rhizal outgrowths. Isolated portions of the stalk usually rounded up and failed to undergo even primary regeneration unless one end became attached to the glass culture dish. Accordingly, it became routine practice to secure one end of an isolated piece by pinning it with a fine glass rod thrust through the tissue and into a substratum of 2% agar. Primary regeneration was studied in a series of isolated whole stalks or in parts of stalks, which had been pinned through the distal (oral) end or through the proximal (aboral) end. Modifications of the proximo-distal gradient and tests of the morphogenetic influence of regions not normally associated were investigated by the techniques of fusing stems or the other regions of the hydranth (gonosome, tentacle-bearing region, and hypostome) in various orientations and combinations. This was accomplished by stringing the pieces to be fused on fine glass rods, then holding them tightly together by means of pieces of glass tubing slipped over the ends of the rods.

Water Diuresis in the Seal, Phoca Vitulina*

Michael Ladd, Lawrence G. Raisz,
Charles H. Crowder, and Lot B. Page
New York University

The theory that renal tubular reabsorption of water is partitioned between an obligatory (proximal) and a facultative (distal) process is based in part on the observation that a limited fraction of the water filtered at the glomerulus is available for excretion during water diuresis. In the dog, this fraction varies from 11 to 19 per cent when the filtration rate is increased or decreased by altering the protein content of the diet (Ludemann, Raisz and Wirz). In the harbor seal, **Phoca vitulina,** the filtration rate may be increased markedly by feeding (Hiatt and Hiatt) and greatly reduced by excitation of the diving reflex (Bradley and Bing). This animal therefore affords an excellent opportunity to examine the influences of wide changes in filtration rate on facultative water excretion.

Methods

Twenty weaning seals and one one-year old female were used in the study. Filtration rate was measured by the exogen-

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ous creatinine clearance. Creatinine was determined by the method of Bosnes and Taussky, chlorides by iodometric titration, urea by the hypobromite method, plasma protein by the copper sulfate method, and the freezing point of plasma and urine by the Johlin method, using a Beckmann thermometer.

Maximal values for filtration rate were obtained 2 to 4 hours after the forced feeding of 1 kg. of herring, moderately low values by fasting the animals for 18 hours, and minimal values during the diving reflex, elicited by closing the nostrils by means of a cone over the snout.

Data on urine flow and filtration rate have been corrected to 100 gms. of kidney weight.

Results

One hundred and five experiments were done, of which 43 were considered successful. The filtration rate varied from 6.8 cc/min. per 100 gms. kidney during the diving reflex to 132 cc/min. per 100 gms. kidney during absorption of a fish meal. The minimal creatinine U/P ratio during maximal water diuresis at these extreme values for filtration rate ranged from 7.9 to 27.0, representing the excretion of 12.7 to 3.7 per cent of filtered water. The mean for the entire series is 8.2 per cent, which is substantially lower than that for the dog (12.9 per cent) or man (12.5 per cent).

Although there is wide scatter in the data, the urine flow during maximal water diuresis in any one animal increases in a fairly uniform manner with increasing filtration rate. Deviations from the average trend could not be correlated with other variables such as chloride or urea excretion, or the magnitude of the water load.

Measurements of the osmotic U/P ratio show that the urine remains dilute during the diving reflex, indicating that reduction in urine flow at low filtration rate is not the result of secretion of the antidiuretic hormone.

These data harmonize with the theory that the fraction of the glomerular filtrate reabsorbed proximally decreases as the filtration rate is increased, with the result that a larger fraction of the glomerular filtrate is delivered to the distal system, where the water is available for excretion as dilute urine after the sodium is reabsorbed.