A REPORT

ON

THE BILIARY SECRETION OF THE DOG:
WITH REFERENCE TO THE ACTION
OF CHOLAGOGUES:*Presented to the Scientific Grants Committee of the
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ACTION OF "HYDRASTIN".

The root of the *Hydrastis Canadensis* has had various medicinal properties claimed for it. It is admitted by all to be tonic, and by some it is said to be aperient, cholagogue, diuretic, antiseptic, etc. "It has been employed in dyspepsia, and other affections requiring tonic treatment, in jaundice and other functional disorders of the liver, as a laxative in constipation and hæmorrhoids, and as an alterative in various diseases of the mucous membranes, such as catarrh, chronic enteritis, etc. By some it is used as one of the best substitutes for quinia in intermittents". These and other statements regarding it are made by Wood and Bache (*United States Dispensatory*, 1869, p. 458), who further aver that a "more precise investigation of its physiological and therapeutic properties is necessary before we can venture to decide its place among medicines." It contains an alkaloid, *hydrastia* or *hydrastin*, which has been found to be identical with *berberina* (*lib. cit.*, p. 457), found in the *Berberis vulgaris* and in *calumba*. The "hydrastin" employed in the following experiments was not the alkaloid, but a resinous substance prepared from the root of the plant, in the manner already detailed in the case of menisperm (BRITISH MEDICAL JOURNAL, December 21st, 1878, page 909), by Messrs. Keith and Co. of New York. The dose for a man of this preparation is from one to two grains.

Experiment 12.

Experiment 13.

Secretion of bile per 15".	Secretion of bile per kilogramme of dog: per hour.	Secretion of bile per 15".	Secretion of bile per kilogramme of dog: per hour.
cc.		cc.	
1.40	} 0.230 cc.	0.7	} 0.09 cc.
1.60		0.35	
1.65		0.60	
1.45		0.35	
<i>h</i> —		0.30	
0.60	} 0.386 cc.	0.40	} 0.323 cc.
0.95		0.30	
1.60		0.35	
2.15		<i>h</i> —	
1.90		0.17	
1.75		0.17	
<i>h'</i> —		0.15	
1.40		0.10	
0.85		0.30	
1.70		0.20	
3.55		0.15	
2.45	} 0.386 cc.	0.30	
2.30		0.35	
1.70		0.55	
2.15		<i>h'</i> —	
1.00		0.60	
1.30		0.80	
<i>s</i> —		0.80	
1.95		0.90	
1.40		1.10	
3.95		1.15	
3.45		1.05	
		1.10	
		0.95	
		1.05	

Experiment 12.—Dog that had fasted seventeen hours. Weight 25.9 kilogrammes (Fig. 12). Two grains of hydrastin triturated with 2 cc. of rectified spirit, 1 cc. of bile, and 2 cc. of water were injected into the duodenum at *h*, and the same dose was repeated at *h'*. A wave, as

it were, of increased bile-secretion followed both doses, the second being higher than the first. It is notable that the periods of excitement after both doses were of the same length—an hour and a half. Twenty grains of sodium-salicylate in 10 cc. of water were then injected into a lower part of the small intestine (*s*), and it produced a higher bile-secretion than had resulted from the hydrastin.

Fig. 12.

Secretion of bile before and after hydrastin and sodium salicylate. 2 grains of hydrastin in 2 cc. of rectified spirit, 1 cc. of bile, and 2 cc. of water injected into the duodenum at *h* and *h'*; 20 grains of sodium salicylate in 10 cc. of water injected into the lower portion of the intestine at *s*.

NECROPSY.—Decided redness of mucous membrane in the upper twelve inches of the small intestine: but there was only scanty evidence of purgation where the hydrastin had been injected.

Experiment 13.—Dog that had fasted seventeen hours. Weight 13.6 kilogrammes (Fig. 13). Two grains of hydrastin, triturated with 2 cc.

Fig. 13.

Secretion of bile before and after hydrastin. 2 grains of hydrastin in 2 cc. of bile, 1 cc. of rectified spirit, and 6 cc. of water injected into the duodenum at *h*, and *h'*.

of bile, 1 cc. of rectified spirit, and 6 cc. of water were injected into the duodenum at *h*, and the same dose was again given at *h'*. Before the experiment was begun, it was observed that the animal was somewhat unhealthy, which accounts for the result being less definite in this than in the previous case; yet, ere the second dose was given, the bile-secretion had begun to rise, and after the second dose the increase was decided.

NECROPSY.—Slightly increased redness of duodenal mucous membrane. Very slight evidence of purgative action.

* Continued from page 947 of last volume.

TABLE IV.

Hydrastin.	Total Dose in Grains.	Grains per Kilogramme of Body-Weight.	Secretion of Bile per Kilogramme of Body-Weight: per Hour.	
			Before.	After.
Experiment 12....	2 with bile	0.077	0.23 cc.	0.386 cc.
" 13....	2 " "	0.147	0.09 cc.	0.323 cc.

Result of Experiments with Hydrastin.—It is a hepatic stimulant of moderate power, and a feeble intestinal stimulant. The fact shown in Table IV—that in Experiment 13 a dose relatively larger in proportion to the size of the animal than in Experiment 12 produced a smaller effect on the liver—seems only explicable by the fact that the subject of the former experiment was, as already stated, in an abnormal condition. Altogether, hydrastin appears to be a substance well worthy of the attention of the physician.

ACTION OF "JUGLANDIN".

Juglandin is not an alkaloid, but an impure substance prepared by Messrs. Keith and Co. of New York from the bark of the root of the butternut or white walnut (*Juglans cinerea*), after the manner already detailed in the case of menisperm. Regarding the properties of the bark of the butternut, Wood and Bache (*United States Dispensatory*, 1869, p. 492) state that it is a mild cathartic, operating without pain or irritation, and resembling rhubarb in the property of evacuating without debilitating the alimentary canal. It was much employed during the late American civil war by Dr. Rush and other army physicians. It is especially useful in habitual costiveness and dysentery. Nothing is stated regarding any influence on the liver. An extract of the bark is officinal in the United States. The dose of Keith's juglandin—the substance used in the following experiment—is from two to five grains.

Experiment 14.—Dog that had fasted eighteen hours. Weight, 21.1 kilogrammes. (Fig. 14.) Five grains of juglandin, triturated with

Fig. 14.

Secretion of bile before and after juglandin and sodium salicylate. 5 grains of juglandin in 2 cc. of rectified spirit, 2 cc. of bile, and 5 cc. of water injected into the duodenum at *j*, and *j'*; 20 grains of sodium salicylate in 10 cc. of water injected into the lower portion of the intestine at *s*.

2 cc. of bile, 2 cc. of rectified spirit, and 5 cc. of water, were injected into the duodenum at *j*, and the same dose was repeated at *j'*. Both doses were followed by increased bile-secretion, which lasted four hours,

and would probably have lasted even longer. Twenty grains of sodium-salicylate in 10 cc. of water were injected into a lower part of the small intestine at *s*, and speedily caused a much greater hepatic excitement. Before any drug was given, the coefficient of secretion was 0.104 cc. of bile per kilogramme of body-weight per hour. After the first dose, it rose to 0.286 cc., and after the second to 0.327, showing that juglandin is a hepatic stimulant of moderate power. Indeed, it occasions a coefficient of secretion almost precisely the same as rhubarb (0.32 cc.) and leptandria (0.31 cc.).

NECROPSY.—Slightly increased redness of the duodenum, and slight purgation.

Experiment 14.

Secretion of bile per 15".	Secretion of bile per kilogramme of dog: per hour.
cc.	
.75	
.65	
.45	
.45	
.40	
.45	
.45	
.45	
.65	
.65	
<i>i</i> —	
.60	
.85	
.95	
1.80	
1.40	
1.55	
1.30	
1.30	
<i>i'</i> —	
1.45	
1.75	
1.65	
1.65	
1.85	
1.55	
1.60	
1.70	
1.65	
<i>s</i> —	
1.95	
3.40	
3.75	

Experiment 15.

Secretion of bile per 15".	Secretion of bile per kilogramme of dog: per hour.
cc.	
0.75	
0.80	
0.90	
0.75	
<i>b</i> —	
0.85	
1.20	
1.05	
1.25	
0.80	
1.30	
1.40	
<i>bs</i> —	
1.05	
1.60	
2.35	
2.80	
2.50	
2.35	
2.35	
2.05	
2.10	

Result of Experiment with Juglandin.—It is a mild hepatic stimulant and a mild purgative, and seems eminently worthy of the attention of the physicians of this country.

[To be continued.]

SPREADING QUINSY.

I READ with interest, in the JOURNAL of December 7th, the report of Dr. Cornelius Fox, which he read at the meeting of the Association at Bath in August, on a throat-disease which he is inclined to look upon as "spreading quinsy".

As there has been recently an outbreak of such disease in an adjoining parish to my own, which, I am given to understand, Dr. Fox considers as spreading quinsy; and as many of these cases have come under my care, I venture to express my opinion, from close observation, that they are really true instances of diphtheria in a mild form, and that there is no more difference between them and true diphtheria than there is between mild scarlatina and malignant scarlet fever.

In all the cases I have seen, there have been patches on the tonsils or soft palate, varying in colour from yellowish white to ashy-grey, and varying in size from a mere speck to a patch covering a greater part of the throat and spreading into the nares; some, or I may say most of them, throwing off a membrane of variable thickness. With all, there has been great accompanying debility and prostration, and in some, followed by considerable impairment (slight paralysis) of vision and of the voice. One or two cases in the parish (not my own) have, I believe, terminated fatally. Now, between these cases (taking the worst) and typical ones of diphtheria, I fail to see the difference, except in severity. I may add that, in several instances, portions of membrane have been discharged, followed by slight hæmorrhage from the nose, which is hardly a symptom of quinsy.

Although practical men may differ in opinion as to the proper name to be given to such a class of cases, I think it will be generally admitted that at least they resemble true diphtheria much more than they do quinsy.

WALTER HART.