be handled with moderate care and no sand grains are knocked off in the handling. Likewise very fissile shale specimens have been preserved *en masse* for laboratory hand specimens.

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A SHORT METHOD FOR THE PREPARATION OF ANIMAL TISSUES FOR STAINING

CUT the tissue in pieces from two to four millimeters in thickness. Drop these in some ten per cent. formalin solution and heat to boiling. Transfer them to acetone for dehydration and leave them in this liquid for one hour, during which time the acetone should be poured off and renewed with fresh material two or three times. The dish should be covered and put in the paraffine oven, as diffusion takes place more rapidly at the higher temperature. Remove the tissue from the acetone and drop it into a container of melted paraffine. Leave this in the oven for one hour.

Embed, mount on block and cut in the usual manner. Smear the slides lightly with Mayer's albumen, float the sections over this on a drop of water, warm gently to expand them and drain off the excess.

Lay the slides out flat in the paraffine oven. At the end of one hour remove them. After they have cooled, put them in xylol to dissolve the paraffine and proceed in the usual way to stain and finish them.

Excellent slides have been made by this method. If quicker results are desired, cut the tissue in smaller pieces. If larger pieces must be used, allow more time for the infiltration of acetone and paraffine.

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SPECIAL ARTICLES

FURTHER EXPERIMENTS ON CORTICO-ADRENAL EXTRACT: ITS EFFICACY BY MOUTH

A RAPIDLY accumulating mass of evidence indicates that extracts of the adrenal cortex which have recently been developed are markedly potent in both experimental and clinical cases of adrenal insufficiency. The methods of Hartman and his associates[1] and Swingle and Pfiffner[2] have been widely used. In experiments reported from this laboratory full support has been given to the observations of the Princeton workers. We have employed a slightly modified Swingle-Pfiffner technique as described.[3]

Cortico-adrenal extract maintains completely adrenalectomized animals in good health for indefinitely long periods. It readily abolishes the severe symptoms of adrenal insufficiency when allowed to develop, and concurrently restores the blood sugar and non-protein nitrogen levels to normal.

Augmentation of the blood sugar to the normal value occurs in adrenalectomized cats showing symptoms within one to three hours after the extract is given. The increase is approximately proportional to the amount of the material injected; it is produced consistently and repeatedly when potent extracts are used. We have observed the effect at least five times within about ten days in the same adrenalectomized animal.

Cats with severe symptoms of adrenal insufficiency invariably show low blood sugar values. In over thirty cases in our experience, cortico-adrenal extract has raised the sugar percentage to within normal limits or higher. Notable increments in blood sugar also occur in unoperated cats, particularly if young animals are used. Biological assay of the extract based on the observed blood sugar effects is suggested from these results.[4]

The decreases in blood non-protein nitrogen, following extract injection, have not been so characteristic in our experiments. They usually occur more slowly than the glycemic changes, and sometimes are long delayed. These differences are possibly referable to the renal condition (damage?) in the different animals, and also to the fluid content of the tissues. In some cases there is considerable urination following extract administration.

Intraperitoneal injections of pituitrin, ephedrine and ergotamine solutions, known to influence the blood sugar in insulin hyperglycemia and other conditions, do not affect significantly the low blood sugar levels or the symptoms of adrenal insufficiency.

The administration of cortico-adrenal extract has been tested by mouth in a series of animals. The large doses which were found to be necessary, and the relatively small supplies of the extract available, as well as the considerable expense of the material, has somewhat curtailed our observations. Cats have been kept alive by oral treatment, however, for two weeks *after* severe symptoms (convulsions) of adrenal insufficiency became evident. Death rapidly fol-

[1] F. A. Hartman, K. A. Brownell and W. E. Hartman, *Amer. J. Physiol.*, 95: 670, 1930.

[2] W. W. Swingle and J. J. Pfiffner, *Amer. J. Physiol.*, 96: 153, 1931.

[3] S. W. Britton and H. Silvette, SCIENCE, 73: p. 322, March 20, 1931; *Ibid.*, p. 373, April 3, 1931; *Amer. J. Physiol.*, 97.

[4] S. W. Britton and H. Silvette, *Amer. J. Physiol.*, in press.