gelatin is of great value in increasing the coagulability of the blood, and pointed out that all the colloid substances possess this property. One reason why gelatin sometimes fails is because it is not used properly. In a Philadelphia hospital, a patient with typhoid fever had hemorrhage from the bowels. One-half an ounce of gelatin was ordered given every hour until relieved. The next day the same hemorrhage was going on, and it was found that a tablespoonful of ordinary prepared gelatin had been given, which contains about 3 per cent. of gelatin. Half an ounce of the dry gelatin must be given in order to have any effect.

DR. HENRY W. COOK, Richmond, Va., emphasized the danger of giving stimulants to persons with hemorrhage. A patient who was very badly injured and in shock from hemorrhage was given adrenalin, which caused a rise of blood pressure, but disturbed the clot; bleeding returned and he bled to death in ten minutes. Vasodilators may push the patient over the border line and cause death. Tentative treatment until the patient is over the danger point is the best treatment.

DR. W. B. ROBINSON agreed as to the value of gelatin in increasing the coagulability of the blood. When administered to a dog, the blood drawn will coagulate in ten minutes, while the blood from another dog, without gelatin, requires half an hour. It should be remembered, however, that the gelatin should not be cooked when given for this purpose, as by cooking it is converted into a different substance.

DR. ABBOTT disagreed with Dr. Wood, who said that atropin is not a remedy to give in internal hemorrhage. Dr. Abbott said that his views were derived from experience at the bedside. The increase of pressure at the point of hemorrhage will be overcome, if there is dilatation elsewhere, by the use of atropin.

DR. C. E. DE M. SAJOUS, Philadelphia, asked if some of the authorities quoted do not state that the action of the atropin is exercised on the arterioles. He said that this would sustain the contention of Dr. Abbott. One would have, in that case, to recognize the fact that the arteries are supplied with a muscular coat while the capillaries are not, and that the bleeding area could thus be deprived of blood and the hemorrhage arrested merely through contraction of the arterioles.

DR. HORATIO WOOD, JR., replying to questions, stated that the effect of atropin is demonstrable by placing a canula in a dog's artery. After giving atropin the blood pressure goes up, because the small arteries in the interior of the body are contracted. Atropin acts particularly on the arteries and very little on the veins; but the great danger is from arterial hemorrhage. Too small doses have no effect.

DR. ABBOTT said that while Dr. Wood gives atropin and gets internal rise of blood pressure, he claims that vasomotor influence sends the blood to the periphery and equalizes the circulation throughout the body.

DR. O. T. OSBORNE, New Haven, Conn., declared that one of the greatest dangers in internal hemorrhage is the contraction of the peripheral vessels, due to the fear of death. Atropin and morphin will produce peripheral flushing and will always help these cases.

DR. T. L. COLEY said that while morphin has no specific action in cases of internal hemorrhage, it allays the patient's restlessness, thus inducing conditions favorable to clotting. The use of bismuth in gastric hemorrhage is open to the same objection as the preparations of iron. In the presence of masses of food particles and blood clots the astringent action would, in the average case, be valueless and the mechanical effect slight. Washing out of the stomach in cases of gastric hemorrhage to remove the offending material is a step too fraught with danger to be employed with safety. The use of atropin seems to Dr. Coley to be contraindicated from its physiologic action—the rise of blood pressure which follows its administration. Clinical evidence is extremely unreliable in estimating the value of any treatment for hemorrhage. It is very difficult to calculate the extent of internal bleeding or the effect of a given drug. In a case of intestinal hemorrhage in typhoid fever several drugs may have been employed and we do not

know which of these, if any, has produced a favorable effect. The spontaneous effort of Nature must not be overlooked. A second patient may recover from severe intestinal hemorrhage without having received any drug treatment whatever.

A STUDY OF APOCYNUM CANNABINUM.*

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PHILADELPHIA.

(Done Under a Grant from the National Academy of Sciences.)

Apocynum cannabinum, commonly known as Canadian hemp, has long been used by certain Indian tribes in the treatment of dropsies and as an antidote to snake-bite. The credit of being the first to call the attention of the medical profession to the value of this remedy appears to be due to M. L. Knapp who, in 1826, ascribed to it great value as a diuretic. In 1833 Griscom published the records of a number of cases of anasarca in which the drug had been used with marked benefit. Despite, however, several clinical reports confirming its utility, the remedy appears to have passed into comparative desuetude for a number of years, until in 1898 Dabney contributed a paper reviewing what was known of its physiologic action and describing a number of cases of various conditions of circulatory weakness from valvular lesions of the heart and of edema dependent on disease of the kidneys, which were benefited by the use of Canadian hemp. The evidence gathered from a review of the not very extensive literature on this drug, as well as from my own experiments, indicate very clearly that in *Apocynum cannabinum* we have a remedy of marked value, but which has not achieved such a prominent place among the practical therapeutic agents as it apparently deserves. It is strange how slowly the profession adopts new drugs, the evidence of whose value rests on the observations of experienced clinicians and scientific investigators, when compared with the avidity with which is taken up the products of interested pharmaceutical manufacturers, whose greatest recommendation rests on highly laudatory and widely distributed advertisements. The clinical evidence of the value of *Apocynum cannabinum* and the comparative poverty of studies of its physiologic action have made it appear worth while to study more exhaustively the effect of this substance on the animal organism, and especially on the circulation.

There are several representatives of the genus *Apocynum* indigenous to this country. It would seem, however, from the work of Griscom and Dabney that of this genus only the species of *Apocynum cannabinum* is of value in the treatment of dropsy, although some authorities ascribe similar virtues to *Apocynum androsaemifolium*. My experiments have been made with the fluid extract of *Apocynum cannabinum*.

CIRCULATION.

The changes in the circulation following the intravenous injection of moderate doses of fluid extract of apocynum consist in a marked slowing of the pulse accompanied with a rise of blood pressure. (Tables 1 and 2.) After large doses the pulse becomes exceedingly rapid, the pressure ascending as the result of the increased pulse rate still higher. (Tables 1 and 3.) There was no secondary depression of the circulation;

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in those cases in which sufficient quantity was given to cause death the heart ceased with great suddenness. (Tables 4 and 5.)

After death the heart was always found in complete diastole. In one or two experiments mechanical irritation of the heart caused a few feeble contractions, but in the majority of the experiments in response to such irritation it passed into a state of fibrillary contraction. In one experiment in which the heart was exposed before the drug was given and directly observed under large doses, it passed into fibrillation directly on cessation of its beats without any stimulation.

TABLE 1.—(Weight of dog 10.6 kilo.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	138	17	
1:00	145	9	1 c.c. inj. at 0:5. Not breath'g.
2:00	220	38	Heart stopped suddenly 1 min. later.

TABLE 2.—(Weight of dog 9.5.)

Min. and sec.	Pressure.	Pulse in 10 secs.	Resp.	
0:00	100	17	33	
1:45	116	11	42	At 0:5 Inj. 0.25 c.c.
3:30	155	19	11	At 2 Inj. 0.5 c.c. Resp. dec., pulse irreg.

TABLE 3.—(Weight of dog 6.05.)

Min. and sec.	Pressure.	Pulse in 10 secs.	Resp.	
0:00	120	30	12	Left vagus cut.
1:30				Inject. 1 c.c.
2:00	163	20	17	
2:40				Inject. 1 c.c.
3:00	182	36		Resp. almost impercept.

Stimulation of peripheral end of vagus had no effect on pulse or blood pressure, but respirations became very deep.

TABLE 4.—(Weight of dog 16.6.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	36	19	An attempt was made to cut the cord, but postmortem showed it uninjured.
1:30	67	10	1 c.c. at 0:50.
2:40	98	8	Left vagus cut.
3:10	154	10	
3:40	200	28	Right vagus cut at 3:20.

Later, 2.5 c.c. caused death. (Fig. 4.)

TABLE 5.—(Weight of dog 8.3.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	135	31	Both vagi have been divided.
2:00	47	25	Spinal cord has been cut.
2:30	51	23	Strongly irritate vagus for 20".
3:00	54	23	
4:00	37	24	50" asphyxia.
5:00	41	24	
6:40	190	25	0.5 cm. fl. ext. of apocynum.
			Inject. 5:10.
7:00	197	26	Begin. asphyxia.
8:10	142	33	End asphyxia.

Dog killed by 1.25 cm. (Fig. 5.)

TABLE 6.—(Weight of dog 5 kilos.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	143	25	Both vagi cut.
1:30	119	22	Cord cut.
1:40			Begin. asphyxia.
2:30	72	19	End. Asphyxia.
4:30	55	23	
4:55	58	23	
4:55	58	23	20" Irritation of central end of vagus.
5:10			Inj. 0.25 c.c. fl. ext.
7:10	175	22	

Asphyxia causes progressive fall of pressure till death. Traube waves. Postmortem showed cord almost but not completely cut.

The slowing of the heart was immediately abolished by division of the pneumogastric nerve (Tables 5 and 8), and did not occur if the vagi had been cut before the drug was administered. (Table 6.) It is, therefore, due to stimulation of the inhibitory centers.

The inhibitory stimulation is so marked that it interferes or may mask the stimulant influence of the drug. Thus, in Table 1, the blood pressure arose only from 138 to 145 mm., while in Table 7 the pressure arose as the result of the first injection from 77 mm. to only 117, and a second injection caused even a fall of

the blood pressure. It is noteworthy that in both of these experiments the rate of the heart was extraordinarily slow, in Table 7 being reduced from the rate of 192 a minute to 24 a minute. That the failure of the pressure to rise under these circumstances depended on the slowing of the pulse is shown by the fact that after the disappearance of the inhibitory stimulation the pressure primarily ascends. Thus, in Experiment 7, as the result of the division of the pneumogastric nerves, the pulse rate rose from 24 to 180 a minute, and the pressure in the arteries was more than doubled, rising from 84 to 188 mm. (Fig. 1.)

Fig. 1.—A. Before administration of apocynum. B. After administration of apocynum, showing the changes produced in the circulation by apocynum, namely, rise of pressure, slowing of pulse and later increase in pulse rate and the late paralysis of the cardio-inhibitory mechanism. X. Stimulation of vagus.

The rise in the pressure in Table 1 can, I think, also be justly attributed to the increase in the pulse rate, evidently brought about by secondary paralyzant effect of the drug on the pneumogastric nerve, and not to the asphyxia. Immediately before the rise an attempt was made to practice artificial respiration by manual compression of the chest. Of course, this method does not guarantee that the animal was receiving enough air to prevent asphyxial stimulation of the vasomotor cen-

Fig. 2.—Showing the sudden cessation of the heart in fatal apocynum poisoning. The movements on the fall of the needle are due to respiratory efforts and are not pulse waves.

ters; nevertheless, the suddenness of the rise of the pressure and the time of its occurrence indicate clearly that it depended on the increased rate of the pulse.

The secondary increase in the rate of the pulse is probably due to a late paralysis of the peripheral terminations of the pneumogastric nerve, since electrical irritation of this nerve had no effect on the pulse rate. (Table 3.)

The rise of the pressure is not dependent on any changes in the respiration or motor excitement as it

occurred equally as marked in thoroughly curarized animals as in the normal dog. (Table 8.) According to Dotschewski,¹ the rise of pressure depends on a stimulation of the vasomotor centers in the medulla and spinal cord.

TABLE 7.—(Weight of dog 7.7.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	85	33	Spinal cord has been cut.
0:10-2:30			Asphyxia.
2:40	69	32	
8:10	77	33	
8:10			Inj. 1 c.c. fl. ext. apocynum.
11:10	117	16	Inject. 1 c.c. at 11:15.
15:10	84	4	
15:20	188	30	Cut vagi.

Postmortem showed the spinal cord had been cut between the second and third cervical vertebrae. The cord was entirely severed save for a small amount on the anterior aspect. Both the lateral tracks seemed to be completely divided as well as all the posterior columns. (Fig. 5.)

TABLE 8.—Weight of dog 10.4 k. Curarized.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	88	28	At 0:5-0:30 inj. 0.03 gm. Curare.
2:50	73	35	Artificial respiration.
3:00			Inject. 0.01 gm. apocynin.
3:50			Inject. 0.02 gm. apocynin.
11:00	77	29	Manometer tube slipped.
12:30	88	30	0.07 gm. has been injected.
14:30	91	30	At 14" inject. 0.07 gm.
17:30	81	28	
18:00	43		17:50 inj. 0.07 gm.
18:30	97	25	0.04 gm. inj. no marked effect.
20:30	92	29	20:35 inj. ¼ c.c. fl. ext. apocynum and 21:30 1.25 c.c. mere fluid extract.
21:10	142	15	
22:10	184	36	
23:10			Heart stopped suddenly.

Apocynin 1 per cent. solution in dilute sodium carbonate. (Fig. 6.)

My own results lead me to contrary conclusions, because I have found that after section of the spinal cord the elevation of the blood pressure is equally as marked, if not more pronounced, than in the normal animal. Thus in the experiment No. 5, in which the normal pressure was 135, but fell to 47, after division of the spinal cord, under the influence of apocynum the pressure arose to 197. That the cord was completely divided was verified both by postmortem examination and by the fact that neither irritation of the central end of the vagus nor asphyxia caused any elevation of the blood pressure. In the experiment No. 7 the result of the injection was the same. In this experiment, although after postmortem a small portion of the anterior part of the spinal cord was found not completely divided, the fact that neither irritation of the vagus nor asphyxia caused any rise in the pressure, shows that the vasomotor fibers had been completely divided. When we compare the effects of apocynum in the normal animal and after section of the spinal cord, it is seen that in the latter case the pressure arose not only a greater number of millimeters, but reached a point as far above the normal pressure as in the uninjured dog. Thus the average of rise in Tables 1, 2 and 3 in which the cord was not divided is 66.3 mm. above the normal, while the average in 5, 6 and 7 in which the cord was divided was 65.6 mm. higher than the pressure before the section of the spinal cord. It is evident, therefore, that destruction, at least of the medullary vasomotor centers, has no influence on the stimulant effect of the drug on the circulation. That the drug has a stimulant influence on the cardiac muscle, is evident from the

1. I have not had access to the original paper by Dotschewski, which was published in the Russian periodical *Vratch*. In the abstract I have quoted from there were no details of the experiments by which he reached his conclusions. It is impossible therefore to explain the contradiction between his results and my own. Incidentally it may be mentioned that in all other points our conclusions are in accord.

TABLE 9.—(Weight of dog 15 kilos.)

Min. and sec.	Press.	Pulse.	Kidney.
0:00	125	20	4.3
1:00	125	20	4.2
1:30	122	19	4.2
2:30	120	25	4.1
3:00	140	22	4.0
3:20	140	21	3.6
4:20	140	19	2.7
5:20	140	19	2.5
6:30	138	22	2.2
7:20	141	20	1.5
8:20	150	27	0.5
9:20	150	27	0.4
11:30	147	42	1.0

2:35 inj. 1½ c.c.

Inj. 1 c.c. at 6:50.

TABLE 10.

Min. and sec.	Press.	Pulse.	Kidney.
0:00	155	22	2.1
1:10	155	25	1.6
6:00	158	24	2.0
6:40	180	20	2.1
6:55	170	17	1.5
7:10	168	18	1.1
7:30	174	16	0.9
7:45	180	13	0.8
8:00	200	10	1.0
8:40	260	33	1.7
9:00	290	40	1.9
9:30	260	40	1.7
10:20	46	..	2.2

Dec. 8, wt. of dog 17 k.

6.20 inj. 1½ c.c.

Heart has stopped.

These figures refer to c.c. of fluid in the registering tube. The fall, for example, in Table No. 9, from 4.3 to 0.4 means that the kidney has diminished in volume to an extent of 3.9 cubic centimeters.

Fig. 3.—Crystalline body separated from apocynum cannabinum.

character of the pulse wave, and also from the fact that the frog's heart was arrested in systole.

It seems extremely improbable that any stimulation of the heart could be sufficient to explain such an enormous rise amounting to 156 mm. in one experiment (Table 5) as was obtained in these experiments if the blood vessels were relaxed, as, of course, they normally are after division of the spinal cord. Of course, these experiments do not prove that the drug has no influence on the vasomotor centers located lower down in the spinal cord, but these centers are so comparatively feeble that it seems unlikely that they play any great rôle in the marked elevation of the arterial pressure, especially in view of the fact that they did not respond to the stimulation of carbonic acid. It would, therefore, seem probable from these results that the rise of pressure depends on a simultaneous stimulation of the heart and of the muscular coats of the arteries.

My belief that there is a constriction of the vessels as well as a stimulation of the heart is further borne out by experiments made on the volume of the kidney. For this purpose I employed the well-known oncometer of Roy. With this method I obtained constantly a

diminution in the volume of the kidney betokening a corresponding lessening in the caliber of the renal capillaries. (Tables 9 and 10.)

If given in sufficient quantity, apocynum produces in the frog complete paralysis. Its action, however, on the nervous system is quite subsidiary to its effect on the circulation, for I found that after a dose sufficient to cause arrest of the heart, there was still a certain amount of voluntary and reflex power, and the motor nerve responded normally to electrical irritation for two hours after the heart had stopped beating.

ACTIVE PRINCIPLE.

In 1883 Schmiedeberg isolated two substances from *Apocynum cannabinum*, which he believed to be the active principles. Of these one was a glucosid, to which he gave the name of apocynein, the other he obtained as an amorphous substance, the chemical character of which he did not determine, and to which he gave the name of apocynin. I was kindly furnished by Merck & Co. with a substance labeled "apocynin," which, however, I found to be almost inert. It produces none of the characteristic changes in the blood pressure produced by the crude drug (Table 8), but when given in large quantities acted as a circulatory depressant. As Schmiedeberg did not give in detail the method he employed for isolating these principles, I was unable to make them for myself, and although I have applied to Merck & Co. for the glucosid, I have not received it.

Fig. 4.—c. l. Cut left vagus. c. r. cut right vagus.

Under these circumstances it seemed to me advisable to make an independent attempt to isolate the active principle for myself. This portion of the investigation was carried out in the chemical laboratory of Professor Marshall, to whom I desire to express my thanks for constant advice and assistance in the investigation. After trials with a large number of extracting substances, I finally obtained by extraction with benzole a crystalline body, contaminated, however, with a large amount of yellow resin-like material. Physiologic tests of these impure crystals showing they were active, I attempted to obtain them in a purer form. To accomplish this end, I first tried washing the mass with a large number of solvents, but the result from this procedure was negative, the crystals being soluble in all these solvents which took up the resin. Finally, by dissolving the mass with hot water and then allowing it to cool, the crystals separated out in a comparatively pure condition. After repeating this process several times I obtained crystals which, although not absolutely clean, were very nearly so. These crystals when tested physiologically arrested the frog heart in systole; a dose of 2 mg. per kilo in a dog produced distinct elevation of the blood pressure with slowing of the pulse; a dose of 1 cg. was sufficient to cause death

in a dog weighing 4.2 kilo with the characteristic and sudden arrest of the heart. (Fig. 3.)

These crystals were soluble in ether, chloroform, alcohol, acetone, benzol and hot water, and were insoluble in cold water, petroleum ether and carbon bisulphid; their melting point was 112 C. On making comparative tests with Merck's apocynin I found it had the same solubilities and had a melting point of 113 C. I am inclined to believe, therefore, that the crystals which separated are identical with Merck's apocynin, the slight difference in the melting point being explained by the contamination which was present in my crystals.

In view of the fact that Merck's apocynin was inactive, I am inclined to believe that the activity of the crystals I separated was due to the adherence of the active principle which I regarded at first in the light

Fig. 5.—Both pneumogastrics and the spinal cord are cut. A. Before injection. The failure of irritation of the vagus to produce rise of blood pressure shows complete destruction of cord. B. Shows the rise of blood pressure under apocynin, also that the drug does not slow the pulse after section of the vagi. X. Irritation of vagus. I. Injection of apocynin.

of a contamination. In support of this view are the following facts:

From 259 c.c. of the fluid extract I obtained 0.6 gm. of impure crystals, that is about 2.3 milligrams from 1 c.c. The dose of the fluid extract required to kill a dog is about 0.1 c.c. per kilo of body weight; if the activity of the plant depended on the crystals it would, therefore, require about 0.2 milligram per kilo to kill, but I found by experiment that with the impure crystals it required approximately ten times this amount. Moreover, the more I purified them the feebler did they become, so that with the purest crystals 43 milligrams

Fig. 6.—Showing the fall of blood pressure under large doses of apocynin; smaller amounts had no effect at all. I. Injected apocynin. X. Stimulation of vagi.

failed to kill a dog weighing 9 kilos, although it did cause a marked slowing of the pulse. Beside this, the original residue left after thorough extraction with a number of agents did not seem to be much diminished in its power, and the material which was separated during the course of the purification of the crystals and which I had regarded as an impurity was physiologically active.

The separation of the active principle from the residue left after extraction with benzol has been a difficult problem which I have not yet succeeded in solving. I have attempted to obtain the active substance of apocynum with a number of methods which have yielded me more or less concentrated preparations of

the active principle, but I have not yet succeeded in obtaining it in a pure form.

The addition of basic lead acetate produced a copious precipitate, but the active substance was not thrown down, passing over into the filtrate. After freeing the latter from lead by passing through hydrogen sulphid, and evaporating the resultant filtrate there was left behind a mass of thick syrupy consistence, which evidently was largely glucose, since it reduced Fehling's solutions and was also fermentable. In order to get rid of this sugar I took the filtrate resulting from the first precipitation from lead acetate, which still contained an excess of this reagent, and added ammonium hydroxid, with the hope that a portion at least of the glucose might be precipitated as a lead saccharate. Even by this means, however, I failed to get rid of all the glucose, so that I still had left behind a substance which could not be evaporated to dryness. This residue was extracted successively with ether, chloroform, benzol, acetone, amyl alcohol and petroleum ether without yielding any results.

Although I have not succeeded in obtaining the active principle in the pure form, I am, nevertheless, strongly inclined to believe that it is in the nature of a glucosid. This view is supported in the first place by physiologic evidence that all cardiac poisons which resemble digitalis in their action which have as yet been isolated have been glucosids. More important than this, however, is the following chemical evidence: I took 5 c.c. of the fluid extract, which had been freed from resin by precipitation with water, and evaporated off the alcohol, added to it some dilute hydrochloric acid and boiled fifteen minutes. The resulting fluid was neutralized with sodium carbonate and injected into the vein of a dog, with the result that there was neither elevation of the blood pressure nor slowing of the pulse.

DISCUSSION.

DR. CLEMENT B. LOWE, Philadelphia, stated that there is some uncertainty, when apocynum is spoken of, whether we are dealing with *Apocynum cannabinum* or *Apocynum androsaemifolium*, dog's bane. He went to a large drug house for some *cannabinum*, and found that it was *androsaemifolium*. He returned it and was told that they always supplied that preparation when apocynum was ordered. Dr. Lowe said that he is afraid, therefore, that Dr. Wood has been working with *androsaemifolium*. The two are very much alike, but differ microscopically in the arrangement of some of the bark cells, which in dog's bane are thick-walled and arranged in groups in a circle near the middle of the bark. It also responds differently to the phloroglucin test. To distinguish them is also more difficult because of the tendency of dog's bane and Canadian hemp to hybridize. A few years ago, when Dr. Lowe was out botanizing, he came across a plant that he could not understand; on studying it he found that it was a hybrid of these two species. The value of a bitter principle is that it causes an increased flow of gastric juice, just as it increases the saliva. Its bitterness is the important feature, and it is lost when disguised. If patients complain that it is bitter, tell them that is why it is given, and that the effect of the bitter can not be obtained without giving a bitter drug.

PROF. C. S. N. HALLBERG, Chicago, called attention to the fact that the alcoholic concentration has been on the market for twenty or thirty years. This preparation of *Apocynum cannabinum* is called "apocynin," and is prepared by precipitating a concentrated alcoholic tincture of the drug in water, following the usual eclectic method and nomenclature. It would be well to remember the fact that if any physician should prescribe apocynin he would probably get, in the vast majority of instances, the eclectic resinoid, instead of the glucosid recommended by Dr. Wood.

PROF. JOSEPH P. REMINGTON, Philadelphia, said that we are all very apt to believe that the active principles of the various drugs are either alkaloids or glucosids of a crystallizable character. We have been led to this idea from the fact that morphin, strychnin, codein and many others are crystalline. In a great many instances the active principles are not crystallizable. For instance, in cubeb and pepper oleoresins are the important constituents. He thinks that the active principle of the drug would be more likely to be a resinous substance, possibly left in the solution which Dr. Wood threw away, instead of the crystallizable principle. In determining these questions Dr. Wood has a much better opportunity of carrying on an investigation into their physiologic action than a pharmacist would have.

DR. H. C. WOOD, JR., said that he was supplied with fluid extracts of both *cannabinum* and *androsaemifolium*, but he had relied entirely on the statement of the pharmacist as to the identity of the fluid extracts. He stated that he did not throw away the residue after getting the crystals, and on subsequent trial he found that it had some activity. He said that the drug is useful in cases of dropsy, whether associated with cardiac weakness or hepatic cirrhosis. He hopes at a future time to bring some more accurate observations on the clinical uses of the drug.

USE OF DIAPHORESIS AND DIAPHORETIC AGENTS IN OPHTHALMIC THERAPEUTICS.*

HIRAM WOODS, M.D.
BALTIMORE.

To properly estimate the therapeutic value of an agent, allowance must be made for the natural enthusiasm of those who introduce it and who often record results which later experience fails to confirm, and the tendency of certain things to remedy themselves, the exciting cause having been removed. Disappointment may ensue because too much is expected. Credit may be given when none is due. Truth lies between these extremes, and is to be reached, it seems to me, by finding out what one should look for, basing judgment on the physiologic effects of the remedy, and the teachings of clinical experience. An example of what one may, not illogically, term therapeutic enthusiasm and therapeutic chaos, is found in the statements of books on general therapeutics and those on eye diseases, regarding the use of diaphoretic agents in ocular affections. If we could accept, for instance, all of the following from Potter's "Materia Medica," pilocarpin would be little short of an ocular panacea. Says this writer: "Ophthalmologists employ pilocarpin with most excellent results in the amblyopia of alcoholism, and that from the use of tobacco, in detachment of the retina, chronic iritis, keratitis, glaucoma, hemorrhage into the vitreous, atrophic choroiditis, white atrophy, to promote resolution and absorption in inflammatory conditions with exudation." Bartholow and other writers indicate practically the same scope. The student turning from this general advice to special works will, I think, be disappointed if he expects to find specific and positive information as to what in this list is true and what is not. Most of our special writers indicate that diaphoresis has been recommended or may be tried in these conditions; but in no text-book with which I am familiar is there the positive teaching the subject deserves, and which is justified by our present knowledge. Scattered through current literature are many most interesting and in-

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