his dress. Since then he has improved steadily in every respect, he has regained what he lost in weight, notwithstanding attacks of diarrhoea and vomiting when the weather is cold or he is worried; he can do a full day's work without distress, is neat and clean in appearance, and has had no return of craving for opium or for alcohol.

It seems to me that this case illustrates how very strong an effect atropine has as an antidote to opium. Every circumstance was against the success of treatment except the patient's own earnest desire to be cured. I have seen him frequently since treatment was completed, and feel satisfied that so far it has been perfectly successful, and promises to prove permanently so.

THE PHYSIOLOGICAL ACTION OF WHISKY ON THE CIRCULATION.

BY

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THE action of alcohol upon the circulation, and more especially the influence which it exerts in diseased conditions has long been a subject of dispute. Briefly it may be stated that two views have been advanced: (1) That alcohol in suitable doses acts as a stimulant; and (2) that the action of alcohol is always depressant. The supporters of both views agree on one point, namely, that to a certain extent alcohol is burnt up in the body tissues, and thus to a limited degree acts as a food.

Although these views are still under dispute, it seems from the careful investigations of recent observers that the statement regarding the depressant action of alcohol upon the highest nerve centres is probably correct.

As regards the effect of alcohol in medicinal doses on the blood pressure, it is generally held that in healthy individuals there is practically no action. The elaborate investigations of Cabot upon a large number of patients suffering from enteric fever show that any influence which alcohol exerts in this disease upon the circulation, respiration, and excretion of urea is of a very transitory nature. The same point is brought out in the recent work of Martin Kochmann.¹ It is not meant, however, that alcohol has no action upon the circulation, as witness, for example, the cutaneous flushing which it produces. Still the general pressure is not lowered, and therefore there must be another effect produced in some other vascular region. To account for this apparent slight action, Meltzer² has suggested that probably a constricting influence is exerted on the vessels in the area supplied by the splanchnic nerves—that is, within the abdominal cavity. Alcohol, according to this observer, does good in so far as it leads to a redistribution of the blood in diseased conditions.

Very little is known about the action of the various wines and spirits commonly used in practice as compared with that of pure alcohol, with which the pharmacological experiments mentioned above have been carried out. In this country the favourite alcoholic stimulants are whisky, brandy, port wine, and champagne, and of these probably whisky is most frequently employed. It is, therefore, of interest to know (1) what is the nature of its action, and (2) whether it is a generic action, or whether it depends on the character of the whisky employed. A recent law case in England has shown that, technically, there is a difficulty in determining what constitutes whisky. In Scotland it is popularly understood that pot-still whisky is the true product, and that patent still products are not genuine whiskies. The pot-still whisky is more complex in its character, and contains secondary ethereal products which may conceivably alter the alcoholic action; whereas the patent-still product is a much purer substance, and is much more cheaply produced. Our attention was drawn to this question by the somewhat irrelevant evidence adduced to show that there was a distinct difference in action between the two products. One gentleman (not a pharmacologist) stated in evidence that a difference in action could be demonstrated on animals. He said that a pet monkey, when made drunk with pot-still whisky, "behaved like a gentleman," whereas, when intoxicated with patent-still whisky, "its conduct was that of a beast."

A comparative investigation into the action of pot and patent still whiskies seemed the most likely method of determining any difference. With this object we tested upon three healthy men, practically abstainers, the effect produced upon the circulation by corresponding doses of absolute alcohol and of whisky. The action was studied upon the rate of the pulse and upon the peripheral tension as measured in the brachial artery by means of Martin's modification of the Riva-Rocci sphygmomanometer and in the digital arteries by Gärtner's tonometer. The dose given corresponded to 1 oz. of absolute alcohol, and sufficient water was added to make the dilution of alcohol 1 in 4. While no special importance was paid to the mental effect, we may state that as a rule this amount of alcohol produced a distinct sedative action. During the experiment the subject remained seated in a chair and was allowed neither to speak nor move. The investigations were carried out at different periods of the day, and at varying intervals after food. A sufficient number of blank experiments was done to show that under similar conditions without alcohol the alterations in pulse and pressure were almost *nil*. Thus in a blank experiment upon one of the subjects four observations showed that in 25 minutes the pulse-rate only varied two or three beats whilst the pressure in the digital arteries varied to the extent of only a decimal point, ranging between 4.0 and 4.1 as estimated by Gärtner's instrument. The readings of another blank experiment on the same man, in which the pressure was estimated by the Riva-Rocci instrument, were:

Time.	Pressure.	Pulse.
7.16	105	76
7.23	105	78
7.27	106	78
7.37	106	75
7.40	106	77
7.50	105	75

Our control experiments demonstrate that the pulse shows slightly more variation than the blood pressure, but such alterations are very trifling.

The normal variation having been fixed we proceeded to test the effects of drinking 2 oz. of whisky mixed with 2 oz. of water. A typical experiment is reproduced for each form of whisky, all three observations being made upon the same man.

The results obtained on the other two healthy subjects varied only very slightly from those shown in the accompanying table (page 1175). From the three series of observations (several of which were duplicated) composite charts were drawn out for each form of alcohol.

Whisky S has very little action on the circulatory system. The pulse-rate rises slowly from the commencement, then slowly sinks to the former level, or perhaps a little higher. The pressure is somewhat reduced. This whisky has perhaps a greater soporific action than either A or C.

Whisky A in all three individuals caused a slight increase in the pulse-rate within the first ten minutes, followed by a fall to normal or slightly below normal. The blood pressure is seen to correspond with the pulse. When the pulse-rate increases the pressure rises, and vice versa.

Whisky C does not bring about an increase in the pulse-rate. In all three men the pulse-rate is not more frequent, but in all three there is a slight rise in the pressure, as is brought out in the composite chart. In only one instance was a transitory rise of pulse-rate noted, where it was probably due to direct irritation, as in this instance the swallowing of the alcohol brought on a fit of coughing.

Absolute alcohol produces a very constant action upon all three men. No well-marked preliminary increase of pulse is noted. The pulse falls in rate by a few beats, and with this there is a slight reduction in pressure.

In general terms it may be stated that the effect upon the pulse and pressure of all three alcoholic preparations, in the above dosage, is very slight, and that after the first ten minutes practically no difference can be detected

Whisky S.			Whisky A.			Whisky C.			Absolute Alcohol.		
Time.	Pressure.	Pulse.	Time.	Pressure.	Pulse.	Time.	Pressure.	Pulse.	Time.	Pressure.	Pulse.
12 50	105	68	11.48	92	53	4.50	—	63	4.20	106	80
12 55	104	68	11 55	92	56	4.53	102	—	4.26	104	73
1.0	104	67	11.58	92	56	4.55	—	64	4.35	104	79
1.2	2 oz. + 2 oz. water		12.2	2 oz. + 2 oz. water		4.58	102	—	4.36	1 oz. + 3 oz. water.	
1.5	98	63	12.6	96	62	5.0	2 oz. + 2 oz. water		4.42	104	80
1.10	102	67	12 12	94	60	5.4	106	65	4.45	104	80
1.22	106	68	12 19	94	60	5.12	104	60	4.53	102	76
1.25	104	67	12.25	92	58	5.20	100	58	5.0	100	73
1.32	102	62	12.33	94	62†	5.27	102	60	5.7	93	76
1.39	104	65	12.40	92	55	5.35	102	60	5.12	102	78
1.45	104	61	12.46	92	58	5.42	104	53	5.23	100	76
1.50	103	63	12 54	94	57	5.47	102	53	5.29	100	74
—	—	—	—	—	—	5.57	102	58	5.42	102	73
—	—	—	—	—	—	6.3	102	62	—	—	—

* Sleepy.

† Spoke.

The whiskies tested were guaranteed samples of their particular brands. Whisky S was a pure malt pot-still whisky. Whisky A was a pure uncoloured patent-still whisky. Whisky C was also a pure patent-still product, but coloured. The two patent-still whiskies were amongst those which are most in demand. The alcoholic content of these various whiskies was respectively: S, 47 per cent. by volume; A, 58 per cent. by volume; C, 48 per cent. by volume; absolute alcohol, 93-93 per cent. For purposes of experiment we regarded, from these figures, 2 oz. of whisky as equal to 1 oz. of absolute alcohol.

between the action of absolute alcohol and the whiskies examined. In other words, the action of whisky on the pulse and pressure depends upon its alcoholic content and not upon any special body distilled over either in the process employed in the manufacture of pot-still whisky or in that used in the preparation of the patent-still whisky.

We performed a limited number of experiments of a similar comparative type on patients suffering from pneumonia, the classical instance of a disease in which alcohol

to a slight increase in length of action of alcohol than to any essential difference in effect from that produced on the normal circulatory system.

Finally, an attempt was made by intravenous injection in rabbits to detect any difference in action of these various alcohols on the blood pressure measured at the carotid artery. Here, again, no distinct difference could be observed.

In conclusion, we wish to offer Dr. R. May our best thanks for his assistance in this investigation.

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¹ *Archiv. de Pharmacodyn. et de Thérap.*, xv, 1903, p. 443. ² BRITISH MEDICAL JOURNAL, 1906, ii, p. 1463. ³ *Fock, Münch. med. Woch.*, 1906, No. 44.

CALCIUM SALTS IN THE TREATMENT OF CERTAIN TYPES OF PNEUMONIA.

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As we appear to be in danger of a boom in calcium salts in the treatment of pneumonia, and as, in my opinion, the withholding of them in certain types of cases may be quite as important as their administration in other types, I venture to give a short account of two cases of pneumonia treated by me in April, 1903. The types of the two cases, or perhaps it would be more accurate to say, the two soils in which the disease grew, were in marked contrast.

CASE I.—The Haemorrhagic Type.

A married woman, aged 38, of stout build, had pneumonia of the right base, and on the evening of the fourth day of the disease her chances of recovery appeared to be small. She could only breathe when propped up high with pillows; respirations were shallow and 42 to the minute; she was cyanosed; had an almost incessant cough and was expectorating a large quantity of watery, haemorrhagic sputum (upwards of one pint in 24 hours); she was vomiting after medicine and food; her temperature was 102.4°; her pulse was small, of low tension and 122; her urine contained albumen; she was obviously becoming weaker.

The drugs that had been administered to her were ammonia, digitalis, strychnine, and brandy; her diet had consisted of milk, beef-tea, meat extracts, etc.

The picture that the woman presented to my mind was that of one drowning in her own excretions rather than that of one dying from a toxæmia. She was of the hydraemic type, and I considered her condition to be due to an insufficiency in the coagulability of the blood. Reasoning upon these lines, I observed the effect of the next dose of brandy upon her, when, as I noticed an increased difficulty in respiration and an increase of the sputum shortly after its administration, I felt confirmed in my opinion, and altered my previous treatment. The diet was restricted to milk, at first by the rectum, and afterwards by the mouth. The brandy and the other drugs were stopped, and she was given 20 grains of calcium

Composite charts for whiskies C.S.A. and absolute alcohol Time in minutes; pressure taken by Gärtner's tonometer; pulse — pressure — — —

is exhibited for its stimulating action. A recent German writer⁴ has emphasized the fact that most clinicians in Germany who use the drug for its stimulating action have no clear conception of the guiding principles underlying its use. Probably no better rule is available than the old dictum that so long as alcohol reduces the pulse-rate, steadies the heart, and increases its tone, the drug is doing good. Incidentally we may point out that in cases of great cardiac embarrassment we did not find any reduction in pressure. Our observations in pneumonia, as far as they go, under these conditions would seem to point rather