ratio of 50-60 is reached at an inulin U/P ratio of 150-200. Thus, the concentrating ability for urea is rather poor in the seal. A possible interpretation is that active transport of urea is not very pronounced in the renal tissue of the seal. The effect of apnea upon the renal function and upon the heart was found to depend upon the degree of struggling with which artifical "diving" was accompanied. Apnea not accompanied by struggle caused a slowing of the heart rate but each heart cycle was normal. In apnea accompanied by struggling the T-waves were inverted or isoelectric. When the animal was struggling, (with or without apnea), the maximum urea U/P ratio was decreased. It is not clear to what extent quiet diving affects the glomerular filtration rate.

This work was supported by a grant from the Coastal Plain Heart Association of North Carolina.

1 The work was done during the tenure of an Established Investigatorship of the American Heart Association.

Extra-Renal Salt Excretion in Marine Birds

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The finding (summer 1956) that the nasal gland, or salt gland, of the head is the major organ of excretion for sodium chloride in cormorants was extended to a number of other species of marine birds. The composition of the secretion was determined in greater detail. The innervation of the gland, and its response to various stimuli were established. A detailed study of the anatomy and histology of the gland was commenced.

The results indicate that the salt gland is universally present and of functional importance in all marine birds. The gland is under parasympathetic control, and is stimulated by osmotic loads, mainly sodium chloride, as it is ingested with food or by drinking of sea water. It is assumed that this stimulus acts via central osmoreceptors. The gland functions only after an osmotic load, and does not secrete in the absence of such load.

Supported by National Institute of Health Grant No. H-2228.

Fetal Thyroid of the Spiny Dogfish, Squalus acanthias

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Activity of fetal and maternal thyroids was studied by injection of I^{131} into pregnant females ("candle" and late fetal stages), nonpregnant

adults, and free-swimming late fetuses (5 inches, rostral tip to midvent). Fetuses survive removal from the uterus.

Adult thyroids apparently are not hyperactive during gestation, as shown by uptake values 16-72 hours after subcutaneous injection of 24-175 microcuries (0.08 - 0.23 percent, which is less than the rabbit). Unlike some vertebrates tested, maternal thyroid activity does not decrease during late gestation, but is at a level similar to nonpregnant and male animals. Stomach fluid shows high activity, higher than uterus, blood, bile and intestine. Thyroids of late fetuses in utero show some radioactivity above blood and background 24 hours after maternal injection, but eyes may be slightly more active. Highest activity is in stomach, less in yolk.

Radioactivity appears in thyroids of free-swimming fetuses (subcutaneous injection, 5-9 microcuries) within first 5 minutes, increases progressively during following hours (0.11-1.9 percent uptake), and amounts within minutes to as much, or later more than (2-10 times), that of maternal thyroid (weight approximately 230 mg). Thyroidal activity is generally 1.3-5 times that of blood after first few hours when compared with almost the entire fetal blood volume; stomach 1.2-4 times, intestine 1.4-2 times and yolksac yolk is much lower. Radioactivity of stomach is greater than intestine, uterine fluid and eyes in all cases, and may be higher than thyroid especially in first few hours. Abdominal yolk and eyes may show higher radioactivity than blood.

1 NSF Grant 2255
2 New York Heart Association Grant

The Excretion of Ammonia by the Gills of the Fresh-Water Catfish, *Ameiurus nebulosus*

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The excretion of ammonia by the gills of fish constitutes one major path of nitrogen excretion. This study was planned to determine whether this branchial process contributes to the maintenance of acid-base balance as does renal ammonia excretion in the frog, dog, and man. In fresh-water catfish (140 to 250 grams) the anus was ligated, and the urinary papilla was either ligated or catheterized for the collection of urine. The fish were placed in closed plastic containers with 400 ml distilled water through which oxygen was bubbled continuously. No ammonia escaped in the excurrent gas. The ammonia in the bath after 90 to 200 minutes is considered to have been excreted by the gills, assuming a negligible contribution from the skin and buccal mucosa.

Control branchial excretion of ammonia ranged between 15 and 70 μEq per 100 gm of fish per hour. When ammonia accumulated in the bath in successive periods, or when ammonium sulfate was added to the bath,