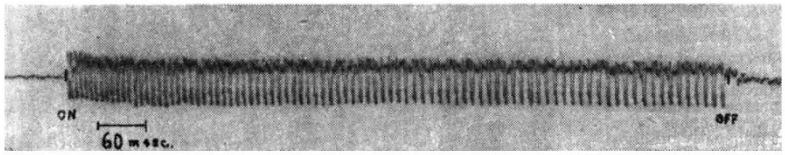

REPETITIVE RESPONSE OF THE GIANT FIBRES TO A CONSTANT DIRECT CURRENT OF 20 μA., APPLIED AT THE HEAD END OF THE ISOLATED NERVE CORD OF THE EARTHWORM. RECORDING ELECTRODES WERE PLACED ON THE CENTRAL PORTION OF THE CORD.

We find a rapid repetitive firing, often sustained for the whole time that the current is maintained (for example, 1 sec.), as shown in the accompanying figure. The response shows slow accommodation: initial rates up to 330 impulses per sec. have been observed, diminishing to 10–50 per sec., but this latter rate varies widely from one preparation to another. The repetitive burst may contain as many as a hundred spikes. Current intensities of 5–20 μA. are adequate to evoke the response from the isolated cord, stimulated through fluid electrodes with a contact area of 1–2 sq. mm. and interpolar distances of 5–15 mm. Transmission of this repetitive response in the dorsal giant fibres is abolished, reversibly, by solutions of potassium chloride, of strength 0·5–2·0 per cent (made up in a 66 per cent mammalian Ringer fluid[1]).

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Influence of a Decreasing Rainfall on *Physopsis africana* Krauss

NOT since 1933 has the annual rainfall in Natal approached the low figure of the last two years except in 1941, and more than half the annual total for 1945, namely, 27·1 in. up to December 26 (when some rains started), fell in the months of February and March.

There has been a steady disappearance of pond-snails and allied wild life for the last thirty years, and river trout have largely disappeared from parts of the country; but *Physopsis africana* Krauss has shown a resistance to environmental influences which have proved detrimental to its natural enemies. Specimens of this shell have remained in river-pools for an abnormally long period, and may now be collected from the open river measuring twenty millimetres in length, though 18·8 mm. was regarded as the maximum length for the shell in even sheltered pools in former years.

These larger specimens are free of larval trematodes and suggest that it is not until rains have washed human pollution off stones in the river-beds and bathing becomes frequent that infestation occurs.

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Adrenocorticotrophic Activity in Urine from Pregnant Women

DURING the past few years repeated attempts have been made to isolate, from the urine of pregnant women, pituitary anterior lobe hormones or substances with activities similar to those of the pituitary anterior lobe hormone, other than chorionic gonadotrophin.

The different extracts have all been tested on hypophysectomized rats, so that any unspecific extraction product stimulating the endogenous pituitary hormone production could be excluded. The morphological changes of the atrophic thyroid were used for the determination of thyrotrophic hormone. For testing the presence of corticotrophic hormone, the resultant changes of the sudanophobic zone were investigated[1].

The first experiments, in which only unconcentrated urines were used, did not give any result. Experiments in which adsorption to benzoic acid was tried were equally negative.

In a later series of experiments, mixed pregnancy urine acidified to *p*H 5 was precipitated by an equal amount of saturated picric acid. The precipitate was extracted with slightly ammoniacal water (*p*H 8) and the filtered solution was reprecipitated by ten times its volume of acetone. The acetone-dried precipitate showed not only gonadotrophic activity but also corticotrophic activity, while thyrotrophic activity was absent in all experiments.

One unit of gonadotrophic hormone was found in 0·1 mgm. of the dried powder. One unit of corticotrophic hormone was found in 3–4 mgm. of the powder; while 12 mgm. of the powder failed to show any thyrotrophic action.

Ten litres of mixed pregnancy urine worked up with the picric acid procedure yielded an average of 1·4 gm. of powder. This means that from one litre of the mixed urine sample an average of 35 units of corticotrophin, or corticotrophin-like hormone, could be isolated. The identity of this compound with the corticotrophic hormone isolated from the pituitary anterior lobe has not yet been established. It was only found to be equally thermostable.

Investigation of the presence of the corticotrophic substance in normal urines has, hitherto, shown considerably smaller values[2]. Blumenthal[3] has recently investigated the action of normal female human urine and of pregnancy urine on the number of mitoses in the adrenal cortex of guinea pigs, and found these mitoses significantly increased after the injection of unconcentrated urine.

Excluding the possibility of this action being due to the presence of unspecific adrenal cortex stimulating substances (the test animals were not hypophysectomized), one might assume an identity between the mitosis-stimulating substances and the substances which restore the sudanophobic zone of the adrenals of hypophysectomized rats. In view of the activity of corticotrophic hormone in increasing body resistance on one hand, and the increased resistance on the other hand of the pregnant organism against colds, infections and particularly against the toxic products of the growing embryo, the presence of corticotrophic hormone in the urine of the pregnant women is of interest in discussing the mechanism of the increased resistance of the organism.

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Sodium/Potassium Ratio in the Coelomic Fluid of Insects

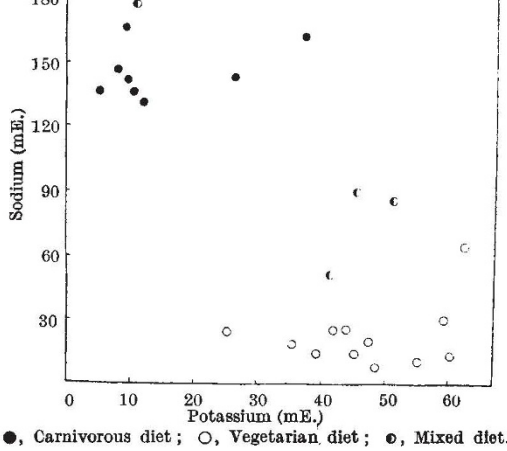
THE ionic composition of the circulating fluids is very uniform throughout the animal kingdom: it shows especially a marked excess of sodium over potassium ions. The insects were the only supposed exception. According to the analyses of several authors[1], their coelomic fluid was thought to contain an excess of potassium, the Na/K ratio being less than unity.

Adapting microanalytical methods for sodium and potassium so as to work on such small quantities as 1 μl. of fluid, we analysed the coelomic fluid of twenty-four insects belonging to several orders.

The Na/K ratio appears to be highly variable among the insects, its value ranging from 0·11 to 26·0.

The supposed biochemical hiatus between the insects and the rest of the animal kingdom clearly does not exist; the problem, open to experimental analysis, emerges of the variation of ionic regulation among the members of a single zoological group.

The variation of the Na/K ratio shows no relation to taxonomy. A clear association with the alimentary diet of the insects appears from an examination of the accompanying graph.



●, Carnivorous diet; ○, Vegetarian diet; ◐, Mixed diet.

The vegetarian insects have in their coelomic fluid a predominance of the potassium ions over the sodium ions (Na/K < 1), while the reverse holds for the carnivorous insects, which thus have more sodium than potassium (Na/K > 1). The insects with mixed diet have, in general, an intermediate ratio.

Further investigations may elucidate the origin of the observed association: whether it results from an actual influence of the food or whether it is the present state of an evolutionary process acting along the history of the insect phylum.

Details will be published in the *Ann. Soc. Royale Zool. de Belgique.*

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