonsense which were characteristic of everything he did, and perhaps even more valuable than his overt services were those which he gave spontaneously and generously without thought of return or reward. NATURE, in particular, owes much to his labours. His association with Lockyer naturally brought him into close relation with this journal, and he was a constant contributor to "Our Astronomical Column" which for many years was a characteristic feature of NATURE. But perhaps his outstanding work in this category was done in connexion with the formation of the International Astronomical Union. He had already taken a prominent part in the working of the International Union for Co-operation in Solar Research, which came to an end with the War of 1914–18, and on the formation of the International Astronomical Union, originally as an activity of the International Research Council, he was appointed as the first general secretary, and more than any other single man was responsible for establishing the Union and for the form which it afterwards took. He remained as general secretary for six years.

In later years honours came in quick succession. He was in turn awarded the Valz Prize by the Academy of Sciences, Paris, the Gold Medal of the Royal Astronomical Society, a Royal Medal, and honorary degrees of D.Sc. (Bristol), Sc.D. (Cambridge), D.Sc. (Durham), and D.Sc. (Leeds). In 1920 he was elected *Correspondant* of the Academy of Sciences, Paris, in the Section of Astronomy, and in 1926, president of Section A of the British Association. In June 1935, he was elected a fellow of the Imperial College and created C.B.E. for services to science. American astronomers acknowledged his work by the award of the Henry Draper Gold Medal for Astrophysics, and the Bruce Gold Medal of the Astronomical Society of the Pacific, and by electing him in 1938 as a foreign associate of the National Academy of Sciences.

To those who were fortunate enough to know him, however, Fowler will be remembered chiefly for his inspiration as a teacher and his never-failing encouragement and readiness to help in every way possible. His laboratory was the training-ground for many who have since achieved distinction in various

spheres, and there have been numerous acknowledgments of indebtedness to his guidance and sympathy. It was his aim always to develop and never to repress the qualities he discerned in those who came under his charge, whether or not those were qualities in which he himself excelled. He leaves a widow, a daughter and a son, by whom, and by his many friends, he will be greatly missed.

HERBERT DINGLE.

Lieut.-Commander J. R. de la H. Marett

LIEUT.-COMMANDER JOHN RANULPH DE LA HAULE MARETT, R.N., of H.M.S. *Glorious*, presumed killed in action, was, like his father, Dr. R. R. Marett, rector of Exeter College, Oxford, a student of anthropology, though he approached the subject from a somewhat different angle. Like his father, however, he had a bold pioneer spirit, and was not afraid to collect and review the specialized contributions of many others with the view of showing what came of the synthesis, and what problems were raised in the whole effort to understand man, his race, culture, and environment. Like his father again, he held that all specialized contributions, including his own, must be judged in the light of their relation to the whole complex of studies. Many famous pupils of Dr. Marett will recall this constant attention to great problems and main issues, and those who knew his son, including his former teachers, will remember in him the same flair for formulating and planning the line of approach and possible solution. To the father has been given the fullness of time to show the value of his attitude to life. To the son, this longer time has been denied, but to those who knew his work, there has been ample promise of great fulfilment and much valuable and stimulating achievement.

The younger Marett served at sea during most of the War of 1914–18, and afterwards retired from the Navy to take up farming in Jersey, an island beloved by himself and his father. His main interest as a farmer was the care of a famous herd of Jersey cattle, and as editor of *The Island Cow* he contributed articles on animal genetics that attracted a good deal of attention, more particularly in America. It was this interest in genetics that brought him to Oxford, where he studied anthropology, obtaining the diploma with distinction in all subjects. Later, after a considerable amount of work elsewhere, mainly on problems of genetics, he was awarded the B.Sc. degree at Oxford, for a thesis which afterwards developed into a substantial book, entitled "Race, Sex, and Environment, a Study of Mineral Deficiency in Human Evolution" (Hutchinson 1935). Though this essay deals mainly with man, and covers a vast field, it probably grew naturally out of his earlier work on the theory that the Jersey breed of cattle is Nature's successful attempt to cope with calcium deficiency; and the same principle when extended to man suggests various lines of investigation that may well prove to be exceedingly fruitful. While it is easy for specialists in the varied fields from which he has gathered to criticize him, it must be remembered that much of his synthesis and many of his suggestions are those of a pioneer in a great adventure. His attempt to synthesize work on the soil sciences with that on the ductless glands on so large a scale opens a vast unexplored country, a land of great promise.

During the last few years, Marett was conducting an enthnological survey of Ceylon for the Government, and it is to be hoped that his researches, which have resulted in a rich store of material, will some day be published.

Leaving this valuable work on the outbreak of the present War, he once more undertook active service, and now, to the best of our knowledge, has given his life for his country. While there can be no greater gift, his friends and former teachers cannot fail to regret that a life so full of brilliant promise could not have been given, in the happier times to come, to the constructive work which he was so able to do.

T. K. PENNIMAN.

Dr. E. G. C. Poole

EDGAR GIRARD CROKER POOLE was born in Limerick, the son of Major Walter Poole, R.A.M.C., and educated at Rugby and the Queen's College, Oxford, where he was mathematical scholar. He obtained both the Junior Mathematical (1911) and the Senior Mathematical (1920) University scholarships and two first classes in the school of mathematics. He was one of C. H. Thompson's most brilliant pupils. During the War of 1914–18 he served as a lieutenant in the Intelligence Corps in France. In 1920 he was elected fellow of New College and was for a time a University lecturer in mathematics. At the time of his death he was one of the editors of the *Quarterly Journal of Mathematics*.

Poole was the most learned of the Oxford mathematicians. He had a magnificent library and he constantly read very widely in all branches of pure mathematics. He was an excellent linguist also. His published papers were mainly on differential equations, an important work on which was published by the Clarendon Press in 1936. He was a good teacher and a good colleague. He was, however, ultra-sensitive and events unconnected with himself as, for example, the depression of 1931 and the bad news of this year made him utterly miserable. Despite his fine reputation for work both as a researcher and a teacher, he felt in recent months a keen sense of depression and frustration; this produced the ill-health which led to his death in tragic circumstances on June 28.

Oxford has thus lost a fine and most erudite mathematician, and his college a delightful colleague and friend. He was forty-nine years of age.

WE regret to announce the following deaths:

Sir Alfred Bourne, K.C.I.E., F.R.S., formerly professor of biology in the Presidency College, Madras, on July 14, aged eighty.

Dr. W. E. Harper, director of the Dominion Astrophysical Observatory at Victoria, B.C., on June 4, aged sixty-two.