high degree of toxic action upon mesenchymal tissue and blood vessels with those preparations not containing theophylline.

(5) It was found that intracutaneous injections in man (9 subjects) of 0.02 cc. of the drugs free of theophylline using dilution 1:10 produced a greater local reaction as regards extent, severity and duration than those preparations containing theophylline. In the dilution used the greatest reaction was the production of a small superficial slough.

It has been demonstrated that the presence of theophylline in combination with a mercurial diuretic definitely decreased the local toxic action. This was true not only for the animal experiments but also for man.

8171 C

Blood Alcohol and Its Relation to Intoxication in Man.*

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A method was described[1] for the detection of blood alcohol based on the Naville modification of the Nicloux method. It differs from the above modification in that the proteins are precipitated with the ordinary Folin-Wu reagents and the distillation is carried out with a modified ice condenser. When applied to blood distillates the method gives an average per cent error of 5.09 with a range of 0.3 to 15.0. The greater error is encountered in blood samples containing less than 10.5 mg. of alcohol. Schumm and Fleischman[2] showed that during the first hour the blood alcohol rose more rapidly than did the spinal fluid, but that during the decline of the blood alcohol the spinal fluid surpassed it and remained at a higher level. Abramson and Linde[3] showed that the alcohol content of the spinal fluid rose more slowly than that of the blood and reaches its maximum later. This maximum is lower than that

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1 Turner, R. G., *J. Pharm. and Exp. Therap.*, 1932, **44**, 305.

2 Schumm, O., and Fleischman, R., *Deutsche Z. f. Neivenheilkunde*, 1913, **46**, 275.

3 Abramson, L., and Linde, P., *Arch. Internat. de Pharmacodynamic et Ther.*, 1930, **39**, 325.

reached by the blood. A previous communication[1] from this laboratory shows that intoxication in the dog is definite, if within one-half to two hours after ingestion the alcohol content of the blood measures 0.25%; at a blood alcohol concentration of 0.3% intoxication is marked and a concentration of 0.4 to 0.5% is accompanied by alcoholic stupor. Gettler and Freireich[4] published results indicating that there was a more constant relation between the alcohol content of the brain and spinal fluid than between the brain and blood.

Newman and Mehrtens[5] in a report on 50 cases induced intoxication both by intravenous and oral route. They conclude that the alcohol content of the cerebral fluid closely follows that of the blood and correlates well with the symptoms of intoxication while that of the lumbar fluid shows a lag of about one hour and suggests that the better index is probably that of the blood.

In this paper the results of estimating blood alcohol in humans is reported. A total of 32 cases brought into Receiving Hospital, Detroit, for supposedly being drunk were tested. The blood was obtained from the cubital vein and the alcohol determined as previously described.

The degree of intoxication is indicated from the mode of action, appearance and speech as follows:

Intoxicated—Under the influence of liquor. Able to stand, but talk and walk not normal.

Markedly intoxicated—Able to stand but falls frequently.

Alcoholic Stupor—Not able to stand but would attempt to answer questions and attempt movements.

Coma—Unable to move or answer.

These are indicated by the blood alcohol concentration in the following manner:

Blood Alcohol	%	
0.1	0.2	Not intoxicated
0.21	0.3	Intoxicated
0.31	0.4	Marked intoxication
0.41	0.5	Alcoholic stupor
0.5	0.6	Coma

The results of this investigation show that 6.3% or 2 of the cases gave negative blood tests. One of these cases was later diagnosed as angina pectoris and hypertension. In the other case

[4] Gettler, A. O., Freireich, A. W., *J. Biol. Chem.*, 1931, **92**, 1929.

[5] Newman, H. W., and Mehrtens, H. G., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 725.

RESULTS

Case and No.	Sex	Race	Age	Time blood taken	Condition	Blood alcohol %
E.H. 1	Male	white	—	10:30 P.M.	Intoxicated, not in stupor. Would not talk about what he drank or how much.	0.321
J.C. 2	”	”	—	—	Slightly intoxicated, talkative but could walk with very little staggering.	0.260
F.M. 3	”	”	—	—	Coma, cannot sit up or talk	0.570
R.F. 4	”	”	31	11:00 P.M.	Talkative but not intoxicated. Drank ½ pint of gin but did not say when.	0.20
C.M. 5	”	”	28	10:00 P.M.	Not intoxicated, talks moderately. Drank 4 whiskeys.	0.149
L.R. 6	”	”	51	4:30 P.M.	Chronic alcoholic. In stupor. would not talk. Picked off street.	0.440
M.D. 7	Female	colored	32	3:30 P.M.	Picked off street in alcoholic stupor. Would not talk.	0.220
J.B. 8	Male	white	45	5:00 P.M.	Picked off street. Not in stupor. Marked intoxication.	0.300
M.M. 9	Female	colored	28	2:30 P.M.	Picked off street at 2:00 P.M. Talkative and crying. Could not answer questions intelligently.	0.320
F.C. 10	Male	”	38	10:45 A.M.	Liquor drank night before. Claims to have had none in morning. Hit by car. Talkative and appeared intoxicated.	0.240
E.J. 11	Female	”	31	10:10 A.M.	Throat cut. Last drink 3 hours previous. Talkative but not raving. Had 10-13 drinks of lightning.	0.270
F.C. 12	Female	white	25	12:50 P.M.	Struck by car. Very talkative and silly. Does not stagger, slightly unsteady. Drank wine at 10:30 A.M.	0.250
J.J. 13	Male	colored	32	10:30 A.M.	Last drink at 3 or 4 A.M. Had been hit on head by wife. Talks with sense. Does not stagger or appear intoxicated. Drank lightning.	0.167
T.P. 14	”	white	65	11:30 A.M.	Talkative, spry but unsteady on feet. Last drink 2 hours previous.	0.230
H.M. 15	”	”	60	2:15 P.M.	Taken to hospital at 1:40 P.M. unconscious. Still in stupor at 2:15 P.M. Refuses or cannot talk.	0.275
J.D. 16	”	”	—	—	Unconscious.	0.448
J.E. 17	”	”	—	—	Alcoholic stupor. Could not talk	0.424
D.M. 18	Female	colored	29	7:00 P.M.	On admittance slightly intoxicated. Could talk but refused. Drank pint of whiskey on empty stomach.	0.260
D.M.	”	”	”	11:00 P.M.	Sober; could talk without difficulty. Would not state when she had taken liquor.	0.140

RESULTS (Continued)

Case and No.	Sex	Race	Age	Time blood taken	Condition	Blood alcohol %
J.D. 19	Male	white	—	11:05 P.M.	Markedly intoxicated. No information obtained regarding liquor.	0.350
J.S. 20	"	"	—	8:10 P.M.	Intoxicated. Could talk but refused to say anything.	0.360
J.M. 21	"	"	—	—	No information regarding condition or time blood was taken.	0.250
W.S. 22	"	"	35	7:05 P.M.	Belligerent; talkative, crying. Fairly steady on feet.	0.250
W.A. 23	"	"	42	5:00 P.M.	Unconscious. No information obtained.	0.300
B.S. 24	"	"	35	3:30 P.M.	Rational. Had been drinking whiskey, gin, or anything continuously for 3 weeks. Staggered but not markedly intoxicated.	0.390
J.D. 25	"	"	37	7:15 P.M.	Alcoholic stupor. Regurgitated 15 minutes after admittance.	neg.
J.I. 26	"	"	42	4:30 P.M.	Alcoholic stupor. Regurgitated. Blood taken 10 minutes after admittance.	0.250
J.N. 27	"	"	51	4:45 P.M.	Fainted twice in County Bldg. Claimed loss of memory. Diagnosed later as angina pectoris and hypertension.	neg.
W.N. 28	"	"	49	7:45 P.M.	Fairly intoxicated; quite talkative. Had last drink one hour before. Says he is chronic.	0.207
R.H. 29	Female	"	28	11:30 A.M.	Alcoholic stupor. Says she did not drink. Hysterical and raving at times. Would not answer questions.	0.460
C.L. 30	Male	"	—	1:00 P.M.	Unconscious. Lacerated scalp and possible skull fracture. Accident case.	0.330
J.D. 31	"	"	—	11:50 P.M.	Unconscious. No information	0.370
J.D. 32	"	"	55	2:20 P.M.	Unconscious. After bath woke up but remained in stupor. Difficult to talk.	0.450

no definite information was obtained. Four or 12.5% showed a blood alcohol of 0.1 to 0.2%. Of these, Case 4 stated that he drank ½ pint of gin but would not say when. Case 13 had last drink between 3 and 4 A. M. At 10:30 A. M., the time the blood was taken, he appeared normal. Previously he had been hit on the head by his wife. Thirty-seven and five-tenths per cent of the cases appeared intoxicated and the blood alcohol level was between 0.21 and 0.3%. In this class 41.6% (cases 7, 15, 26, 23 and 8) showed more intoxication than the test revealed. Marked intoxication, 0.31 to 0.4% blood alcohol level, was found in 25% of the cases. Of these cases

two were unconscious. Case 30 is explainable because of a lacerated scalp and possible skull fracture. No information was obtained in Case 32.

Alcoholic stupor was observed in 15.6% with blood alcohol between 0.41 and 0.5%. Of these cases two were unconscious. Case 32 was unconscious but woke up after a bath.

The cases showing a blood alcohol from 0.5 to 0.6% amounted to 3.1%. The above result for non-intoxication 0.1 to 0.2% blood alcohol apparently is greater than the amount indicated by Heise,[6] who believes loss of efficiency and judgment occurs even when small amounts of alcohol, 0.02%, accumulate in the blood and urine, although the individual can still walk and talk. It is shown from the results given that in all the stages of intoxication a small percentage of the cases always show more signs of intoxication than the blood test actually reveals. This we believe to be due to accidents, complications, taking hypnotics or other sleep producing substances previous to the consumption of alcoholic drinks. Experiments have been conducted on dogs to partially prove the latter point and the results will be reported in another communication.

Summary. In general, intoxication is not noticeable in the human until the blood alcohol concentration is greater than 0.2%; from 0.31 to 0.4% there is marked intoxication; alcoholic stupor is definite between 0.41 and 0.5%; above 0.5% coma or death may result.

8172 C

Effect of Total Pneumonectomy on Position of the Esophagus.*

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The increasing number of instances in which the total removal of one lung in man is being performed for tumor or bronchiectasis has created renewed interest in the effects of this procedure. The experiments reported here deal with the effects of total pneumonectomy on the position of the esophagus of the dog, but it does not follow necessarily that similar alterations occur in the human.

[6] Heise, H. A., *J. A. M. A.*, 1934, **103**, 739.

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