

heart of *Batrachus* seemed so well suited for testing the action of drugs, etc., that a considerable number of experiments were made to ascertain their influence when directly applied to the heart. The drug was either applied in solution with a camel's hair pencil, or simply dropped over the heart; the fish meanwhile being kept under normal conditions (on its back, with sea-water bathing its gills, etc.) That the effect witnessed on the heart was not due to indirect influence through the extrinsic nervous system of the fish was shown by isolating the heart and treating it with the same drug or poison as the heart *in situ*. The results have always been harmonious.

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.