

## Research Items

### Sarcee Indians of Alberta

As little has been published about the Sarcee Indians, the National Museum of Canada sent Diamond Jenness to a reserve near Calgary to study their old customs and beliefs. The material gathered has now been embodied in a report of the Canadian Department of Mines and Resources (*Bull.*, No. 90, *Anthropol. Ser.* 23, 1938). Though frequently mentioned by European explorers of the eighteenth century, the Sarcee did not become regular visitors to any trading post until the last decade of that century. In the inter-tribal warfare of the earlier nineteenth century, the Sarcee, being one of the weaker tribes, joined themselves to the Blackfoot Confederacy. Throughout the nineteenth century, they suffered much from the effects both of warfare and epidemics, so that by 1924 the number on the reserve had been reduced to 160 individuals only. In physique, mentality and customs they seem scarcely distinguishable from Blackfoot Indians; but they have retained an Athapascan tongue. They were a democratic people, who did not countenance hereditary distinctions of caste or rank. They were divided into bands containing a number of closely related families, that usually hunted together and always camped as a unit when the tribe was united. Girls belonged to their mother's bands; boys above the age of nine or ten years to that of the father, though still retaining close contact with their mother's band. The bands seem to have been very fluid, constant neither in number nor composition. Each band had its leader, who was not elected, but was recognized by common consent because of his prestige. Although he possessed no formal authority, his advice and instructions were rarely disobeyed. Separate from the bands and cutting across them were five societies or clubs, to one or more of which every male Sarcee belonged at some time or other. Each society held an annual four days' dance, being dormant for the rest of the year.

### Androgens and the Ovary

M. Mazer and C. Mazer (*Endocrinology*, 24, 175; 1939) have found that, in the immature rat, prolonged administration of the androgen testosterone propionate caused a decrease in the weight of the pituitary, adrenals, ovaries and uterine horns and inhibition of oestrus with mucification of the vaginal epithelium. The degree of uterine atrophy was not in proportion to the ovarian atrophy, probably because the suppression of oestrogen production was partly counterbalanced by the direct stimulative effect of testosterone on the uterus. The adult rat reacted similarly except that the pituitary gland showed no significant decrease in weight. The deleterious effect of prolonged testosterone treatment on the ovaries was temporary. Restitution of structure and function occurred within 29 days. The literature and the authors' experiments showed that the duration of treatment was the determining factor in the effect of testosterone on the ovaries; short treatment produced stimulation and prolonged treatment depression. The ovarian atrophy, in the authors' opinion, was secondary to pituitary inhibition.

### Glucose Excretion in Diabetic Dogs

P. Govaerts and P. Muller (*J. Clin. Invest.*, 18, 25; 1939) have investigated the excretion of glucose and creatinine in dogs made diabetic by pancreatectomy. The creatinine clearance being considered as a measure of the glomerular filtration and the glucose concentration of the arterial plasma as equal to the concentration of this substance in the glomerular filtrate, the quantity of glucose which the tubular cells reabsorbed from 1 c.c. of glomerular filtrate could be calculated. This figure was called the 'threshold'. When the blood-sugar concentration increased moderately, this threshold increased, and with further elevation soon reached a maximal value which remained constant for any higher level of glycaemia. In the diabetic dog at high levels of hyperglycaemia, a constant part of the filtered glucose saturated the reabsorptive power of the tubular cells, and the remainder was completely excreted as in a phlorizinized dog. These characteristics of the renal function did not change appreciably in the diabetic dogs during a period of observation lasting several months.

### A Fossil Whale from Australia

IN the older Tertiary rocks at Torquay, Victoria, B. G. Pritchard and his assistants discovered and collected from a cliff face the greater part of the skull of a zeuglodon whale, described as belonging to a new genus *Mammalodon* (*Victorian Nat.*, 55, 151; Jan. 1939). Various discoveries of fossil whale remains, consisting mostly of teeth, have been made in the Tertiary deposits of Australia since McCoy's first record of *Squalodon* or *Phocodon* from the Miocene of Cape Otway in 1864. But the present find differs from them in the small size and delicate build of the skull and of the teeth and their cusps. Dr. Pritchard considers it to be a very early type of Tertiary whale, "showing the closest approach to descent from a mammalian type of ancestor". The age of the rocks from which it was recovered is a matter of controversy, for they have been attributed to various periods ranging from Miocene to Eocene, but the author favours their Eocene origin.

### Reproductive Organs of the Silk Worm Moth

SEINOSUKE ÔMURA has recently issued a notable paper on this subject (*J. Fac. Agric. Hokkaido Imp. Univ.*, 40, Pt. 3; 1938). In so far as the female organs are concerned, the work is directed to tracing the whole history of the spermatozoa from when they are discharged into the bursa copulatrix. It appears that the spermatophore, ejected by a male, occupies the greater part of the cavity of the bursa. Several hours after ejaculation, the spermatozoa fill the receptaculum seminis. They enter the ductus seminalis by their own motility, while their passage along this duct is aided by means of peristaltic movement of its muscular walls. About thirty minutes after mating, spermatozoa were appearing in the receptaculum seminis. The author claims that the sperms enter the receptaculum by its duct, the so-called ductus tortuosus. On the other hand, when they leave the receptaculum, to fertilize the eggs, he states that

they pass down the hitherto unrecognized canaliculus fecundans. Each egg, in its passage to the exterior, passes in such a manner that its micropyle is opposite the opening of the canaliculus into the vestibulum, and in this way becomes fertilized. The average time for laying each egg is only 6.7 sec. As regards the male organs, Ômura points out that the ductus ejaculatorius of most authors is divided into three parts, namely, glandula spermatophora, glandula alba and glandula prostatica. The histology of the different parts of the male reproductive system is described and figured while the functions are discussed in some detail. The mechanism of ejaculation, and of spermatophore formation in the bursa of the female moth, is also described. The author claims that the secretion of the glandula prostatica is necessary for the proper functional activity of the sperms. The translocation of the spermatozoa from the testis into the post-testicular parts takes place, it appears, some four days before the moth emerges from the pupa.

#### Genetics in the U.S.S.R.

IN February 1938, a conference on interspecific and intergeneric hybridization, arranged by the Institute of Genetics, was held at the U.S.S.R. Academy of Sciences at Moscow. A hundred and fifty scientific men took part, and more than forty papers were read. Profs. Vavilov, Kostoff and Luss gave critical surveys of the present-day knowledge of distant hybridization and its importance in the improvement of plants and animals and to a better understanding of evolution. Reports were also made of work on hybridization in cereals, tobacco, fruits, forage crops and potatoes. Work on the crossing of various species of *Agropyron* with wheat, on the artificial induction of amphidiploidy (that is, of chromosome doubling in hybrids) and the genetics of animals was also considered. The proceedings of the conference have recently been published (*Bull. Acad. Sci. U.R.S.S., Ser. Biol., Nos. 3 and 4. Summaries in English.*)

#### Organic Compounds Toxic to Fruit Pests

Two types of winter wash are necessary for fruit trees. Tar distillates are toxic to the eggs of aphides and apple sucker, but have little effect on those of capsid or red spider. Petroleum oils, on the other hand, are toxic to eggs of red spider and capsids, but not to those of aphides and apple sucker. H. Shaw and W. Steer (*J. Pom. and Hort. Sci., 16, 364; 1939*), in attempting to find a single substance toxic to both these groups, have investigated the ovicidal properties of 44 organic compounds consisting of di-nitrophenols, thiocyanates, naphthalene derivatives and organic bases. As a result of field and laboratory tests on eggs of the vapourer moth (*Orgyia antiqua*), the green apple aphid (*Aphis pomi*), the winter moth (*Operophtera brumata*), red spider (*Oligonychus ulmi*) and apple sucker (*Psyllia mali*), a large proportion of the materials tested was eliminated as showing little promise as winter ovicides. These included all but two of the thiocyanates, the naphthalene derivatives, and the bases other than nicotine and some of the quinoline and iso-quinoline compounds. The materials regarded as worthy of extended trial were 3:5 dinitro-cresol, *n*-dodecylthiocyanate (lauryl rhodanate),  $\beta$ -butoxy- $\beta$ 'thiocyano-diethyl ether and nicotine. All these are suitable for use as supplements for winter petroleum washes. The authors discuss the mechanism of the

toxicity of nicotine in some detail, and favour the view that it penetrates the egg shell and interferes with the development of the embryo.

#### Soil Decomposition of a Plant Pathogen

SEVERAL fungi which attack plants from the soil disappear when the host is not grown for a certain period. S. D. Garrett, of Rothamsted Experimental Station, has made a study of this action with *Ophiobolus graminis*, the fungus causing 'take-all' disease of wheat (*Ann. App. Biol., 25, No. 4, 742; 1938*). The fungus apparently disappears as a result of natural decomposition by other micro-organisms of the soil. It will remain alive indefinitely in air-dry soil, at low temperatures of 2-3° C., and under sterile conditions. Decay of *Ophiobolus* mycelium is quickest when conditions are such that the normal micro-flora of the soil is greatest. Addition to the soil of energy materials lacking nitrogen, such as glucose or starch, hastens the destruction of mycelium, whilst dried blood, with readily available nitrogen, has the opposite effect. Soil conditions which are least favourable for the parasitism of *O. graminis* may, in fact, best preserve the organism during the non-pathogenic phase.

#### Proteins and Viruses

PROTEINS which possess the active principle of plant viruses have been isolated by W. M. Stanley and by F. C. Bawden and N. W. Pirie from diseased hosts. Hideo Moriyama and Shunkichi Ôhashi have studied the properties of certain proteins precipitated from healthy plants, and compared them with virus proteins (*J. Shanghai Sci. Inst. (Sect. 4), 4, 17; 1938*). Normal proteins which form minute masses visible under the microscope or ultra-microscope, were obtained without exception from healthy leaves of cucumber, kidney-bean, tomato, poplar, spindle-tree, dandelion, lettuce and egg-plant, and also from petals of bindweed flowers. They were precipitated with acetic acid at a certain hydrogen ion concentration, a method which Moriyama has also used for the isolation of vaccinia virus protein and phage protein. Some of the protein precipitates exhibited double refraction and all had a low content of nitrogen; they are lipo-proteins. It is suggested, from the general similarity of these preparations with virus proteins, that virus attack disintegrates the protein of the host, appropriates some of the decomposition products for its own formation, and leaves an unbalanced physiology which induces the observed pathological conditions.

#### Mechanical Properties of *Pinus radiata*

ONE of the exotics which has been most extensively planted in Australia and New Zealand is *Pinus radiata*. It grows comparatively fast and it is therefore not surprising that doubts should have been expressed as to the quality of timber that will result. In a previous pamphlet (No. 81), general information on the timber of the species was given. In the present pamphlet, No. 87 (Melbourne, 1938) "The Mechanical Properties of South Australian Plantation-grown *Pinus radiata*", by Ian Langlands, published by the Council for Scientific and Industrial Research, Australia, the results of the mechanical tests to which the timber has been subjected are given. This little brochure is divided into two parts. The first gives in non-technical language the chief results of

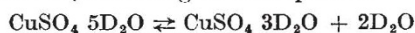
the tests; in the second the detailed results and the methods of analysis are given. The tests show that *Pinus radiata* ranks fairly high among other conifers in so far as its mechanical properties are concerned. A considerable variation in properties according to the position in the tree was found, the sapwood near the butt usually being the strongest portion. The direction of loading relative to the rings did not affect the static strength properties, with the exception of cleavage strength. The impact strength, however, was higher when the load was applied to the tangential surface. Statistical analysis showed that, although there is a correlation between mechanical properties and density, it is not sufficiently high to enable the properties of any particular piece to be estimated from its density. The pamphlet contains a discussion on the influence of rate of growth on the properties of the timber, and also gives a table of permissible working stresses.

#### The Illinois Basin Earthquake of November 17, 1937

THE Illinois Basin is now considered a seismic district, especially for small shocks. Earthquakes occurred there on January 30, 1907, April 30 and May 1, 1920, March 8, 1923, and November 17, 1937, and this latter has been studied by Ross R. Heinrich and Albert Frank (*Earthq. Notes*, Eastern Sec. Seis., Soc. Amer., 10, No. 3, Dec. 1938). Questionnaire cards were sent out, and, 160 being returned, much macroseismic evidence was available in order to draw a map showing the isoseists on the Wood-Neumann scale. In the centre shocks of intensity V are experienced, rolls of linoleum in the stores being toppled over and canned goods shaken off the shelves. The area covered was approximately 8,000 square miles. This macroseismic data agreed very well with the results obtained by reading the seismograms recorded at various towns. This latter evidence, using Joliat's tables for near earthquakes, gave  $T_0$  11h. 4m. 47.7s. C.S.T. and epicentre lat.  $38^{\circ} 34' N.$ , long.  $89^{\circ} 5' W.$ , about midway between Centralia and Odin. The epicentre was thus on the north-west limb of the Illinois Basin syncline and on the eastern flank of the Junction City dome. Faults exist near, but not at, the epicentre.

#### Copper Sulphate Pentadeuterate

A SHORT announcement by F. Schacherl and O. Běhounek appeared a few years ago in NATURE (138, 406; 1936) describing the preliminary results of their investigation of copper sulphate crystals containing heavy water. These authors have now extended their observations (*Coll. Czechoslovak Chem. Commun.*, 11, 57; 1939). The pentadeuterate is greenish in contrast with the blue pentahydrate, and its dissociation, according to the equation



has been studied over the range  $20^{\circ} \text{C.}$  to  $60^{\circ} \text{C.}$  The dissociation pressures of the two deuterates, measured tensimetrically, satisfy the equations

$$\log_{10} p = 11,176 - \frac{3086 \cdot 98}{T} \quad \text{and}$$

$$\log_{10} p = 10,625 - \frac{2956 \cdot 88}{T}.$$

The heat of 'hydration' of the pentadeuterate at  $25^{\circ} \text{C.}$  is 6.96 kcal.; that for the pentahydrate is 5.32 kcal., which suggests that  $\text{D}_2\text{O}$  is more firmly bound to the anhydrous salt than water is.

#### The Ionosphere

IN the issue of the *Journal of Research* of the U.S. Bureau of Standards of December 1938, N. Smith, T. R. Gilliland and S. S. Kirby give a summary of the results deduced from their observations of the heights of the various layers of the ionosphere and the critical frequencies at which reflection from them ceases, during the years 1933-38, in which sunspot frequency has increased. The daily and seasonal changes were regular over this period. The *E* layer had a minimum height of 110-120 kilometres, and its critical frequency varied as the fourth root of the zenith distance of the sun and as the intensity of solar radiation. At night the *F* layer had a minimum height of 300 kilometres; in the daytime it descended to 225 kilometres and in the summer had a second member at 350-400 kilometres. The critical frequencies for these layers were much higher than for the *E* layer and less regular. The long-period variations of critical frequencies for all the layers followed closely the variations of sunspot numbers. While the latter increased from 5 to 120, the critical frequencies increased for *E* by 25 per cent and for *F* by about 100 per cent, corresponding to increases of ionization of 55 per cent and 300 per cent respectively.

#### Total Solar Eclipse of June 8, 1937

C. B. MICHIE has recently published a report of the New Zealand Total Solar Eclipse Expedition to Canton Island on June 8, 1937 (*Mon. Not. Roy. Astro. Soc.*, 99, 2; 1938), in which he gives a brief description of some of the results obtained, more especially with the 19-ft. coronagraph and the 78-in. camera. It is interesting to notice that the two instruments gave very different results. The coronagraph showed a wonderful wealth of detail throughout the inner corona, and, in addition, the prominences were well defined. Nevertheless a 45-seconds exposure failed to reveal the corona beyond 1.5 diameters from the limb of the sun. By using the 78-in. camera it was possible in some cases to follow the streamers to distances of 3.5 or more diameters. The camera was provided with a rotating sector to enable photographs to be taken with the object of studying detail over a wide range of light intensity. The photographs obtained in this way and also the short exposure plates taken with the coronagraph showed several dark regions in the corona extending inwards to the rim of the eclipsed sun. From these and other details there is the suggestion of electromagnetic fields in action.

#### Radiants of the Orionid Meteor Shower

J. P. M. PRENTICE, director of the Meteor Section of the British Astronomical Association, has recently issued a paper with the above title (*J. Brit. Astro. Assoc.*, 49, 4; 1939) in which he gives an account of his work on the Orionids in 1936 and 1938. In previous papers he suggested that there is a 'radiant pattern' for this stream, and that the various centres of radiation are not stationary, as Denning believed. There was the further suggestion that each stream, as it moved eastward, came to a maximum on the same meridian of right ascension at about  $\alpha = 96^{\circ}$ . The paper gives very full details of the work which was carried out to investigate the last result, and Prentice is convinced that the Orionid streams have a standard meridian of maximum at  $\alpha = 96^{\circ}$ . This result is very interesting, but there seems to be no physical explanation for it.