

Research Notes.

**The Physiological Anatomy of
Ulex europæus L.**

IN a paper published by T. S. Raghavan in the *Journal of the Annamalai University* (1, No. 2) the results of an investigation into the anatomy of the vegetative organs and its probable bearing on xeromorphy are set forth. A parenchyma sheath in close contact with the vascular region is identified as a modification of Haberlandt's second system of construction of photosynthetic cells. How far this plant could be regarded as xerophilous is discussed. Increased assimilative surface by ridges and furrows and consequent high stomatal frequency, a well-developed conducting tissue, and the dissected nature of the leaves which besides being resistant to strong winds, also being a means to reduce the distance between the water conducting veins and the evaporating cells of the mesophyll—all these indicate that *ulex* cannot be termed xerophilous but only drought resistant.

**Observations on the Stomatal Distribution
and the Rates of Transpiration in
Wilting Leaves.**

STOMATAL distribution and the rates of water lost by wilting leaves of a dozen plants comprising mesophytes, halophytes, and succulent xerophyte have been investigated by T. S. Raghavan (*J. A. U.*, 2, No. 1). Stomatal frequency as well as rates of transpiration in the halophytes are high and therefore they cannot be termed xerophilous. How far the loss of water in wilting leaves is a purely physical phenomenon is discussed. No direct relationship exists between the rate of transpiration and the number of stomata per unit area. Till about three hours after severance from the plant, the leaves exhibit fluctuations in the rates of water loss. The water content of the leaf cells seems to control the rate of transpiration. It is believed that wilting leaves behave like ordinary leaves till a certain time in respect of transpiration. On the water deficit reaching the maximum, the time taken for which varies with different plants, there is only a uniform decline in the rate and no more rises and falls occur.

Development of *Ophiocoma nigra*.

IN this paper (*Q. J. M. Sc.*, 76, part I) Dr. N. Narasimha Murti gives a complete account of the development and metamorphosis of an Ophiuroid. That a 'right hydrocœle' arises as a thickening of the right anterior cœlom in most larvæ in addition to the usual left hydrocœle and that it degenerates as metamorphosis progresses are two points of interest. The author also observes that a 'pericardial vesicle' originates from the right anterior cœlom in the same manner as in the sea-urchin and the star-fish and that it persists in the adult as a thin walled pulsating sac. Another observation to note is that the most posterior lobe of the left hydrocœle does not move across the œsophagus towards the larval right but bends to the right to meet the most anterior lobe which travels towards it after passing round the œsophagus. The author has further shown that all the 'perihæmal spaces' arise as pocket-shaped evaginations from some part of the left posterior cœlom or other, recalling the similar state of affairs in the star-fish *Asterias*. Yet another remarkable feature of the late larval forms of *Ophiocoma* is that the outer ends of the cylindrical cells of the stomach are vacuolated and stain deep black in specimens preserved in osmic acid followed by Muller's fluid—owing probably to the presence of fat in them. The fact that in the just metamorphosed larvæ the stomach appears, at first, as a solid mass and later sends out five projections alternating with the arms seems to be a new observation. The work, in short, attempts to verify the results of previous authors and to add new observations wherever possible.

**On the Occurrence of Hepato-Pancreatic
Glands in the Indian Earthworms of
the genus *Eutyphæus* Mich.**

IN this important paper, [K. N. Bahl and M. B. Lal, *Q. J. M. S.*, 76, pp. 107—127, pls. ix and x, June, 1933.] Prof. K. N. Bahl of the University of Lucknow has described the structure, development and blood-supply of the "intestinal glands" which occur as paired structures on the dorsal surface of the gut of earthworms of the genus *Eutyphæus* in segments 79 to 83. As the glands in each segment are fused in

the middle line and those of successive segments are connected, it has been rightly stated that it would be just as correct to speak of a single large gland extending over five segments. The glands are richly supplied with blood-capillaries and open into the intestine through ciliated apertures. In the physiological part of the work, in which Dr. Bahl, as is indicated in the introductory chapter, was assisted by his demonstrator Mr. M. B. Lal, interesting experimental evidence is adduced in regard to the nature and function of these glands. That the glands do not secrete calcium but a proteolytic ferment is amply proved by digestion-experiments; that their blood-supply resembles a hepatic portal system is brought out convincingly in the illustrations of both sections and dissections; that glycogen-granules are present in the cells has been demonstrated by staining sections with Best's carmine; and, finally, that they develop as mid-dorsal outgrowths of the endodermal lining of the gut has been worked out in embryos. In view of all these characteristic attributes, the glands are presumed by the authors to be hepatopancreatic in nature and this view is fully confirmed by the situation of the glands—they lie just at the place where the main work of digestion and absorption takes place. The paper is beautifully illustrated and marks a great advance on our knowledge of the morphology and physiology of the oligochæta.

B. P.

Fire Hazards in the Use of Oxidising Agents as Herbicides.

It is not often realised that certain chemicals, particularly chlorates and dichromates, are not safe to use as herbicides, particularly under conditions where the relative humidity of the atmosphere is likely to fall below 30 or 40 per cent. In his recent publication of the subject (*Canadian Journal of Research*, 8, 509, 1933) Cook has drawn attention to the nature of hazards attendant on the use of various herbicides both by themselves and in association with other chemicals. The chlorates are generally hazardous by themselves but when mixed with chlorides, particularly those of magnesium or calcium, in equal proportions, they are generally very safe to handle at all the usual concentrations. The most effective mixture would be that containing two-

thirds of sodium chlorate and one-third of magnesium chloride. It has a herbicidal power equivalent to about half that of pure sodium chlorate.

It is hoped that the above observations would be of interest to those engaged on the eradication of noxious weeds, particularly in the midst of other forms of vegetation, as in forests or in the neighbourhood of human habitations.

Stabilisation of Chlorinated Hydrocarbons.

ALTHOUGH chlorinated hydrocarbons have lately found much favour as solvents for a variety of substances, yet their instability, as also their tendency to attack metallic containers, have always been a source of trouble to their users. The Imperial Chemical Industries have recently developed a process for the stabilisation of such compounds (*Ind. Pat.*, No. 19646, 1933) which involves the addition of alkylamines the boiling points of which are not substantially different from those of the chlorinated hydrocarbons concerned. The stabilising action of the alkylamines is further augmented by the addition of small amounts of alkalies or alkaline reacting compounds, which, under the working conditions, are capable of liberating the alkylamine from its hydrochloride and which are inert to the chlorinated hydrocarbon. This invention should render chlorinated hydrocarbons still more popular than before.

An Improved Process for preparing Vegetable Fibre Rubber Product.

Two French Engineers have developed a process (*Indian Paten*, No. 19498, 1932) for the combination of mercerisation with impregnation with rubber. When treated with the mercerising agent the vegetable fibre swells up. It is then washed free from caustic alkali and then pressed with finely dispersed rubber, which may be natural or synthetic, vulcanised or otherwise. The product thus obtained is a compact and homogeneous mass of vegetable fibre and rubber which is useful for a variety of purposes, particularly for making felted materials and in the pneumatic tyre industry. It is not unlikely that these and related products will soon play an important part in the development of a number of products which combine the good qualities of both cellulose and rubber.

Embryonic History of the Germ Cells in *Passer domesticus* (L).

IN this important contribution Hubert W. Blocker (*Acta Zoologica*, Bd. XIV, 1933, five plates and 32 figs.) has given an account of the breeding habits of the bird and confirmed the results of Etyold and Loisel concerning the seasonal variation in the testes of sparrows. In his critical study the investigator has not only given the characteristics of germ cells but also reviewed morphological and experimental studies on the early history of germ cells. The author summarises and concludes his elaborate study of the very vexed question of the origin of germ cells as follows: The primordial germ cells of *Passer domesticus* are of extra-embryonic origin and are first seen in an embryo of one or two somites in a crescent-shaped area at the outer margin of the proamnion. They are found in the ectoderm and in spaces between the ectoderm and endoderm. They remain in this position up to seven or eight somite stage during which time they take on more definite germ cell characteristics. After the arrival of the mesoderm, the germ cells enter the vessels of the vascular area, in part passively during the formation of the blood islands and in part actively by forcing through the endothelial lining of these vessels. In a ten-somite embryo all stages in the process of migration can be observed. The germ cells are carried through the circulation with the blood cells and at about twenty-five somite stage make their appearance in the small vessels of the splanchnopleure where they leave their vessels and begin their migration toward the site of the future gonad, where some of the germ cells take their place among the cells of the so-called germinal epithelium. The lodging of the germ cells in the vessels of the splanchnopleure is attributed solely to mechanical factors, and is dependent on the size and shape of the vessels in this region. The progress of migration of the germ cells from the vessels of the splanchnopleure continues to about thirty-six somite stage, when practically all the germ cells have left the blood vessels. A small number of germ cells become lodged in small vessels of distant regions and never reach the gonads.

There is a shifting of the germinal epithelium with its contained germ cells from the splanchnopleure through the coelomic angle to the somatopleure during

the stages from three to four days incubation. During the formation of the gonads and during sex differentiation germ cells are found in all parts of the gonad. The first mitoses of germ cells were observed in a four and one half day embryo. During sex differentiation there is no distinct formation of tubules as has been described for the chick. The first reliable criterion of sex distinction is the relative size of the right and left gonad in the female. A rudiment of the right gonad of the female with the germ cells persists at all stages of incubation. It retains its undifferentiated structure throughout this period. Histologically sex cannot be distinguished before the eighth day of incubation when a cortex begins to form beneath the epithelium of the left ovary. The primordial germ cells are not replaced by a second generation of germ cells but they give rise directly to the definitive sex elements. Their number is increased only by mitosis and no germ cells are derived from somatic sources.

A. S. RAU.

Crocota pilgrimina, N. Rao—A New Fossil Hyæna.

A NEW species of fossil hyæna, derived from sorely denuded surface deposits overlying the Ariyalur Cretaceous beds of Trichinopoly district, named *Crocota pilgrimina*, N. Rao, has been described by Prof. C. R. Narayan Rao in the *Half-Yearly Journal of the Mysore University*. The new species makes an interesting addition to the known fossil Hyænae described by Pilgrim from the Upper Tertiaries and post-Tertiary of various parts of India. The precise affinities of the present fossil with the latter are described by the author. The genus *Crocota* is now totally extinct from South India, though a solitary species *C. crocuta* is still found living in Africa. The exact horizon of the fossil is a little doubtful, varying from Upper Cuddalore sandstone stage to the Pleistocene. It is hoped that some associated ungulate and carnivore remains obtained from the same locality may solve the question of the age of the Ariyalur mammaliferous beds.

D. N. W.

The Endocrine Factors concerned in the Control of the Ovarian Cycle in *Xenopus laevis*.

THE influence of pituitary extracts on the activity of the ovary in mammals has been

extensively studied, but C. W. Bellerby (*Biochem. Journ.*, 27, No. 3, 1933) has used *Xenopus laevis* as a test animal with great advantage. The employment of this animal for the experiments has obviated the necessity of killing the animal to examine the condition of the ovary, as the extrusion of the eggs marks the activity of the ovary. Even under normal conditions ovulation in *Xenopus* does not take place in the laboratory so that the extrusion of the eggs after injection of the extract is full of significance. A further aid is afforded by the fact that ova extruded after pituitary injection are devoid of the mucilaginous envelope so characteristic of the Amphibian egg shed in the normal manner. It has been found that ovarian activity can be induced in *Xenopus laevis* even outside the breeding season in the laboratory. In all cases both acid and alkaline extract injections of the ox anterior pituitary were made and the effects of these two are identical in producing ovulation. It is seen that while there is no relation between the number of eggs shed and the dosage, the relation between the percentage response and dosage is evident. In fact this relation is more constant in *Xenopus* than in mammals. And on account of the absence of the necessity of killing the animals, the same set of animals may be used successively for a series of experiments. Ovulation usually occurs within 18 hours after injection, rarely over 48 hours.

The Component Fatty Acids and Glycerides of the Milk Fats of Indian Goats and Sheep.

D. R. DHINGRA (*Biochem. Journ.*, 27, No. 3, 1933) has extended the work of Hilditch and his co-workers on the fatty acids and glycerides of Indian cows and buffaloes.

The author gives a comparative account of the properties of the milk fats of goats and sheep and those of cows and buffaloes and comes to certain interesting conclusions. The goats and sheep which formed the source of the milk fats in this investigation came from two different localities in the Punjab separated by a distance of about 300 miles but fed on the same diet in the same winter season. As compared with the cow and buffalo butter fats the Polenske value of the goat and sheep butter fats is higher while the Kirschner values in relation to the Reichert-Meissel values as also the saponification equivalents are low. Another point of special mention is the higher content of capric, caprylic and caproic acids in the goat and sheep butter fats. This seems to be almost exclusively at the expense of oleic acid. There is, on the whole, a similarity between the properties of the goat and sheep fats and the cow and buffalo fats.

On the Nature of the "Yolk Nucleus" of Spiders.

SUKH DYAL AND VISHWA NATH (*Journ. Roy. Micros. Soc.*, Ser. III, 53, Part 2, 1933) have come to the conclusion that the albuminous yolk at the periphery of the egg in spiders is not traceable to the mitochondria, the golgi elements or the yolk nucleus and is probably *de novo* in origin. The yolk nucleus of *Plexippus paykulli* is of the same type as described by Wittich. The yolk nucleus of *Plexippus* is differentiated into a cortex and a medulla, the mitochondria being prominent in the former and the golgi elements in the latter, while the "substance specifique" secreted by the golgi in the yolk nucleus of *Tegenaria* described by Weiner is absent.