Research Items

Indian Culture and the Native States

PROF. L. F. RUSHBROOK WILLIAMS, in an address to the Royal Society of Arts on the cultural significance of the Indian States (*J. Roy. Soc. Arts*, **86**, Sept. 16, 1938), stressed the position of the States as embodiments of traditional Indian conceptions of socio-political organization, and hence important for the rightful understanding of India's political development. No Government has ever ruled the country from a single centre. Under every Indian empire there have been numerous subordinate kingdoms performing many of the most essential functions of government in territory nominally under imperial control. There are certain fundamental differences between the Western and the Indian views of the State. In Indian ideas, the State deals with the individual, not as such, but as a member of overlapping communal, or local groups, carrying out many forms of corporate action, which the State cannot compass, but essential for the well-being of the citizen. Hence India is a country of communities —village communities, castes or guilds, and the joint-family: and it is only recently that the State has taken over such functions as police, education, or poor relief. Before British rule, the State scarcely came into contact with the individual. The political separatism resulting from these social institutions has been powerfully reinforced by the different cultures, races and languages, which have poured into India since historic times. The subordinate States have played an important part in crystallizing these socio-political institutions, and as supporters of the traditional arts of India, which, but for them, might have perished in the pursuit of Western ideas and culture under the British *raj*.

Properties of the Protoplasmic Membrane

IN a recent review of the literature, Harvey and Danielli (*Biol. Rev.*, **13**, 319; 1938) propose a relatively simple model of the surface layers of the cell, based on their physical properties. The tension of the surface lies between 1·0 and 0·1 dynes/cm., which is too low for a simple oil-water interface. The presence of an adsorbed protein film is shown, however, materially to reduce the interfacial tension. On this and other grounds, it is suggested that the surface of the cell involves, as a minimum, a bi-molecular layer of lipoid molecules between two layers of protein molecules. Measurements of the thickness of the surface film (about 50 A.), of its permeability, and of its wetting properties are found to be compatible with this model. A simple explanation is given of the Na-Ca type of antagonism in terms of the acidic groups of the protein and lipoid films. Thus, on the alkaline side of the iso-electric point of the membrane, cations will be adsorbed to form salts. It is well known that water is less soluble in the calcium salts of the probable active groups (carboxyl, phosphate, sulphate) than the sodium salts. High temperature coefficients of penetration are also explained without the necessity of the intervention of chemical processes. The membrane allows for preferential absorption of lipoids, and for pore and mosaic effects.

Histamine and Tyramine in Lung Diseases

J. L. HERRENSCHMIDT (*Thèse de Paris*, No. 634; 1938), has made a study of histamine and tyramine in the blood of thirty-one cases of respiratory disease including pulmonary tuberculosis, and comes to the following conclusions. (1) Severe ulcero-caseous tuberculosis is as a rule accompanied by an excess of tyramine and a normal amount of histamine in the blood. (2) In cases of tuberculosis complicated by hæmoptysis, involvement of the pleura, or allergic or cutaneous manifestations, there is little change in the tyramine content but always an excess of histamine in the blood. (3) Broncho-pulmonary suppuration is usually associated with a rise of tyramine and in many cases also of histamine in the blood, and there is always an appreciable or considerable proportion of these two substances in the sputum. (4) In tumours of the lung there is always a considerable quantity of tyramine in the blood. (5) In asthma there is a large quantity of histamine in the blood during an attack and a normal quantity apart from the attacks. The tyramine is normal throughout.

Synthetic Preparation of Ephedrine

THIS alkaloidal drug is obtained from a shrub growing in a small area near Tientsin, China, and since the recent hostilities in China its price has fluctuated widely. Thus attention is directed to efforts to synthesize the drug, upon which Dr. J. Kamlet of the Israel Zion Hospital, New York City, reported (according to Science Service) at the meeting of the American Chemical Society at Milwaukee in September 1938.

Maturity of Salmon Parr

IT has long been known that male salmon parr may mature before leaving the river. These fish were regarded by some as precocious males, and it was not known to what extent maturity was normal. An examination of parr has been made recently in the Welsh Dee (J. H. Orton, J. W. Jones and G. M. King, "The male sexual stage in Salmon Parr (*Salmo salar* L. juv.)", *Proc. Roy. Soc.*, B, **125**, 103–114; 1938). The results showed that 40 per cent of the population of two- and three-years old salmon parr became sexually mature in October 1937. Successful fertilizations were made in November. There is some indication that the parr spawn on the redds before migrating to the sea as smolts. It is suggested that all or most of the males normally attain their first sexual maturity in the river before migrating to the sea. This interesting observation should be followed up by similar work on other rivers.

Insects in Petrified Wood

EVIDENCE of ancient insect activity has lately been brought to light in the fossilized logs of Triassic age found in the Petrified Forest National Monument, Arizona, U.S.A. In many of these fossil trees there are ridges, channels and tunnels which seem to represent the burrows of larvæ of certain beetles. Some of these are channels just under the bark and

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appear to be the work of Scolytidæ. Others take the form of tunnels into the heart wood and are perhaps the work of Buprestid or allied beetles. The only species of tree attacked is *Araucarioxylon arizonicum*, and it seems probable that many were killed as the result of girdling by the Buprestid beetles. A short account of these fossilized remains has recently been published by Mr. M. V. Walker (*Proc. United States Nat. Mus.*, **85**, 137–141; 1938), who classifies them into four new genera.

Biology of the Cockroach

The life-history of the very common and cosmopolitan *Blatta orientalis* L. has long remained very imperfectly known. A contribution towards a knowledge of this subject by Dr. M. A. H. Qadri has recently appeared (*Bull. Entom. Res.*, **29**, 263–276; 1938). Breeding of the insect was at a constant temperature of 27·5° C. It appears that the œthecæ are normally laid in May and June and the time taken for the emergence of the first nymphs is from seven to ten weeks. At the time of its escape from the œtheca the insect is in the so-called pronymph stage, which has been overlooked by most observers. It lasts but a few minutes, after which the first ecdysis takes place. There are six true nymphal instars and at the seventh ecdysis change into the adult occurs. The average developmental period, after exit from the œtheca up to the adult stage, is 279 days. The formation and structure of the little-known spermatophore is described together with the changes during development of the male gonads and their associated parts.

Leaf Abscission in Healthy and Diseased Leaves of *Picea*

A. H. Campbell and A. E. Vines have re-examined the abscission mechanism in *Picea excelsa* (*New Phyt.*, **37**, No. 4, October 1938). It has long been known that this abscission mechanism is actuated by the drying of the leaf, the structural features associated with abscission having been present in the leaf from a very early stage in its development. The authors give grounds for attributing abscission not merely to the loss of water from the leaf but also to its relatively rapid loss. In these circumstances, hygroscopic movements are set up in a thick-walled hyaline layer at the base of the leaf, as the water loss is apparently greater from this layer, in which hygroscopic movements result, than from the leaf cushion, and the tissues separate in this region. The cause of the water deficit in the leaf, it is suggested, may be wound gum deposits in the tracheids; these are seen after leaf-fall but their presence just prior to leaf-fall has still to be established. In one form of the disease attacking spruce needles, *Lophodermellina macrospora*, the infected leaves remain attached to the tree. The authors show that in this case the stomata on the infected leaf are blocked by substomatal sclerotia formed by the fungus hyphæ which, on the evidence of porometer experiments, may be expected to reduce materially the water loss from the leaf, and thus throw out of action the drying mechanism upon which leaf abscission normally depends.

Anthracnose of the Watermelon

The watermelon plantations of Egypt cover about fifty thousand acres, the produce of which is damaged to the extent of several thousand pounds each year by the fungus *Colletotrichum lagenarium*. Dr. Amin Fikry has given the results of his researches into the incidence and control of this disease in a recent paper (Min. Agric. Egypt, Mycol. Sect., *Bull.* 190, Govt. Press, Bûlâq, Cairo. Price P.T.4. 1938). The fungus causes leaf spotting or anthracnose upon a wide range of varieties, and symptoms usually appear when the plants are about two months old. Almost complete control of the disease has been accomplished by dusting twice with sulphur. The crop must be treated first as soon as the fungus appears, and again three weeks later. Symptoms and control are illustrated in the bulletin by ten half-tone plates.

Past Seismic Activities in Japan

This subject has recently been reconsidered by Prof. Akitune Imamura (*Japanese J. Astro. and Geophys.*, **15**, No. 3; 1938). He examines chiefly the activity in Honsyû and Sikoku, since the earthquake history of Taiwan dates only as far back as A.D. 1655. The principal catalogues used in the work are the Dainippon Disin Siryô (*Reports Imp. Earthq. Inv. Comm.*, **46**; 1904) and Omori's catalogue (*ibid.*, **88** *B*; 1919), both going back as far as A.D. 416. The authenticity of the reports of earthquakes mentioned in these catalogues is weighed with records of volcanic outbursts and also with records of tunamis. Imamura considers that the catalogues do not omit any great earthquake, though small ones may not be mentioned. It appears that since A.D. 416 there have been three great periods of seismic activity in Japan, namely, between the years 684 and 887, between 1586 and 1717, and since 1847 continuing at the present time. The table of earthquakes divided into four intensity classes which are defined, and the maps of epicentral regions during the three periods, are very valuable additions to the paper.

Storms in the China Sea

A pamphlet entitled "The Law of Storms in the China Sea" by C. W. Jeffries and G. S. P. Heywood has been produced to replace an earlier publication of the Hong Kong Observatory. The earlier work appeared in 1904 under the title "The Law of Storms in the Eastern Seas", and was written by W. Doberck, formerly director of the Observatory. The need for revision arose partly through the virtual disappearance of the large sailing ships, which made a large part of the text of the earlier work meaningless, and partly through the increase of information available about the storms; these it need scarcely be said are the dreaded typhoons of the Far East. The present work contains synoptic charts showing part of the life-histories of some typhoons of recent years and some typical barograms obtained at the Observatory during the approach and recession of storm centres at various distances, with a curve of normal daily pressure variation for comparison. The most interesting and valuable part, however, is the section dealing with the precursory signs of the approach of a typhoon from the point of view of a forecaster at Hong Kong. Swell is noted sometimes 1,000 miles from the centre; it moves outwards from the centre and gives a fair indication of the position of the centre, besides being probably the earliest indication of its approach. It is interesting to note that the barometer is not an unfailing guide to the near approach of a storm centre, an example being the disastrous typhoon of September 18, 1906, which gave no definite barometric indication of its proximity four hours before it was at full strength in Hong Kong harbour. Microseisms are also unreliable as premonitory signs.

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