anhydrase inhibition. In a second series, the fish were laparotomized and fluid was emptied from the sac. Drug or control solution was injected, and one or two days later the newly formed fluid was collected. In four out of seven cases the concentration of total carbon dioxide in the fluid formed during carbonic anhydrase inhibition was about 100 mM/L, i.e. substantially less than normal, and about the same as concentration in *R. stabuloforis*, where there is no enzyme. In three other fish there was no decrease in CO_2 concentration. Data thus far suggest that as in other physiological systems, carbonic anhydrase is not essential for bicarbonate accumulation, but that the presence of the enzyme may be associated with a somewhat higher gradient from plasma to gland fluid, than in its absence or inhibition.

Reflex Bradycardia in the Free Swimming Seal (Phoca Vitulina L.)

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In 1936 Irving and co-workers demonstrated that bradycardia occurs in the seal when breathing is arrested. Scholander and co-workers found that with artificial diving (tilting the seal's head under water) the blood flow in the periphery was reduced to a minimum. This has been referred to as the arterial constrictor response to diving. Nickels and Bradley reported that with simulated diving (occluded cone held over the seal's nose) bradycardia and cardiac arrhythmias, including fibrillation, occurred. In this study seals were monitored using subcutaneous needle electrodes on 50-foot teflon insulated electrocardiogram leads. They were allowed to swim freely in an aquarium and in the Bay on a 45-foot rope leash. During spontaneous diving there did not occur arrhythmias with the exception of an occasional failure of ventricular response to A-V conduction. When the seal was forcibly submerged and struggled a bradycardia occurred but was accompanied by inversion of P-waves, T-waves, the appearance of flutter fibrillation. The bradycardia accompanying struggling was not as pronounced as that found with normal diving. Atropine was found to block the reflex bradycardia of diving. One seal drowned after less than 3 minutes submersion following cessation of bradycardia. Since Scholander has demonstrated that seals can tolerate up to 15 to 20 minutes submersion while struggling, the occurrence of drowning in such a short period of time in an atropinized seal would suggest that the arterial constrictor response to diving was also obliterated. It was noticed that the seals would not dive for long periods while atropinized. These findings are in agreement with the observations in the rabbit by Forster and in the porpoise by Scholander. Bradycardia persisted while eating submerged. The bradycardia of normal diving differs from the Bradycardia of simulated diving when accompanied by struggling.