bacteria was much greater when submerged in the sea than when submerged in autoclaved or Berkefeld-filtered sea-water. Giaxa[7] observed that pathogens soon perish in raw sea-water although they may survive indefinitely in sterilized sea-water.

This seems to indicate that raw sea-water possesses some constituent which exerts a bactericidal effect besides its salts. Further proof was forthcoming by suspending bacteria in synthetic sea-water and in isotonic NaCl solutions. It was found that the death-rate was somewhat greater in the 3.0% NaCl solutions than in synthetic or in autoclaved sea-water, probably due to a better mineral balance in the latter, but in Berkefeld-filtered sea-water and more particularly in raw sea-water (submergence experiments) the death rate was greater than in the NaCl solution. In fact, sewage bacteria survived longer in 6.0% NaCl (approximately twice the salt content of sea-water) than they did in raw sea-water. It is believed that the bactericidal potency of raw sea-water is even greater than is indicated by these experiments in which the bacteria were surrounded by the semi-permeable walls of the retaining tubes.

Corroborating the conclusions of Burke and Baird,[8] it has been demonstrated that most freshwater bacteria can be acclimatized to tolerate and actually to grow in sea-water media although many of the bacteria undergo other physiological and in some cases morphological transformations. The addition of organic matter reduces the bactericidal potency of sea-water.

8522 P

Influence of Posterior Pituitary Extracts on Sodium Balance in Normal Subject and in Patient with Diabetes Insipidus.

FRANCIS M. SMITH AND EATON M. MACKAY.

From the Scripps Metabolic Clinic, La Jolla, California.

In the normal subject anti-diuretic extracts of the posterior pituitary cause an increase in the excretion of sodium and chlorine with the result that the balance for these elements becomes negative.[1, 2] In Fig. 1 we have presented data on a normal subject (male, 25

[7] Giaxa, D., *Z. f. Hyg.*, 1889, **6**, 162.

[8] Burke, V., and Baird, L. A., *J. Bact.*, 1931, **21**, 287.

[1] Manchester, R. C., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 717.

[2] Engel, R., McQuarrie I., und Ziegler, M., *Arch. f. Exp. Path. u. Pharm.*, 1933, **173**, 248.

years old) which shows the same thing. The patient with diabetes insipidus (male, 19 years old), on the other hand, behaves differently. The same dose of posterior pituitary extract as given the normal caused no increase in sodium chloride excretion although a

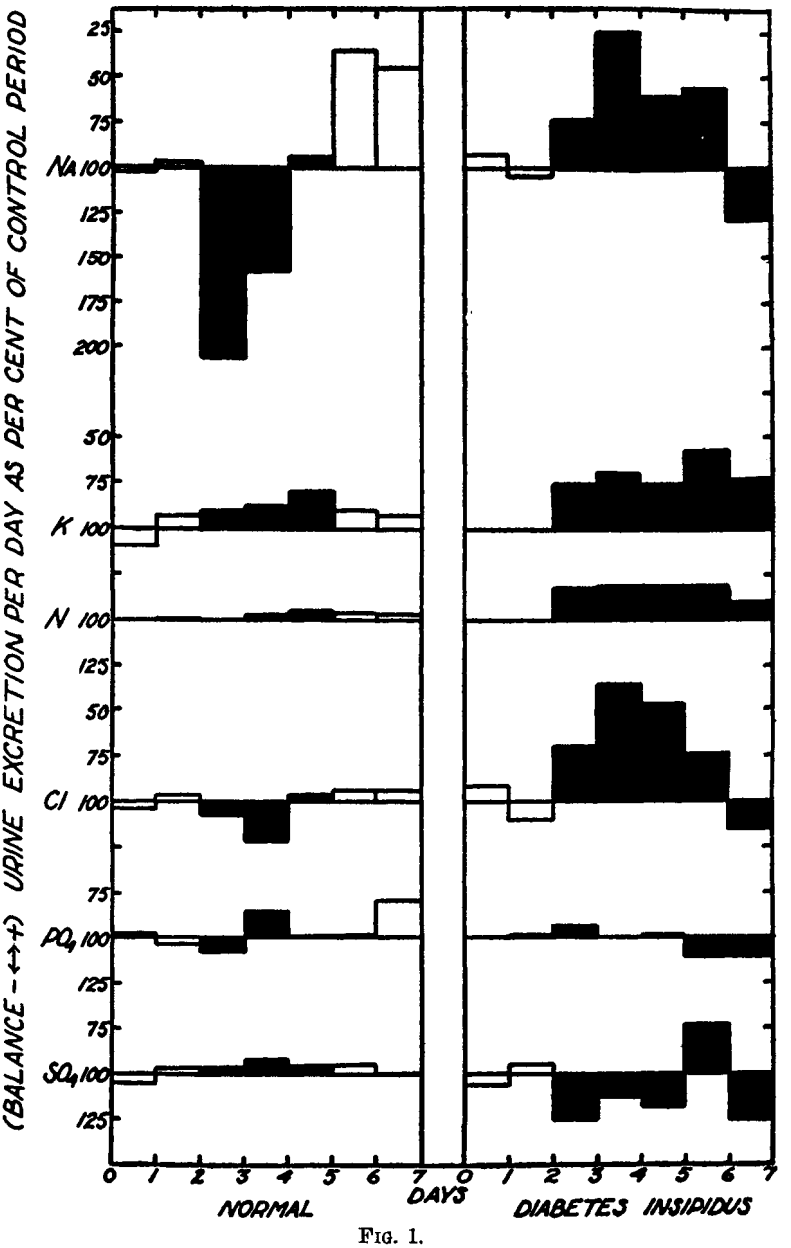

FIG. 1.

marked anti-diuresis resulted (Fig. 1). The days upon which "Pituitrin" (Surgical, 0.5 cc. twice daily) was administered are indicated in solid black. In the normal subject there was no appreciable reduction in urine volume the rate being about 1.5 liters per day without the extract and 1.2 to 1.4 liters per day when "Pituitrin" was given. In the patient with diabetes insipidus the specific antidiuretic effect was obvious. The daily urine output was reduced from around 8 to 3 liters per day with a corresponding decrease in the fluid intake.

Both subjects received a constant diet during the period of observations and for several days preceding. The data in Fig. 1 assumes a constant excretion in the stool of the various elements each day. Although we know that this is not absolutely true we have data which shows that the variations are such as to have no influence upon the picture presented here. The urinary excretion in these cases is therefore a good measure of the mineral balance. In the normal it happens that the chlorine does not follow the sodium as closely as it might because this subject had 5 gm. of KCl added to his diet each day and the percentage variation in chloride excretion is consequently less than in sodium excretion, with the same absolute change in both. Unlike the normal the sodium balance does not become negative in diabetes insipidus as a result of "pituitrin" therapy. In this patient it happens that it actually becomes positive, at least for 4 days and although not a constant result in this condition it is frequently the case. The potassium balance is positive in both the normal and in this and other patients.

It is possible that the difference in the effect of "Pituitrin" on the sodium balance in normals and diabetes insipidus is an accidental result of the difference in the effect of the drug on the urine volume. If it were possible for a patient with diabetes insipidus to receive a normal fluid intake with ensuing normal urine volumes and the normal to be given an excessive amount of fluid until the administration of "pituitrin" when both would get ordinary quantities of fluid it is conceivable that the influence on the sodium balance might be reversed. It is planned to examine this question at the earliest opportunity.