

There are four pairs of well-developed legs. No claws could be distinguished, but the legs terminate in a sort of sucking disk. It was impossible to find any trace of a respiratory system.

The genital opening, which is located just behind the level of coxal IV, is represented by a longitudinal slit with a pair of minute sucker-like structures on each side. As can be seen in the accompanying figure, the anus is terminal.

These mites are extremely minute, measurements of four specimens studied being as follows.

Specimen	I	II	III	IV
Length	240 μ	196 μ	184 μ	220 μ
Breadth	64 μ	56 μ	64 μ	48 μ

The length was measured from the tip of the chelicerae to the tip of the abdomen; the breadth at the level of leg II.

No males were recovered, though a large number of bees were examined.

A new family Pediculocheilidae and genus *Pediculocheilus* is erected to receive this most interesting species, which is named *Pediculocheilus raulti* after Mr. P. Rault, of Mount Edgecombe, who was instrumental in discovering the new species.

A further communication will appear shortly.

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A New Method for the Study of Renal Tubular Excretion in Birds

THE existence of a renal portal circulation in birds has hitherto lacked experimental confirmation. In order to investigate this question, the following method has been adopted.

At each ureteral opening in the cloaca of a chicken, a small funnel is attached by sutures. The operation is performed under local anaesthesia of the cloacal mucosa. This arrangement permits the separate collection of the urine from each kidney. Phenol red is then injected intramuscularly into one of the legs, and the amount of the dye excreted by each kidney is determined.

In every instance far more phenol red (on an average about three times as much) is excreted by the kidney on the side of the injection than by the other. It is clear that at least part of the venous blood from the legs passes through the capillaries of the kidney.

The arrangement used in these experiments seems to be well suited to the study of tubular excretion. By using this method it has been possible to show that hippuric acid and menthylglucuronide are excreted by the tubules in the chicken. Hippuric acid depresses the excretion of phenol red and menthylglucuronide.

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Transformation of the Kidney into an Exclusively Endocrine Organ

USING a special surgical technique, it is possible to transform one of the kidneys of the rat into an exclusively endocrine organ.

The technique is based upon the fact that, in order to permit filtration, the hydrostatic pressure in the glomerular capillaries of the kidney must be much higher than in the other capillary territories. Indeed, it is indispensable for urine formation that the hydrostatic pressure in the tuft capillaries be greater than the sum of the osmotic pressure of the blood and the hydrostatic pressure of the filtrate in the spaces of Bowman's capsules.

By placing the style of a subcutaneous injection needle parallel with the aorta and tying a silk thread around both aorta and style, a partial constriction of the aorta can be obtained which decreases the lumen approximately to the width of the style. The latter is subsequently removed, so that circulation re-establishes itself, but the constriction, if placed between the origins of the two renal arteries, decreases the pressure in the left (lower) renal artery far below the level required for normal filtration. By choosing styles commensurate with the size of the rat, it is possible to decrease filtration pressure exactly to the level where urine formation ceases, but the nutrition of the renal parenchyma does not suffer.

Since the exact gauging of the degree of constriction needs considerable practice, a greater safety margin may be secured by simultaneously occluding the left ureter, transecting it between two ligatures. Under such conditions, a slight and transitory hydronephrosis builds up some hydrostatic pressure; but afterwards, when filtration ceases and the fluid in the renal pelvis is absorbed, the kidney is transformed into an exclusively endocrine organ. Ureter occlusion without preliminary arterial constriction would result in pronounced and permanent hydronephrosis with pressure atrophy of the entire renal parenchyma.

Histological study has shown that the tubular epithelia of such kidneys lose their brush border, and the lumina of the nephrons become filled with proliferating, well-preserved parenchymal cells. Treatment with renotropic steroids or renotropic pituitary extracts may even induce active mitotic proliferation in the completely "endocrine kidney".

The increased pressor substance production of such kidneys manifests itself, within a period of about ten days, by the development of myocarditis, nephrosclerosis of the contralateral kidney and widespread periarteritis nodosa. No such lesions are observed if the "endocrine kidney" is removed, and hence these pathological lesions are regarded as due to the increased hormone production of the transformed kidney.

A detailed communication on this subject will appear in the *Journal of Urology*.

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Reciprocal Effects due to Stimulation of the Spinal Cord by Constant Currents of Opposite Direction

ALTHOUGH the occurrence of slow electrotonic potentials which act as exciting agents has been demonstrated in the spinal cord, only a few investigations in which the cord was stimulated artificially by constant currents have been reported. Barron and Matthews¹ showed that polarization of the central part of the motor neurons evoked rhythmic responses when the cathode was placed on the cord and the anode on the root, whereas regular responses were only occasionally obtained if the current was reversed.

In the course of an analysis of the activity in the spinal cord, in which a special technique² involving stimulation with slowly rising currents was used, I observed that the extent to which extensor and flexor responses predominated was partly determined by the direction of the stimulating current. Many different electrode positions were tried, but only the results from a few typical arrangements will be described here. In ten cats the lumbar region of the spinal cord was exposed and the dorsal roots cut, while in five others the ventral surface of the medulla and the cord between the base of the skull and the first vertebra was laid bare and the dorsal roots left intact. The strength of the stimulating current was gradually increased to threshold and supra-threshold values. In some experiments a simultaneous recording of the action currents from two opposed muscles was made; in others the effects were determined by observation of the movements of the intact leg.

In one arrangement, in which both stimulating electrodes were placed on the lateral surface of the lumbar cord, one above the other and several centimetres apart, it was found that when the upper (cranial) electrode was the anode, stimulation with currents of moderate strength caused extension, while a reversal of the current gave flexion of the corresponding hind leg. When only one electrode was placed on the cord (near the entrance of a motor root) and the other (indifferent electrode) on the dorsal muscles, the effects were most pronounced in the extensors when the cord electrode was positive and in the flexors when it was negative. The reciprocal effects were more or less selective in different experiments. In some of these, in which the muscle action currents were recorded, considerable activity was found in the active muscle (for example, *tibialis anticus*) but none in the opposing muscle (*soleus*). However, if the stimulation was sufficiently great, both groups of muscles were activated. Under some conditions, breaking the current produced an effect in the muscles opposed to those activated during the current flow.

When the stimulating electrodes were placed on the cord or the medulla below the decussation of the pyramidal tracts, the reciprocal effects were still more pronounced. With one electrode on the cord, some millimetres from the mid-line, a pronounced extension of both fore and hind legs of the same side was produced if the active electrode was the anode, while flexion resulted from a reversal of the current. If both electrodes were placed on the cord at the same level, the positive on one tract and the negative on the other, an extension of the limbs on one side simultaneously with flexion on the other was observed. Selective responses to different directions of the stimulus in functionally different parts of one and the same muscle were also seen.

The effects described may be due either to different inherent properties of the excitable structures (cf. Skoglund³) or to differences in anatomical orientation of the elements in relation to current flow.

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¹ Barron, D. H., and Matthews, B. H. C., *J. Physiol.*, **92**, 276 (1938).

² Skoglund, C. R., *Acta physiol. Scand.*, **4**, Suppl. 12 (1942).

³ Skoglund, C. R., *Kungl. Svenska Vetenskapsakademiens Handl.*, **21**, 9 (1945).

The Thyroid and Tuberculosis

NOLAN and his co-workers have described^{1,2,3} the isolation from the lichen *Buellia canescens*, of diploicin, and from constitutional studies have provisionally assigned to it structure I. Diploicin is insoluble

