(Cl^-). The urine volume, pH, total CO_2 and sodium excretion increased. Elimination of the sodium bicarbonate load was slow and blood levels of (HCO_3^-) did not return to normal within 24 hours. CO_2 excretion via the gills and sodium loss into the surrounding fluid was slightly increased.

The intraperitoneal injection of a combination of 1.5 mM of sodium bicarbonate and 20 mg of the sodium salt of Diamox elicited a less consistent rise in blood (total CO_2) and (HCO_3^-) and virtually no change in pH. The urine volume, pH, total CO_2 and sodium excretion increased. The rate of excretion of CO_2 via the gills did not differ significantly from that observed in control animals and in fish receiving Diamox alone. The rate of sodium loss into the surrounding fluid was similar to that observed following sodium bicarbonate alone.

Conclusion: in contrast to the marine dogfish, the freshwater catfish retains a sodium bicarbonate load for as long as 24 hours. Part of the bicarbonate is excreted by the kidneys thereby increasing the urinary pH. However, it could not be demonstrated in the catfish, that branchial excretion of sodium bicarbonate is significantly increased after a (sodium bicarbonate) load, nor was it possible to demonstrate inhibition of branchial bicarbonate exchange by Diamox. It was again shown that Diamox inhibits the formation of acid urine.

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The Transport of Indigo Carmine and Neutral Red by the Isolated Flounder Tubules

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Observations were made on the rate of transport of indigo carmine and neutral red by isolated flounder tubules suspended in modifications of the medium described by Forster.

The transport of neutral red across a cellular barrier is generally related to its dissociation constant and the difference in pH on both sides of the membrane. In the isolated flounder tubule, a low intraluminal pH and an alkaline suspending medium would theoretically facilitate the transport of neutral red from the medium to the lumen. Accumulation of the dye in the lumen may then be ascribed to trapping. This phenomenon was repeatedly observed in the present studies and the degree of concentration agreed with the prediction formula of Jacobs (Cold Spring Harbor Symposium 8: 1940). However, a similar but less marked intra-luminal accumulation occurred in the absence of a proper pH gradient (acid suspending medium). The following hypothesis seems to account for the observations: 1) neutral red enters the cell of the flounder tubule by virtue of an appropriate concentration gradient, 2) the dye is concentrated in plates along the luminal surface of the cell, thereby maintaining appropriate diffusion gradients, 3) enters the lumen by virtue of the difference in pH

across the luminal interface and 4) is concentrated in the lumen, possibly trapped by chemical binding.

In 2 goosefish, U/P ratios for neutral red of approximately 1 were obtained.

Indigo carmine (original dye of R. Hoeber provided by Dr. C. Schmidt) resembled phenol red and chlorophenol red in its transport behavior. In contrast to neutral red, its entry into the lumen was blocked by PAH, diodrast and Benemid. Transport was also blocked by metabolic inhibitors and intracellular tapping occurred with a high potassium, low calcium medium (Puck, Wasserman and Fishman, J. Comparative Physiol. 1952).

In 2 goosefish, U/P ratios for indigo carmine of 13 and 6 were obtained.

These observations on the two dyes illustrate differences in transfer and concentration mechanisms in the isolated flounder tubule.

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On Porosity of Gill Filters and Filtration Rate in Mussels (*Mytilus edulis*)

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Mytilus edulis and other lamellibranchs are able to vary widely the porosity of their gill filters. However, undisturbed mussels living in water that contains only small amounts of suspended material have been found to retain effectively graphite particles of about 1μ. The possibility that undisurbed mussels were able to retain even smaller particles such as protein molecules was investigated. The experiments were made on 3- -4cm long mussels using the technique previously described (C. B. Jorgensen and E. D. Goldberg, Biol. Bull. 105, p. 477, 1953). It was found that the gills were able to retain at most a few percent of dogfish hemoglobin or lobster hemocyanin, stained with T-1824, from a suspension passing the gill filters.

The rate of water transport through the gills under standardized laboratory conditions was independent of the tidal cycle. No significant difference was found between water propulsion in mussels collected from high and low levels of the tidal range. This is contrary to recent findings by Rao (Biol. Bull. 106, p. 353, 1954). In 44 experiments filtration rates varied from 0.8 to 2.1 l./hr./g wet weight of soft tissues at temperatures of 12 - 14°C.