

XXI. "Physiological Action of the Bark of *Erythrophleum guinense* (Casca, Cassa, or Sassy Bark)." By T. LAUDER BRUNTON, M.D., F.R.S., and WALTER PYE, M.R.C.S. Received June 15, 1876.

(Abstract.)

1. It diminishes oxidation, and thus prevents fresh vegetable tissues from communicating a blue colour to tincture of guaiac.

2. It does not hinder the development of the yeast-fungus nor the germination of seeds.

Penicillium grows freely in a solution of it.

3. A watery solution of the alcoholic extract prevents the development of *Bacteria*, but one of the watery extract does not do so.

4. It does not destroy the life of *Bacteria* or Infusoria. The motion of cilia is not arrested by it.

5. It arrests amoeboid movement in leucocytes.

6. It has no action on fresh muscular fibre; but muscular tissue, when kept in a solution of the alcoholic extract for some days, undergoes extensive fatty metamorphosis, but does not become putrid.

It does not alter the sensibility of muscle to electrical stimuli, nor does it diminish its lifting power.

7. It has little, if any, poisonous action on the Invertebrata.

8. It has a comparatively slight action on fishes and frogs. The symptoms produced by its administration are failure of muscular power, preceded by irregular muscular movement.

9. On birds a small dose produces violent vomiting and irregular muscular movements, with difficult respiration. These symptoms are followed by loss of muscular power and death.

10. In cats and dogs the symptoms are restlessness, nausea succeeded by violent vomiting, spasmodic jerks of the limbs during locomotion, quickened respiration, staggering gait, inability to stand, and death generally during a convulsion of an emprosthotonic character, apparently connected with an attempt to vomit. Consciousness seems to be preserved to the last.

When injected subcutaneously, although it produces violent vomiting, it never purges; division of the vagi before its administration lessens or prevents the vomiting usually observed, as well as the other symptoms of distress; and in one instance a dose which would ordinarily have been speedily fatal produced no apparent effect in an animal thus operated on.

11. When injected into the stomach of a cat it produces violent vomiting and purging. Sometimes this is followed by recovery, in other cases by loss of muscular power and death.

12. Injection of atropia does not prevent death; and although in one case it prolonged life for two hours, in other instances it seemed rather to accelerate a fatal issue.

13. It causes the heart in frogs to pulsate more slowly; the ventricle

becomes irregularly contracted, leaving pouches over the surface, and finally is arrested in systole; the auricles contract for some time longer.

14. In cats the ventricle also becomes irregularly contracted before finally stopping.

15. In frogs it causes no rise of the blood-pressure in the aorta, but raises the oscillation of the mercurial column connected with the vessel to three times its previous height.

16. In cats and dogs moderate doses injected into the jugular vein first raise the blood-pressure without altering the rate of cardiac pulsation or the extent of oscillation at each beat; they then slow the heart by stimulating the roots of the vagus. The tension rises, notwithstanding the slowness of the heart's beats. An additional dose paralyzes the ends of the vagus in the heart, and quickens its pulsations; the pressure rises slightly. A further dose again slows the heart by acting on its ganglionic apparatus, and the beats sometimes fall as low as three per minute, three or four respirations occurring during each cardiac diastole. Notwithstanding the very slow action of the heart, the pressure may remain as high as 165 millimetres of mercury, a fact which indicates that the arterioles are in a state of extreme contraction. After the heart has ceased, the pressure falls very slowly. Slight pulsations of the ventricle occasionally occur when the thorax is opened.

17. Small doses do not seem to increase the excitability of the peripheral ends of the vagi to electrical stimuli; moderate and large doses paralyze these nerves.

18. After injection of casca into the veins of an animal completely narcotized by chloroform, electrical irritation of the central end of the divided vagus of one side, the other remaining intact, is followed after a short interval by marked slowing of the pulse, fall of blood-pressure, and increased oscillation.

19. When injected into the veins of a cat after division of the spinal cord opposite the second cervical vertebra, the blood-pressure rises to a greater height than is attained under other conditions.

20. When in the rabbit the sympathetic has been divided in the neck on one side, subsequent injection of casca into the jugular vein produces pallor of the recently congested ear of the side on which the division had been made.

21. When locally applied to the web of a frog's foot temporary slowing of the circulation was observed, but no alteration in the diameter of the blood-vessels.

When injected beneath the skin of the back of a frog it produces no visible effect on the vessels of the web.

22. It does not appear to possess any special action on reflex excitability.

23. In moderate doses it increases the secretion of urine at the same time that it raises the blood-pressure. Further doses diminish the secretion, while they raise the pressure yet more; and at the time when the pressure reaches its maximum the secretion of urine is entirely

arrested. When the pressure begins to fall the secretion of urine again commences. The urine collected after the recommencement of the secretion was not albuminous.

24. When injected into a loop of intestine it does not increase the secretion, nor does it produce any distinct congestion.

25. When applied to the eye it has no action on the pupil, nor does it cause congestion of the conjunctiva or lachrymation.

26. When administered to a pregnant cat it did not produce abortion.

27. The temperature of the body is not affected by administration of the drug.

XXII. "Note on Independent Pulsation of the Pulmonary Veins and Vena Cava." By T. LAUDER BRUNTON, M.D., F.R.S., and Sir J. FAYER, M.D., K.C.S.I. Received June 15, 1876.

In a former communication* we incidentally mentioned that in a rabbit killed by the injection of cobra-poison into the jugular vein we had observed the pulmonary vein pulsating after all motion had ceased in the cavities of the heart. We have since observed the same phenomenon three or four times under conditions which show that this pulsation is not due to the action of the cobra-poison with which the animal in which we first observed it had been killed. The following example will show the changes in rhythm observed in these pulsations.

A cat was chloroformed, and the vagi exposed and irritated by an interrupted current. Artificial respiration was kept up by air containing chloroform vapour, and the thorax was then opened, and a solution of atropia injected directly into the heart by means of a Wood's syringe. The vagi were again irritated, but without any effect being produced on the heart, the inhibitory apparatus in it being evidently paralyzed by the atropia. A solution of glycerine extract of physostigma was now injected into the heart in a similar way. The vagi were now irritated again, and the heart stood still, the effect of the atropia having been counteracted by the physostigma. After the irritation ceased the heart again commenced to pulsate.

Artificial respiration was now discontinued, but all the cavities of the heart continued to beat for a considerable time. The ventricles then stopped, but the auricles continued to beat. It was then noticed that the pulmonary veins in the right lung, which was exposed to view, were pulsating. The veins, as well as both auricles, pulsated at the rate of 119 per minute, but the contractions of the veins were not synchronous with those of the auricles. Both auricles next ceased to beat, but the pulmonary veins in both lungs continued to pulsate. The ventricles now began to beat again, while the auricles remained still. The ventricles pulsated at the rate of 8 per minute, while the pulmonary veins pulsated at the rate of 46 per minute; and no motion was perceptible in any part of the auricles.

* Proceedings of the Royal Society, 1874, vol. xxii. p. 125.