

It may be remarked at the outset that almost all the drugs and poisons used by me have had, as a first effect, the production of an increased rhythm, owing, probably, to the exciting effect of a foreign substance before the specific action had time to manifest itself. To this general rule the auricle proper has often proved an exception. I have constantly found that its beat is arrested with the greatest ease while the sinus extension remains comparatively unaffected.

It will be borne in mind that the heart of the fish consists of a sinus and sinus-extension (as in the tortoises, turtles, etc.), one auricle, and one ventricle.

#### PILOCARPIN AND ATROPIN.

The following extracts from my notes will give a general idea of the action of these drugs:

"At 2.30 P.M.—Fish prepared as usual. Pilocarpin Mur. in solution of 1 per cent. applied freely to heart, which has a rhythm of 30; vigor soon diminished, the beat lacking in decision; is a lazy heart; diastolic relaxation increased; heart more readily arrested; *e.g.*, wiping it over with a moistened sponge arrests heart for two minutes, which is much longer than the usual stop under such circumstances.

3.05.—Pilocarpin removed with a sponge, and Atropin applied; at once the rhythm, which had sunk, rose to 32; manifest increase of force in both auricle and ventricle; original decision of action restored."

The above notes are meant to be merely illustrative; space does not admit of all being given without undue distension of the paper.

#### *Summary of the results of the action of Atropin and Pilocarpin.*

1. Pilocarpin and atropin are antagonistic in action. The former is a cardiac depressor, tending to lower the excitability of the heart, render its action sluggish, and to stop it in diastole; the latter to improve a sluggish or weakened heart, and heighten the excitability of this organ under all circumstances. While pilocarpin tends to slow the rhythm, atropin quickens it, and increases the force of the beat. It manifests its action rapidly.

2. Atropin freely applied to the heart annihilates the possibility of arresting the heart reflexly.

Atropin applied to the conus arteriosus, arrested by a ligature between conus and ventricle, excites it to pulsation.