The rate of apposition, however, was the same. In 6 animals which hibernated less (21-75%) the rate was increased to 2.5 u per day or 20% of the control. In 13 animals which hibernated between 0 and 20%, the rate was 6.6 u per day, or 52% of the control. This was the only group in which there were any mortalities; 11 of the 13 animals died. The foregoing demonstrates the marked suppression of the activity of the dentin-forming cells of animals kept at cold temperatures and hibernating for variable periods of time.

The daily weight loss was greatest in the animals which hibernated least. Conversely, those animals which hibernated most had the smallest weight loss (Table I). These findings are consistent with those of the rate of eruption and dentin apposition.

*Summary.* The rate of eruption and dentin apposition of the incisor in the thirteen-lined ground squirrel kept at 2-5°C is markedly retarded and, further, is retarded in approximate proportion to the number of days the animal hibernates.

## 13007 P

## Renal Concentration Test Employing Use of Pituitary Extracts. Response of Normal Subjects.

W. A. SODEMAN AND H. T. ENGELHARDT.

*From the Department of Medicine, School of Medicine, Tulane University, New Orleans, La.*

The various concentration tests for renal function in use today consist primarily of some form of water restriction sufficient to reduce urinary volume. The specific gravity of urine is thereby elevated a variable degree depending upon tubular function and the degree of water restriction. We have attempted to shorten or abolish the long period of water deprivation necessary in concentration tests by the use of the antidiuretic action of posterior pituitary extracts. The effectiveness of posterior pituitary extracts in raising the specific gravity of the urine has recently been shown in dogs by Paine and Nelson.[1] Comparison of a standard concentration test for renal function with the use of posterior pituitary extracts was obtained by submitting patients to three or more of the following 5 procedures: (1) A modified Fishberg concentration test with restriction

[1] Paine, W. G., and Nelson, E. D., PROC. SOC. EXP. BIOL. AND MED., 1939, **42**, 729.

of fluids from 6 o'clock the previous evening. The overnight urine was discarded and half-hourly specimens collected from 9 o'clock in the morning until 11 or 12 noon; (2) the same procedure with the administration of 0.5 cc (10 units) of surgical Pituitrin subcutaneously at 9 o'clock in the morning; (3) free access to fluids until 9 in the morning when they were restricted; the Pituitrin administered and 30-minute specimens taken as above; (4) free access to fluids until 9 in the morning when, in 15 minutes, 1,600 cc of water were given followed by administration of 0.5 cc of surgical Pituitrin; specimens of urine were again collected at half-hourly intervals; (5) the fourth procedure was repeated without the administration of the Pituitrin. Specific gravities were obtained by weighing the urine in a 2 cc weighing bottle or pyknometer to 0.1 mg and comparison made with a similar quantity of distilled water at the same temperature according to the usual technic.[2]

Fifty-two experiments have been carried out on 15 normal individuals. Consistent results have been obtained in all. Fig. 1 shows the results in one subject. The curves are numbered to correspond to the procedures described above. In this instance, the test was

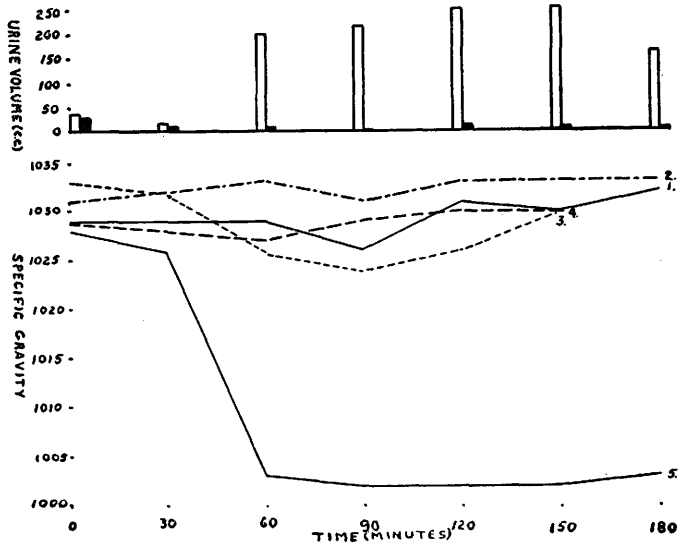


FIG. 1.

Results in one subject. The curves are numbered to correspond to the procedures described in the text. Black and white columns represent urinary volume corresponding to curves 4 (1600 cc water with Pituitrin) and 5 (1600 cc water without Pituitrin) respectively.

2 Peters, J. P., and Van Slyke, D. D., *Quantitative Clinical Chemistry*, Volume II, Williams and Wilkins Co., Baltimore, 1931.

carried out in very hot weather, which accounts for the fact that with or without preparation the urinary specific gravity started in each experiment in a range (above 1.025) indicative of satisfactory renal function. This fortunate circumstance revealed data which indicated that when water diuresis was inhibited by water restriction (Curve 2), or by excessive loss by perspiration or other routes of excretion (Curve 3), the addition of the pituitary extract had little or no effect in elevating the specific gravity. Since pituitary extract inhibits water diuresis, when the latter is already eliminated, little effect is to be expected upon the specific gravity. However, water diuresis instituted by the administration of 1,600 cc of water in 15 minutes at the beginning of the procedure (Curve 5) is inhibited by Pituitrin (Curve 4) indicating the effectiveness of this function of Pituitrin. This is also reflected in the urinary volumes which, with Pituitrin, were maintained at the initial low values (Fig. 1). Regardless of preparation of the patient, the administration of Pituitrin maintained the specific gravities at levels diagnostic of adequate tubular function.

Fig. 2 represents results obtained in a normal individual with (1) modified Fishberg test, (2) modified Fishberg test plus Pituitrin, and (3) no preparation plus Pituitrin. In this subject the initial

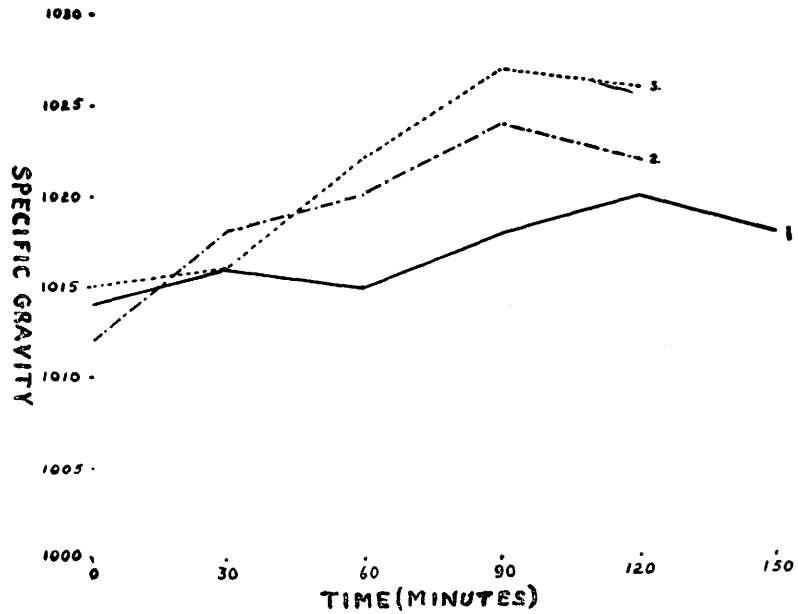


FIG. 2.

Results obtained in a subject with initial low urinary specific gravity. The curves are numbered to correspond to the procedures described in the text.

values of the specific gravity started in a low range not diagnostic of adequate renal function, and were elevated to diagnostic levels only when Pituitrin was added. It appears that without a period of water restriction, water diuresis was inhibited sufficiently by Pituitrin to give values considered indicative of adequate renal function. In all normal subjects studied, the results have been similar and in each instance specific gravity values were equal to or exceeded those obtained by the standard test with water restriction.

These results indicate that posterior pituitary extract in the doses used produced in individuals with normal renal function an inhibition of excretion of water sufficient to bring the specific gravity to or above the levels obtained with usual test periods of water restriction.

13008

## Differentiation of Urogastrone and Pituitrin.*

JOHN S. GRAY, STANLEY C. HARRIS AND E. WIECZOROWSKI.
(Introduced by A. C. Ivy.)
*From the Department of Physiology and Pharmacology, Northwestern University Medical School, Chicago.*

Urogastrone, a substance which inhibits gastric secretion and motility, has been obtained by a number of investigators from human urine.[1, 2, 3] The pressor principle of the posterior lobe of the pituitary, which also inhibits gastric secretion[4] and motility,[5] has likewise been obtained from human urine.[6, 7] Because of the similarities in the sources and properties of the two substances, it appeared desirable to investigate the possibility of their being iden-

* Aided in part by a grant from the Committee on Endocrinology of the National Research Council.

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