

## Research Items

### Greek Wolf Lore

A DISSERTATION by Dr. Richard Preston Eckels on "Greek Wolf Lore" (Philadelphia: University of Pennsylvania, 1937. Pp. 88) discusses the place of the wolf both in popular belief and as the object of a cult in ancient Greece, and concludes generally that the evidence is unfavourable both to the view of A. B. Cook that in connexion with the cult of Apollo it is a manifestation of a 'light' cult, and the view that it points to totemism in Greece. The author touches incidentally on the Romulus and Remus legend, which he concludes is not of Greek origin, and its modern parallels of children reputed to have been suckled by wolves and other wild animals. In coping with wild animals, primitive man has two choices only, extermination and domestication. The wolf problem could be solved partially only by domestication, and the wolf, with an effective range of about thirty miles, was in Europe a constant danger to the shepherd. In European folk-lore, therefore, it holds an arbitrary position as the wild animal most widely feared and the embodiment of all that is most malignant and terrible in the natural world—an unconscious abstraction that may be called the Baleful Beast, a mirror of the darker side of human imagination. A number of folk-lore beliefs were current in ancient Greece, such as that the wolf had one cervical vertebra only, that he was an eater of earth and that he was stupefied by squills, while men became mute when they met the wolf's eye, but music could put him to flight. An examination of Greek wer-wolf belief in relation to the beliefs in other wer-animals, as found widely distributed, reduces the importance of the wolf as a specific vehicle of the superstition. The belief is seen to be a manifestation of the Baleful Beast, one of a number of animals which appear in 'shape-shifting'. The more difficult problem is the place of the wolf in certain cults—Zeus Λύκαιος, Apollo Λύκειος, and the belief that Leto, the mother of Apollo, was a wolf. The connexion of Zeus with the wolf and cannibalism in Arcadia seems a piece of folk-etymology to explain the epithet, while that with Apollo is probably derivative from an original function in popular belief of the protection of the flocks from harmful beasts.

### A Giant Fairy Shrimp

MR. JAMES E. LYNCH describes an enormous new species of fairy shrimp, discovered in 1935 by Mr. J. F. Clark of Washington State College from the vicinity of Coulee City, Washington, and later found in numbers by the author in temporary alkali ponds in the Upper Grand Coulee, 19 miles north of Coulee City, Grant County (*Proc. United States Nat. Mus.*, 84, No. 3025; 1937). This is the fourteenth species of *Branchinecta* to be described and the fifth reported from North America. In *Branchinecta gigas* the male measures 63 (61–70) mm. in length and the female 86 (69–97) mm. The only other species of the genus approaching it in size is *Branchinecta ferox* from Eastern Europe and Asia Minor, the female

of which may reach 70 mm. *B. gigas* differs from all other species of the genus in its large size and in having the antennæ in the female as long as those of the male. It is interesting to find that its food is a *Diaptomus*, the intestine of fresh specimens being bright red from the remains of this crustacean which it has eaten.

### West North American Mollusca

A. MYRA KEEN has expended a great deal of labour in making the check list of west North American Mollusca ("An Abridged Check List and Bibliography of West North American Marine Mollusca". 1937. Stanford University Press). An enormous amount of matter is compressed into this small volume, which is very useful to all conchological workers, especially on the statistical side. Ranges of all species are given. The method employed for using the list to its full advantage is simple, and a large amount of information can be obtained, including literature during the past thirty years besides references to other works of general importance. The maps and diagrams are on the small side and require much enlargement in order to read them, but the whole is comprehensive and a valuable addition to any molluscan library. The book has been reproduced from typewritten sheets.

### A Leaf-rolling Weevil

GUM leaves rolled into cylinders and known as 'ant-letters' have been attributed in parts of Australia to the activities of ants of the bullant tribe (Myrmecii). But since the structure of the mouth parts of these ants makes leaf-cutting impossible, John McAreavy has investigated the matter (*Victorian Naturalist*, 54, 123; 1938) and finds that the cutting and rolling of the small gum leaves and the regular scratches made upon the surfaces of the leaves are due to a weevil. The species concerned, *Euops falcata*, sub-family Attelabinae, is common in Victoria and New South Wales. It works upon young gum trees or on suckers from old stumps, because on these the leaves are tender and easy to roll. The cutting is carried out by the female, and as soon as a leaf section is cut, the upper and sometimes the under surface also are marked with small scratches by the tips of the mandibles. The male takes no part in the operation, but remains close at hand upon the leaf, and at this stage mating takes place. Thereafter the female, after making a couple of deep cuts, which enable her to begin the rolling of the leaf, lays one yellow egg, and then proceeds to roll the rest of the leaf strip tightly with her feet. The cylinder is finally sealed by sticky sap squeezed from the cut surfaces by the rostrum of the beetle, and the author surmises that the scratches made upon the leaf-surface encourage the exudation of sap sufficient to hold the surfaces of the cylinder together as the rolling process is carried out. The beetles prefer for the formation of this egg-case the leaves of *Eucalyptus macrorrhyncha*, the red stringybark tree.



### Incompatibility between Stock and Scion

INCOMPATIBILITY between stock and scion occurs in a number of fruit tree species and may be due to diverse causes. Dr. W. T. Chang, working at the East Malling Research Station, has investigated the problem in the case of pears, plums, cherries and peaches (*J. Pom. and Hort. Sci.*, 15, 4, 267; 1938). The symptoms of incompatibility were generally a low percentage take of grafts or buds, premature autumn leaf coloration and flower bud formation, early defoliation, and dying back of young shoots. Defoliation was basipetal in incompatible combinations and acropetal in compatible ones. The graft union was invariably weak mechanically in incompatible combinations due to discontinuity of bark or wood fibres or both, this being associated with slow diffusion of dyes across the union, resistance to flow of water under pressure, and a heavy deposit of starch above the union in November. It is concluded that mechanical weakness and obstruction at the union are the immediate causes of shoot and root decline in incompatible combinations, whilst differences in the periodicity of cambial activity and wide divergences between the growth periods of stock and scion are important contributory causes.

### Soil Conditions and the 'Take-all' Fungus

MR. S. D. GARRETT has investigated the effects of soil reaction and aeration upon growth of *Ophiobolus graminis*, the fungus which causes 'take-all' disease of wheat. A recent paper (*Ann. App. Biol.*, 24, No. 4, 747-751, Nov. 1937) describes experiments upon the forced aeration of soil in relation to the incidence of the fungus. Such treatment was found to permit considerable activity of the organism in soils which were normally too acid for its good growth. Even in alkaline soils, aeration brought a marked increase in mycelial extension. Mr. Garrett has also evolved a method of clearing and staining fungus-infected rootlets (*Ann. Bot. (New series)*, 1, No. 3, 563, July 1937). A solution of 0.04 per cent brom-thymol blue in 4 per cent sodium hydroxide is allowed to act upon the roots for a period of 5 minutes or more. The effect is a combination of clearing and maceration, whilst the brom-thymol blue stains fungal hyphae to a deeper colour than any non-meristematic tissues of the host.

### Age of the Slieve Gullion Gabbros

THE apparently ambiguous evidence bearing on the age of the Slieve Gullion gabbros has now been satisfactorily cleared up by Doris L. Reynolds (*Proc. Geol. Assoc.*, 247-275; 1937). The gabbro intrusions of Camlough Mt. and near Flurrybridge are shown to contact-alter the Caledonian Newry granodiorite in such a way as to cause the development of micropegmatite around each quartz group. As shown by alkali determinations, the alteration is a metasomatic change, potash having been introduced into, and soda driven out from, the granodiorite. The Slieve Gullion gabbro is found to be associated with a similar micropegmatite-bearing granodiorite and adamellite, and to enclose a block of the micropegmatitic granodiorite. Micropegmatitic veins extend from the zone of altered acid rock into the gabbro, both on Slieve Gullion and near Flurrybridge, and provide evidence that the metasomatized rock eventually became magmatic (rheomorphic). The rocks which result from the metasomatism and

rheomorphism of the Caledonian granodiorite are shown to have petrological peculiarities in common with the Tertiary granophyre of Slieve Gullion. It is suggested that the Tertiary granophyre is the final product of metasomatism or rheomorphism of the Caledonian granodiorite. If this is so, it follows, since the change is correlatable with the gabbro contacts, that the gabbros are all (like that of Camlough Mt.) of Tertiary age. This is consistent with Egan's findings, that the gabbro and granophyre of Slieve Gullion mutually intrude one another. Richey's more recent conclusions, that the gabbros of Slieve Gullion and Flurrybridge are Caledonian, are shown to be founded on invalid evidence.

### Distribution of Deep-Focus Earthquakes

Messrs. B. Gutenberg and C. F. Richter, to whose work in connexion with deep-focus earthquakes we owe so much, have recently added an important memoir on the depth and geographical distribution of these earthquakes (*Bull. Geol. Soc. America*, 49, 249-288; 1937). They give a catalogue including all important deep-focus earthquakes from January 1, 1918, until March 31, 1932 (taken chiefly from the "International Seismological Summary"), as well as 12 earthquakes from 1905 until 1917, and 47 others from April 1932 until June 8, 1937, the total number being 255. The authors distinguish three classes of earthquakes, namely, normal earthquakes with focal depths up to 60 km., intermediate earthquakes with depths from 70 km. to 250 km., and deep earthquakes with depths from 350 km. to 730 km. It is a remarkable and well-established fact that no earthquake has been found with a focal depth much in excess of 700 km., a fact the more striking since some of the deepest earthquakes are among the greatest recorded. The distribution of earthquakes with very deep foci shows no direct relationship with the surface geology, though the epicentres occur in zones that are usually parallel to the larger structures. They are confined to zones bordering the Pacific Ocean, at some distance inland from the regions in which normal or intermediate earthquakes occur. The authors believe that the data already collected show that deep-focus earthquakes, like normal earthquakes, originate in a shearing or faulting movement, that takes place in the same direction over large areas and persists over long intervals of time.

### Industrial Luminescence Research

IN the case of several manufactured products, luminescence can be employed to detect abnormalities. In *Philips' Technical Review* of January, A. Van Wijk describes a simple practical method of doing this by means of an 80-watt quartz-mercury lamp, the visible light being absorbed by a suitable filter. The filter is made of glass 'blackened' with nickel oxide and an extra addition to the molten glass cuts out the rays which cause conjunctivitis. In the Philips apparatus the lamp is surrounded by an outer bulb of the filter glass and the total useful radiation of the lamp is made available. The author suggests possible uses for these luminescent lamps. For example, it is known that the age of hens' eggs can be ascertained at a glance by means of the fluorescence of the shell. A fresh egg fluoresces red, and an old egg blue. It is stated that luminescence analysis is the best method for checking large numbers of eggs, in an egg market, where whole racks can be inspected at once. If hard



water which contains lime is used in a laundry, spots of insoluble calcium soap appear in the material. When these spots are new they are invisible under normal lighting conditions. But under the luminescence lamp they glow with a bluish brightness. Instead of using disfiguring numbers or other marks on linen the laundry stamps the incoming goods with a number in invisible ink which luminesces strongly. The ink is 'fast' to washing so that after being washed the goods can be sorted in the usual way by luminiscent light. Luminescence analysis is useful in the following industries: textile, paper, paint, rubber and food. In addition, there is room for application in goods inspection, and for detecting all kinds of falsifications—cheques, postage stamps, banknotes, paintings, etc.

#### Progress in Power Rectifiers

DR. W. G. Thompson's paper on recent progress in power rectifiers and their applications, read on March 17 before the Institution of Electrical Engineers, gives a general survey of the present stage of their development. The introduction of the arc rectifier into power engineering may be considered to mark the beginning of a new stage in electrical development. The engineer has not only to extend the scope of his technical knowledge so as to include a field of electron phenomena, hitherto regarded as the physicist's domain, but he has also to adapt in engineering practice much of the vacuum technique of the physical laboratory. During the last twenty years the steady progress of rectifier installations shows how effectively the new knowledge has been applied. Some of the outstanding advantages of the rectifier arc, used for converting alternating into direct current, are its static nature, robust construction, high efficiency and low cost. The demand for this type of apparatus is steady and progressive, and shows no immediate sign of diminution. More than four million kilowatts of rectifier plant is in operation throughout the world. There is now little competition between this plant and rotating machinery; the competition is now between different types and makes of rectifier. With one or two exceptions, recent progress in practice has been by way of improvement and simplification of existing types rather than by new innovations. At the present time power rectifiers are divided into two main groups: (1) vacuum, or more strictly low-pressure vapour apparatus and (2) non-vacuum types. Of the equipment installed the vacuum type is much the larger, but active experimental work is being carried out on alternative forms of rectifier. The power rectifier has a widespread application and there are no signs of its limits of usefulness being approached. Typical examples of rectifier traction work associated with British industry are the London Transport Board's system and the electrification of the Southern Railway, the South African Railways and the Polish State Railways.

#### The Aurora

THE meeting of the British Astronomical Association held on February 23 was devoted almost entirely to a discussion of the auroras of January 25. Prof. S. Chapman discussed auroras in general, and a considerable number of the members contributed notes and papers on the subject or took part in the dis-

ussion at the close of Prof. Chapman's address, which has recently been published (*J. Brit. Astro. Assoc.*, 48, 5, March 1938). Prof. Chapman showed on the screen the iso-auroral lines—most frequent along the auroral zone which was more or less circular, centred at the magnetic axis pole. The usual height of auroras is about 60 miles for the bottom of the streamers, though on rare occasions heights of 40 miles have been recorded. An aurora might extend 300 miles or more upwards. The association between auroras and sunspots is rather nebulous, though there is a definite increase in auroral activity at the times of sunspot activity, but good statistics are difficult because suitable conditions are essential for the observation of auroras. Particles ejected from the sun with parabolic or greater velocity would, if they came within the region of our planet, be guided along the magnetic lines of force and diverted to polar regions, assuming that they were electrified. The light of auroras is due to excited atoms returning to the normal state or to electrons recombining with ions, ionization and breaking up of molecules into atoms being due to collisions between the solar particles and our atmosphere. For this reason, the spectrum of the aurora gives us information, not about the particles, but about the constituents of the upper atmosphere; and this was shown to contain neutral molecular nitrogen, ionized molecular nitrogen, and atomic oxygen. Discontinuities in auroral light, large gaps of clear sky appearing between active regions, may find an explanation on the assumption that exciting agents are absent from these zones.

#### A Comparison Image Micrometer

Messrs. C. R. Davidson and L. S. T. Symms have recently published a paper with the above title (*Mon. Not. Roy. Astro. Soc.*, 98, 3; Jan. 1938), in which they describe the results obtained with a comparison image micrometer applied to the 28-inch refractor at Greenwich. Mr. F. J. Hargreaves formerly described a method for improving the measurement of double stars (*Mon. Not. Roy. Astro. Soc.*, 92, 72; 1931). This consisted in producing in the field of the telescope an artificial double star which could be varied in distance, position-angle and brightness, so that it matched the real double star. He made a micrometer on this principle with which he obtained excellent results, and it was sent to Greenwich to be applied to the 28-inch refractor. A Wollaston prism was utilized to produce the double star, crossed nicols controlling the relative brightness of the components, and the paper describes fully the use of these additions to the original micrometer of Mr. Hargreaves. Very remarkable results have been obtained by the apparatus, the advantages of which are most apparent in the case of close pairs. Where it has been impossible to measure these with the filar micrometer owing to the overlapping of disks of diffusion, with the comparison image micrometer glimpses of the nuclei are of sufficiently long duration to observe whether the real and artificial images match. The authors are of opinion that the claim of great accuracy made by Mr. Hargreaves is fully justified, and a comparison between his results obtained with the original micrometer mounted on his 12-inch reflector and those obtained with the Greenwich instrument shows a remarkably close agreement.