

Research Items

Malay Magic

THE various classes of the magical dance performed in the Malay Peninsula, notwithstanding innumerable variations in character and underlying principle, present a general uniformity of type, while the associated traditions conform to certain common patterns. Details of the dance and the magical beliefs connected with it in the State of Kelantan, studied by Jeanne Cuisinier (*Inst. d'Ethnol. Trav. et Mém.*, 22) were corroborated by the author in Perak, Pahang and Trengganu, as well as in Patani, Siam. In these dances, the spirits, especially the ancestral spirits, are invoked for a variety of purposes, mostly connected with the treatment of disease, especially epidemics. The performers fall into the possessive trance characteristic of this type of dance. In order to understand the character of the dances, it was found necessary to study the whole nexus of magical belief, on which they rest. Observations of the unbalanced mentality characteristic of those subject to supernatural influence were recorded, though without any attempt at psychological diagnosis, owing to the author's lack of medical training. The essential conditions in the 'make up' of the medicine-man belief in Malaya are: revelation, heredity and secrecy; while symbolism plays a large part in magical practice. Revelation may be either voluntary and induced, or involuntary. The voluntary revelation is sought by going into retreat, fasting, prayer, etc. Involuntary revelation is most commonly found in members of families in which sorcery is hereditary, going back to remote ancestors—a matter in which it links up with totemism. Secrecy is maintained, even when incantations have to be uttered aloud, by speaking in a peculiar and incomprehensible voice or by omitting part of the charm, until it is reduced to perhaps no more than one or two words.

A Peruvian Manuscript

IN 1908 Richard Pietschmann, director of the Göttingen Library, when attending as German delegate the xvth International Congress of Orientalists at Copenhagen, discovered in the Royal Library the manuscript, hitherto unnoted, of a chronicle written by a Peruvian, Don Felipe Guaman Poma de Ayala. This manuscript, consisting of 1,174 pages quarto, it was Pietschmann's intention to publish with commentary; but he died before his work was complete. It is now published in facsimile by the Institut d'Ethnologie of Paris (*Trav. et Mém.*, 23). The chronicle, which is in corrupt Spanish interspersed with many Quichua words, was written in the early years of the seventeenth century—it embodies a letter by the author's father, which is dated 1587. Guaman claimed to be a descendant of the rulers of the powerful northern State, which long resisted the power of Cuzco. Whatever his descent, his circumstances were abject, a condition which he attributes to his devotion to the cause of his fellow countrymen. About one quarter of the manuscript is devoted to a description of the country and its inhabitants before the conquest by Francisco Pizarro, in which the historic period is preceded by four legendary epochs, beginning with that of the

divine, or semi-divine Viracocha, followed by those of the authochthones or "giants", the men of the desert, and the warriors. Historical and biographical sketches and an account of the Inca constitution and social orders follow. The story of the acts of the conquistadores and the rule of the viceroys, Indian risings and sufferings, is rounded off by an idealistic sketch of Indian Christendom, and the Indian calendar of agricultural operations. The remarkable and most valuable feature of the manuscript, overshadowing the text, is the very large number of full page drawings, illustrating the narrative, which convey much information throwing light on Indian appearance, vocabulary, dress, custom and belief.

Birds of the South Orkney Islands

THERE are no truly resident birds in the South Orkney Islands, and very few are to be seen in winter, although one or two sheathbills, thanks to their omnivorous diet, find it possible to live through the winter months upon the refuse of human habitations in the neighbourhood of the meteorological station, as they did about the winter quarters of the *Scotia* expedition. In the "Discovery Reports" (12, 349; 1936) R. A. B. Ardley gives an account, illustrated by eight photographic reproductions, of the members of this oceanic bird fauna, supplementing the description of plumage and breeding given by Dr. Eagle Clarke in his account of the *Scotia* material, and adding records of the presence of several species from islands in the group not investigated by the Scottish National Antarctic Expedition.

Marine Research at Millport

THE annual report of the Scottish Marine Biological Association for 1935-1936 shows that a large amount of good work has been accomplished. Research on herring by Drs. Orr, Marshall and Nicholls is progressing, but, as is usually the case with trying to rear herring from artificial fertilizations, the young only lived about three weeks. Various growth stages, however, were obtained from the plankton, and both larval and metamorphosed fish studied. From hatching to metamorphosis they grew rapidly and fairly regularly, increasing in length 2-3 mm. weekly. Metamorphosis began at a little over 40 mm. At hatching, a single larva weighed about a fifth of a milligram, at a length of 20 mm., reached when the fish was about five weeks old, it weighed 1½ mgm.; and at 40 mm. when about twelve weeks old, 35 mgm. Estimations of fat and protein were made, the fat content increasing rapidly as the fish approached metamorphosis. Vertical hauls for plankton were taken whenever the young herring were caught. The food eaten by the fish corresponded in size with the size of the fish, as is usually found. The smallest were eating small *Pseudocalanus*, *Microcalanus*, etc., and the larger were eating adult *Pseudocalanus*, *Centropages*, *Temora*, etc. Dr. Marshall is continuing her work on the biology of the small copepods and Dr. Orr his work on the composition of the food of fish by making analyses of the chemical composition of numerous species of crustaceans, molluscs, echinoderms, worms, etc.; Dr. Nicholls his study of the

copepod genera *Leptosyllis* and *Paramesochra*, and Dr. A. C. Stephen has paid special attention to the spat-falls of *Tellina tenuis*, continuous observations having been made since the autumn of 1926. Dr. D. C. Gibb has carried out an ecological survey of marine algæ of an area of coast at the north end of Cumbræ.

Boll-worms of Cotton in South Gujarat

MESSRS. B. P. DESHPANDE and N. T. Nadkarny have examined methods for controlling the two species of spotted boll-worms, *Earias faba* and *E. insulans* in south Gujarat, Bombay Presidency. The results of their investigations have been published as Scientific Monograph No. 10 (1936) of the Imperial Council of Agricultural Research, India. Various methods of controlling the larvæ of these two moths are discussed, and the results of experiments recorded. It appears that no advantage is likely to be derived from biological methods of control since all the known parasites of *Earias* are found to be present locally. A study of the most important parasite, *Microbracon lefroyi*, also showed that it was not possible to increase the incidence of this species by artificial methods. Advantage has been taken of the fact that the larvæ of *Earias* get their supply of food, between the two cotton-growing seasons, from the fresh shoots sprouting from standing plants of cotton or their stumps, and from stray malvaceous weeds. The authors claim that it will be possible to prevent the carry over of the *Earias* from one season to another by the destruction of cotton plants and weeds at the appropriate time and by withholding the cultivation of 'bhindi' during that period since it is also used as a food plant by the larvæ. A clean-up scheme has, therefore, been started in order to determine the efficacy of the proposed measures, and is still in progress. The scheme, it may be added, is being financed by the Indian Central Cotton Committee.

Hæmostatic Action of Ayapanin and Ayapanin

P. K. BOSE and B. B. Sarkar, writing from the University College of Science, Calcutta, report preliminary observations on the hæmostatic action of two substances isolated from the leaves of *Eupatorium ayapana* Vent., a decoction of which has long been a popular remedy against various kinds of hæmorrhage in Hindu medicine. The substances are termed ayapanin, identical with 7-methoxycoumarin, and ayapin, identical with 6 : 7-methylenedioxy coumarin ; in each case similar hæmostatic effects were found with the synthetic and natural compound ; no effects on heart, respiration or blood pressure were observed. The coagulation time of rabbits' blood was diminished when traces of finely divided ayapanin or ayapin were added *in vitro*, when saturated solutions of the compounds in physiological saline were injected subcutaneously, and when the substances were given by mouth, the effect in the latter instance lasting approximately one hour. The closely related substances coumarin, 7-hydroxycoumarin and sodium *p*-methoxycinnamate had no effect on clotting time.

Hot-water Treatment of Bulbs

HOT-water treatment is now the standard method for dealing with Narcissus bulbs infected by eelworm, but although it has given a considerable measure of success, its efficiency has not reached the standard which was to be expected on theoretical grounds, or could be usually obtained with small-scale trials. The

question has been under investigation during the past few years by Messrs. Staniland and Barber of Seale-Hayne Agricultural College, and the results of their inquiry have been issued by the Ministry of Agriculture as Bulletin 105, "The Efficiency of Baths used for the Hot-Water Treatment of Narcissus Bulbs" (H.M. Stationery Office, price 1s.). Unsatisfactory results could be traced to a number of different causes, but the factor which seems to have led most frequently to the survival of eelworm during treatment is the use of sacks to hold the bulbs, for penetration and circulation of the water within a sack is slow, and the majority of the bulbs fail to reach the requisite temperature under these conditions. Practical suggestions are given for improvements, such as the use of rigid containers in place of sacks and the introduction of a circulatory system where rectangular tanks are employed. Attention is also directed to the fact that inaccurate thermometers or incorrect steam pressures are frequently the cause of apparent inefficiency of the method. It is hoped that the practical recommendations provided in the bulletin will result in the hot-water treatment giving even greater satisfaction than it has in the past, for there is no doubt that such treatment has been the saving of the bulb industry.

Transfusion of Quartzite

DORIS L. REYNOLDS has described (*Min. Mag.*, 24, 367 ; 1936) in great detail the most convincing example which has yet been recorded of the transformation of quartzite into rocks that are indistinguishable from common igneous types. The hornblendite of three small composite intrusions in Colonsay is thickly sprinkled with blocks of white quartzite, most of which exhibit various stages of replacement by micropegmatite, syenite and appinitic. Completely replaced xenoliths are represented by felspathic patches and schlieren. Finally, the process of transfusion gave rise to syntectic magma, of syenitic and appinitic composition, now represented by veins which emerge from metasomatized quartzite. By study of successive replacement zones and chemical analyses, it is found that differential migration into the quartzite of various magmatic constituents took place. The paper is followed by one in which A. Holmes describes the augite-rimmed xenoliths of transfused quartz which occur in many of the alkali basic and ultrabasic lavas of south-west Uganda (*Min. Mag.*, 24, 408 ; 1936). Transfusion begins with the development of intergranular channels of glass and continues until only isolated relics of quartz remain. Microchemical analyses (by F. Hecht) of three samples of glass from pure quartzite or vein-quartz show that the glass has the composition of silica-rich potassic obsidian. The constituents which migrated into the quartz were mainly those of alumina, potash and water. Comparison is made with the Colonsay phenomena, and in both papers references to many comparable but less well-authenticated examples are given.

Effect of a Magnetic Field on Adsorption

THE effect of a magnetic field on the rate of crystallization and some physical properties of substances is well-known. S. S. Bhatnagar, P. L. Kapur, and A. N. Kapur have recently reported the results of the effect of a magnetic field on the extent of adsorption (*Phil. Mag.*, (7), 23, 256 ; 1937). The systems studied were the adsorption of potassium

permanganate, potassium dichromate, potassium ferrocyanide, and ferric chloride on sugar charcoal, and that of potassium permanganate and potassium ferrocyanide on barium sulphate. In the case of potassium permanganate, potassium dichromate, and potassium ferrocyanide, there was a small but definite increase in the adsorption by sugar charcoal in the magnetic field. With ferric chloride on sugar charcoal there was a decrease, whilst for adsorption of potassium permanganate and potassium ferrocyanide on barium sulphate there was no effect. The authors discuss the effects with sugar charcoal in the light of the view put forward by a number of workers, but particularly by Burrage, that active charcoal is covered with a film of active oxide which cannot be removed even by prolonged heating in a vacuum. The filtrate from the potassium permanganate experiments with charcoal was found to contain a suspension of manganese dioxide, the presence of which may be ascribed to the interaction of the permanganate with the active oxide. Similarly, chromic ions were found in the filtrate from the dichromate adsorptions. In the adsorption of ferric chloride it is probable that the active oxide forms iron carbonyl and is thus removed. Potassium ferrocyanide was found to be partly oxidized to the ferricyanide during the process of adsorption. These facts favour the existence of an active oxide of carbon, and a chemical theory of adsorption. The authors go on to show that the effect of a magnetic field on the adsorption which was found by experiment is in agreement with the rule put forward by them in 1929, that a reaction would be accelerated, retarded, or remain unaffected according as whether the sum of the molecular susceptibilities of the products is greater than, less than, or equal to the sum of the molecular susceptibilities of the initial substances.

Protein Films

IN *Science* of January 15, Drs. Irving Langmuir and V. J. Schaefer of Schenectady collaborate with Dr. Dorothy M. Wrinch of Oxford in a very interesting study of films of protein transferred to solids from water surfaces. In order to facilitate optical study of these films, they were deposited on a polished chromium-plated surface. The method of deposition was similar to that already worked out by Langmuir and Miss Blodgett, dipping the slide into water covered by a film; and two different types of protein film were obtained according to whether the slide was dipped into water already covered by a film, or dipped first into clean water, a film then put on, and the protein afterwards spread before withdrawing the plate. The two types of film probably differ in that one is applied the opposite way up to the other, and their outer layers are hydrophilic or slightly hydrophobic according to the manner in which they have been applied. Many successive layers can be built up, and any even number of layers of protein can be inserted between layers of stearate molecules, thus giving a close approach to possible structures for the surfaces of living cells. Studies of the penetration of liquids into these films have been commenced, and it appears that hydrocarbon liquids can easily penetrate into the holes (of molecular dimensions) left by the removal of the stearic acid molecules from a mixed barium stearate-stearic acid film. The water-retaining properties of these films depend on the orientation of the protein molecules.

Encounters between Pluto and the Neptunian System

MR. RAYMOND A. LYTTLETON, who has already contributed an interesting paper (*Mon. Not. Roy. Astro. Soc.*, 96, 566) on the origin of the solar system, prompted by Russell's severe criticism of the theory of Jeans, has a paper on this subject in the same journal (97, 2; Dec. 1936). The high eccentricity of Pluto, exceeding 0.25, implies that it may be nearer to the sun at times than Neptune, and for this reason encounters of Pluto have an important bearing on certain problems relating to the past history, as well as to the future, of the solar system. A rigid mathematical investigation leads to several interesting conclusions, amongst which the following may be noticed. Encounters between Pluto and the Neptunian system may have occurred in the past and may occur again. It is even possible that the orbit of Pluto may come within that of Saturn, and an encounter with Saturn could eject Pluto from the solar system, but as such an encounter is most improbable, the matter is of little interest. The action of Neptune, on the other hand, may cause great alterations in the orbit of Pluto, though it cannot eject it. The considerations in the paper lead to the conclusion that Pluto may originally have been a direct satellite of Neptune, and that an encounter which gave it an existence as an independent planet also reversed the general direction of motion of Triton. It is admitted, however, that this explanation of the retrograde motion of a true satellite is rather speculative.

The Gas Impregnated Cable

DURING the last few years, the development of cables suitable for high-tension currents has proceeded rapidly. In a paper read to the Institution of Electrical Engineers on March 10 by A. W. Arman, various types of these cables are described. The earliest type consisted of a copper core for carrying the current, separated by impregnated paper from a co-axial hollow copper cylinder which formed the return path. It was found that a limiting factor in this type of cable was due to the vacuous spaces (voids) which formed in the dielectric and caused ionization to occur at high electric pressures. The next type of cable was the oil-filled cable, in which low viscosity oil was introduced under moderate pressure from the hollow conductor and filled up the voids, thus avoiding ionization. It has been successfully applied to 132 kV. systems. The main drawbacks are that the cable and the associated apparatus are expensive. Another and more recent method of preventing the formation of voids in three-core cables is to use an impregnated dielectric of the usual type for the three cores and encase them in a thin flexible sheath. The cable is then drawn into a steel pipe, and the latter is filled with gas at high pressure. As the compound in the cable expands and contracts as the current it carries varies, the sheath 'breathes' to accommodate the varying volume and the high external pressure prevents the formation of voids. This type of cable is called the 'pressure cable'. The 'gas impregnated' cable, which the author describes, is intended to produce a 132 kV. cable based on sound principles. The insulation consists merely of high-pressure gas and dry paper. It is unaffected by heat cycles and so the dielectric can be run at a higher temperature than in other cables. Nitrogen at a pressure of 200 lb. per sq. in. was first employed but later on it was found that carbon dioxide gave a better performance.