

Research Items.

Systematic Studies of Mammals.—Mammalogy, in the curiously restricted sense in which Gerrit S. Miller uses the term in his review of the progress of this branch of zoology (*Smithsonian Report for 1928*, p. 391; 1929), concerns itself primarily with the systematic study of mammals. The advance which has been made in the cataloguing and classifying of the world's mammals is very striking. In 1758, Linnæus knew only 86 mammals, a century later Baird knew 220 kinds in North America alone, and now in the same limited portion of the earth's surface about 2500 forms are recognised. Especially since 1890 progress has been rapid, and this, strange to say, has to do with the invention of the break-back pattern of mouse-trap, which has played an invaluable part in bringing into the study the smaller denizens of woods and fields. In the 'nineties Trouessart's "Catalogus Mammalium" enumerated 4423 species; since his last volume appeared in 1898, not less than 8700 new names have been added to the list of living species and sub-species, and the process is continuing at an undiminished rate of about 250 a year. This and the general development of systematics is interesting and important, but mammalogy means more than this, and we wish that the author could have found space to refer to the great development which has taken place also in the study of the mammal as a living organism, for it is the biological trail that promises to lead furthest into the unknown.

Zebra-Horse Crosses.—In 1902, Cossar Ewart described successful crosses made between horses and Burchell's zebra. Afterwards in America the ass was successfully crossed with Grevy's zebra, which is larger and more docile, but matings with the horse failed. Mr. Elmer Roberts (*Jour. of Heredity*, vol. 20, No. 12) describes crosses since made in Indiana between a male *Equus grevyi* and thirty mares, beginning in 1912. Eight colts in all were reared. They were all chocolate-coloured with black stripes, although the dams were of different colours, bay, black, and gray. Three of the colts were male and five female, but all were sterile. These zebroid hybrids were gentle and intelligent, somewhat smaller than horses, but beautiful in appearance. They were good workers, and were better able than horses to withstand high temperatures. Being easily trained, they would appear to be valuable as domestic animals, and in certain respects preferable to mules.

Japanese and Chinese Fishes.—Mr. Henry W. Flower has gathered together a large number of notes and records of fishes chiefly obtained from the markets of Japan, Shanghai, and Hong-Kong ("Notes on Japanese and Chinese Fishes", *Proceedings of the Academy of Natural Sciences of Philadelphia*, vol. 81, 1929). Among those from Shanghai is a new species of barbus, *Barbus nigripapiripinnis*, which the author places in the new sub-genus *Glabrobarbus*, differing from *Hemibarbus* in the presence of two barbels which are maxillary, and a very short snout, the dorsal spine being long and smooth. The lower fins are very dark, giving the fish a characteristic appearance. Most of the fishes listed are from Hong-Kong, upwards of 180 species being recorded.

Collembola of Ireland.—In *Proceedings of the Royal Irish Academy*, Vol. 39, 39B11, January 1930, Mr. H. Womersley contributes a useful list of the Collembola of Ireland, adding 17 species to the 50 kinds already known from that country. His paper commends itself to all students of these obscure insects, since he provides diagnostic keys to the families,

genera, and species of all the British forms. No comprehensive work on the latter is available at the present time, and Mr. Womersley's paper supplies a means for their identification once the student has familiarised himself with the structure of a few leading types and is able to dispense with the use of illustrations. Out of a total of more than 700 described species of the order, 153 are here listed as British. The need for a monograph on the group is becoming increasingly evident as Lubbock's well-known volume is now completely out-of-date. Collectors and observers of these insects are few and far between and even to-day there must be still a number of British species awaiting discovery.

Duration of Life in *Drosophila*.—Considerable quantitative studies have now been made on the influence of various environmental conditions on the length of life in *Drosophila*. It has been found that low temperature, ventilation, and alcohol prolong the duration of life in these flies, while various degrees of starvation with or without water shorten it. Mr. W. W. Alpatov (*Amer. Naturalist*, January 1930) has studied the effect of different kinds of feeding of the larval and imaginal stages on the life of the fly. In one experiment, small flies were produced by removing the larvæ from food before the normal end of larval feeding, but there was no effect on their longevity. It was already known that flies grown at low temperature were larger. Small flies can also be produced by growing them at high temperature, but the duration of life is different from that of the small flies produced by under-feeding. In other experiments, flies were kept on synthetic food with or without yeast. The absence of the yeast greatly reduces the length of life of both males and females. From earlier work of Pearl, it is concluded that the relation between temperature and duration of life is represented by a simple exponential curve, while the relation between starvation and duration of life follows the upper part of a logistic curve.

Mycorrhiza in the Ericaceae.—Prof. Knudson, of Cornell University, and Dr. Rayner discuss again this oft-debated question in the *New Phytologist*, Vol. 28, No. 5, December 1929. Prof. Knudson is of the opinion that he has grown *Calluna vulgaris* from seed, after sterilisation with calcium hypochlorite, and obtained perfectly healthy seedlings under sterile conditions. He is aware that Dr. Rayner has previously failed to do this, and argues that her sterilisation methods (with mercuric chloride) were so drastic that the seedlings never grew thoroughly healthily, and also suggests that injection with the fungus symbiont just tipped the balance in favour of growth, by its effect upon the residual mercuric chloride left on the seed coat from the washing operations. Dr. Rayner, however, argues that Prof. Knudson's grounds for regarding his seedlings as completely sterile are far from convincing, and that his subsequent methods of examining these seedlings would leave the hyphæ of the symbiont still undetected. Under the conditions of his experiment, the hyphal complexes in the host cells, characteristic of fully developed mycorrhizal infection, were not to be expected; the fineness of the normal mycelium necessitates a special technique for its detection.

Floods of the Seine.—The floods that periodically threaten Paris are due to the coincidence of sudden thaw and heavy rainfall in the east and south-east of the Paris basin. The result is that the Seine is unable to carry away the water quickly enough. Many

preventive measures have been suggested. In *Matériaux pour l'Étude des Calamités*, 4, No. 20, Dr. E. Joukowsky proposes a new solution of the problem by the boring of absorbent pits establishing communication between the surface water and the subsoil. This would result both in storage and in drainage. The pits would be in river beds in order to save waste of land and preferably at river junctions. They would be dug at some distance from any artesian well. The value of the wells or pits would clearly depend on their number, diameter, and depths, and to decide these questions a careful study of the level of ground water and the absorption power of the soil would be required.

Formation of Limestone.—Most great limestone formations of past geological ages have had an origin independent of coral reefs, and were apparently laid down in relatively shallow seas. Many were alternately above water, with resultant sun-cracking, and submerged, with marks of wave action. On the Great Bahama Bank such conditions of deposition occur to-day. Waste of terrigenous origin is absent, and there are no coral reefs. Yet a white chalky mud known as drewite is being deposited. In the March number of *Discovery*, Mr. M. Black gives some account of a preliminary investigation of this deposit by an American expedition in which he took part. Needle-shaped crystals of aragonite and grains of calcium carbonate compose 90 per cent of drewite. The remainder is sponge spicules, tests of foraminifera, etc. Hard lumps among the soft ooze proved to be composed of crystalline calcite enclosing rather more foraminifera than ordinary drewite. This recalls the recrystallisation of ancient limestones known as pseudo-breccias. The second recrystallisation by which the whole mass, and not merely the lumps, become solid is still obscure, but it is probable that the cementation takes place when the aragonite needles are converted into calcite. This, however, would appear to take place only in the layers that are buried, since the aragonite is comparatively stable in contact with sea-water. Further investigations are promised.

K-Absorption Edge of Zinc.—In their communication on "The Fine Structure of X-Ray Absorption Edges", in *NATURE* of Oct. 26, 1929, p. 652, Prof. D. Coster and M. Wolf remark that although they have had no difficulty in observing several secondary edges in the *K*-absorption spectra of copper, they were unable to observe fine structure in the case of zinc. Mr. Suekichi Kawata, of the Physical Institute, Kyoto Imperial University, informs us in a letter dated Jan. 25 that he has obtained three secondary edges with zinc in the zinblende used as an analysing crystal employing the method of Lindsay and others (G. A. Lindsay and G. D. Van Dyke, *Phys. Rev.*, 28, 1926; J. C. Nuttall, *Phys. Rev.*, 31, 1928). The energy differences relative to the main edge are (in ν/R) 12.3, 8.0, and 3.3, which may be the right order of magnitude of the energies of $M_{IV, V}$, $M_{II, III}$, and M_I of zinc or the next higher element gallium respectively. The details of the photogram will not reproduce satisfactorily, but we submitted it to Prof. Coster, who writes: "I have seen the photogram of the *K*-absorption edge of zinc obtained with the zinc of zinblende as analysing crystal. It seems possible that Mr. Kawata has really got a fine structure of this edge. If this is true, the question which remains to be solved is, whether there is an essential difference between the intensity of this fine structure in the case of zinc and that of copper as was supposed in the letter of Coster and Wolf (*NATURE*, Oct. 26, 1929) or not. Experiments are in progress at Groningen to try to settle this question."

Capture of Electrons by α -Particles.—The first February number of the *Physical Review* contains further details of the experiments of A. H. Barnes on the capture of electrons by α -particles. In a preliminary report published last year (see *NATURE*, Sept. 7, 1929, vol. 124, p. 389), it had been claimed that capture occurred only when the relative velocity of the electron and α -particle was the same as the speed of an electron in one of the inner Bohr orbits of singly ionised helium, or when the two particles were relatively at rest. A similar result is now reported for the capture of two electrons to give a neutral atom of helium, and the form of apparatus which has been used is described. This consists of an evacuated tube, holding an incandescent plate as a source of electrons, with a set of auxiliary electrodes to give the electrons any desired speed, and to determine their paths. To avoid contamination, the α -particles enter the tube through a thin glass window, and after passing through the cloud of electrons are sorted magnetically and detected by the method of scintillations, the zinc sulphide screens being set up either inside or outside the tube. The total number of scintillations which have been counted is more than 7×10^5 . Mr. Barnes's results seem to show that electron capture takes place in less than 3×10^{-10} sec. in a region where the electron density is probably not greater than 10^7 per c.c.

Prevention of Corrosion in Lead Buildings.—*Bulletin* 6 and *Technical Paper* 8 of the Building Research branch of the Department of Scientific and Industrial Research (H.M. Stationery Office) deal with the above subject. They are drawn up by Mr. F. L. Brady and deal with the subject in a way likely to be of service to builders and architects.

Mine Rescue Apparatus.—We have received *Paper* No. 47 of the Safety in Mines Research Board, which deals with a type of gas mask evolved by the Board on the basis of experiments by Dr. S. H. Katz (of the U.S. Bureau of Mines), who has been working at Sheffield under a scheme of exchange of skilled investigators, and Mr. C. S. W. Grice (London: H.M. Stationery Office, 9d. net). The mask is of the hopcalite type, employing a specially prepared mixture of manganese dioxide and copper oxide which converts carbon monoxide into carbon dioxide. The type of mask successfully used in the United States, known as the 'All Service' mask, has been improved so as to show appreciably less resistance to breathing, and the results are of importance not only to mine workers but also to firemen and other workers who are liable to encounter poisonous gases in the course of their occupation.

Distillation under Low Pressure.—The extraction from solutions of solids which readily undergo chemical change at high temperatures necessitates usually some form of vacuum-still. In the *Chemiker-Zeitung* of Feb. 19 will be found the description of a patent still which embodies some new features. In the usual type of still, the resistance to the flow of vapour caused by the pressure of a column of vapour above the liquid often presents difficulty in operating on an extensive scale; moreover, the narrow cross-section and rather sharp angle of the outlet tube tend to increase the difficulty. These features are to a very great extent eliminated in the new design, in which the vapour is led from a wide tube near the surface of the boiling liquid to the condenser in such a way that very little of the condensed vapour flows back into the liquid. The evaporating vessel is made of special resistance glass, which gives better results than porcelain. The apparatus is supplied by the firm Greiner and Freidrichs of Stützerbach.