Donald Macleod M.B

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Alcohol; its effects

When alcohol is taken in large quantities, and undiluted, it causes death almost instantly, as if by shock to the sympathetic system. A case is described by Orfila of a soldier who drank eight pints of brandy for a wager, resulting in death almost instantly‡. A case of a similar kind is quoted by Prof Marx†

A case was reported in the daily papers of a young man in Birmingham in April 1885, who drank for a wager twenty five sixpennies worth of spirits which caused death in a few minutes.

When death comes on within a few hours. There is generally little

‡ Toxicol Gén ii 454

† Die Lehre von den Giften I ii 306

excitement; coma comes on in a few
minutes and soon becomes as profound,
as in apoplexy. The face is then
sometimes livid more often pale;
the breathing stertorous and smells
of the alcohol; the pupils at first are
contracted but soon are dilated,
and insensible, death ~~some~~ ensues
by paralysis of the respiration
and circulation. Mr Bedingfield,
who has witnessed many cases
of poisoning, with rum at Liverpool,
states from his experience, that the
patients will recover; if the pupils are
contracted, but if they are dilated, and
unstimulous on the approach of light
recovery is improbable‡.

When the poisoning does not
come on so rapidly, usually ending
fatally, in from twelve to eighteen

‡ Edin Med & Surg Journal XII 489

hours. The person is greatly excited, and violent, the face flushed, Confusion of thought, delirium, Co-ordinating power over the muscular movements are impaired, of the tongue, of the eyeballs, and of the limbs, the lower limbs first and affecting the extensors before the flexors, the cutaneous Sensibility is impaired. These symptoms are followed by dozing, and gradually increasing Somnolency, the person becoming, Comatose these proving fatal; or death may be caused, by some ~~by~~ trifling accident, for which the person Cannot respect ~~by~~ the reason of his powerless in-Sensibility. It is not an uncommon thing for persons in this state, to fall down in an exposed place,

where they perish from cold, or to tumble with their face, in a puddle and be suffocated, or by inhaling some of the contents of the stomach imperfectly vomited, or by lying in such a posture that their neckcloth produces strangulation. In other cases death may be caused by disease of the brain, induced by the previous excited state of the circulation. Death may not, however, occur although coma has set in, it may gradually disappear, and then it may be followed by giddiness, headache, sickness, and vomiting.

There is a singular variety in the principal symptoms, of this form of poisoning. Dr Ogston of Aberdeen from an analysis of

of the sixty five cases, I found that when the disease has set in, the pulse is sometimes capable of being roused, that the pulse is sometimes distinct, or even full, sometimes imperceptible, or very feeble, generally slow or natural, seldom frequent, very seldom firm; that the pupils are generally dilated, occasionally contracted, in a few instances, alternating between one state and the other; that the Countenance, is generally pale, sometimes flushed and turgid; and that the breathing is for the most part slow, and also soft, frequently laborious, but very rarely stertorous +.

None, of the special symptoms were found, to bear a marked relation to the ultimate event, thus very many Cases do well, where the pupils

+ Edin. Med and Surg. Journ. XL 279

so much dilated, the coma profound, and the pulse imperceptible.

In this form of poisoning, it usually happens, that if the stage of Stupor be completely overcome, recovery speedily ensues without any symptoms except perhaps headache giddiness and sickness. Or some recoveries the comatose stage, is followed by much cerebral excitement, by flushed face, injected eyes, restlessness, a febrile state of the pulse, and delirium.

Another variety of this degree of intoxication, the sealed state of the circulation induces apoplexy, in predisposed persons. In these Cases after death extravasation of blood is found within the head. In other cases after the Stupor has past on all the characters of apoplexy,

for two days or upwards, the case terminates fatally, without extravasation, then, the cause of death was directly due to congestion, induced by the poison. Again cases are recorded, where an interval of returning health occurs, between the immediate narcotic effects of the poison, and the ultimate apoplectic coma, which is the occasion of death. A boy, eight years of age, soon after swallowing about eight ounces of gin, said he felt like a drunk man, and suddenly became motionless, and insensible. He vomited a fluid of the odour of gin; and in seven hours from the commencement, a fluid was withdrawn from the stomach, possessing no longer no such odour. He was now motionless, insensible pale and cold; the pupils were contracted

the pulse feeble and hurried, the breathing shortened and slow; and he made ineffectual efforts to vomit. On a day and a half the breathing became more natural, and he looked quite intelligent. Yet he could not answer questions, exhibited no signs of volition, and had a pulse of 160. During the next day, the breathing became laborious and rattling, and the lips livid, death taking place soon the close of the third day. The only appearance of any note in the dead body were found injection of the arachnoid membrane of the brain and frothy mucous in the bronchial tubes.† The Symptoms in this kind of poisoning are on the whole remarkably uniform, gradual, and uninterrupted. There are however some anomalies

† Lancet 1838-39 II 233

as in a case seen by Dr Alison of Edinburgh. The individual was in a state of reeling drunkenness, but able to speak and give an indistinct account of himself. He then became lethargic and died in twenty minutes. On a post mortem examination no morbid appearance were seen, except some scarcity of fusion on the surface of the brain and in the ventricles. Dr Christison has recorded a case which differs somewhat from the above. A lad of sixteen years of age, took in consequence of a bet, eighteen ounces of whiskey in ten minutes, walked up and down the room for ten minutes. He then went out into the open air apparently little the worse, but in a very few minutes while in the act of putting his hand

in his pocket, he became so suddenly senseless as to forget to withdraw it, and so insensible that his companions could not rouse him. The young man died in the course of sixteen hours. In some of this kind doubtless the cause of the retardation of the stupor may be due to the determination to win the bet, or because food had been taken a short time before. Another cause of the abrupt onset of stupor is a sudden exposure to cold.

Alcohol in poisonous doses rarely produces convulsions, and then it is chiefly in young people.

It appears to act also as an irritant. After the ordinary narcotic action has passed off, other symptoms appear, indicating inflammation of the alimentary canal.

Such cases are rare, but the following has been recorded. "A young man had been drinking brandy immoderately for several successive days, when at length he was attacked with shivering nausea, feverishness, pain in the stomach, vomiting of everything he swallowed except cold water, thirst, and at last hiccup, delirium, jaundice, and convulsions; and death took place on the ninth day. On examining the body the stomach was found gangrenous over the whole villous coat; the colon was much inflamed; and all the small intestines were red"

† Communications Journ de Méd XVI, 43

If alcohol be taken for a prolonged period in quantities too small to produce acute poisoning, it gives rise to a group of symptoms, which are very distinctive of its effects, and which are universally recognised as such.

The symptoms of this affection consist chiefly of delirium with hallucinations and tremulousness of the muscles. The subjects of delirium tremens have been drinking for a considerable period, taking little or no solid food. It comes on gradually. The patient has sleepless nights, or if he has slept, he is awakened by frightful dreams. During the day, the mind seems clear, but at night, he gets worse, little by little by little, when the affection is well declared the symptoms are present day and night.

The mental phenomena are peculiar; they consist chiefly of hallucinatory disturbances, which are mostly of a painful character, rarely of a gay nature. The patient thinks he has committed some fond crime, and that the Police are after him. He sees lions, hyaenas, or serpents seizing him.

Another of their characters are their changeableness; men, things, and animals move and change in an instant. The patient is restless, anxious, terror-stricken or happy, crying or singing, supplicant or aggressive, suspicious or well disposed to all around.

The hallucinations have for their subject, either the ordinary occupation or the dominant subject of interest of the moment. The soldier hastens to attack the invaders, sees massacres

or have himself called away; the beer seller hastens to attend his Customers, or he has bought at a dear market; the Carpenter sees the planks with which he was trying to load a cart, fall on his head and back, in almost every case there is a marked preference for the disagreeable.

The patient is always in a hurry to perform, some forgotten or delayed duty; packing up his clothes as he must go by train at once. He looks under the bed, or inside the curtains; tries to climb the bed posts. Thinks that he is insulted, or hears the voices of his friends crying to warn him of some impending danger, or he is attacked by armed men, so he becomes maniacal.

The alcoholic at other times sees himself

in prison, imagines that he has done some great crime, betrayed by his friends; or he attends the funeral of his relations; - or he becomes melancholic. Or his sufferings and the calamities which has overtaken him, has completely stupified him.

He sees mucus and he takes them to be spants, or insects, according to their characters. Amblyopia is often present and lasts for a long or short period. Objects become obscure, or enveloped in a grey or white mist. The patient mistakes gold for copper or silver coins, and he reads and writes with difficulty.

With the amblyopia Galezowski says he never found a case, but had the chromatic power affected in some way or other. This was found more especially in the case of composite colours, which are

:+: Galezowski. On the diagnosis of diseases of the eye by retinal Chromatoscopy.

neither, clear nor dusky, such as yellowish green and bluish green, which are confounded with the predominant tint. Magnan did not find in Paris the perversion in the perception of colours nearly so common as this †.

The senses of taste and smell also to some extent undergo perversions, but they are less numerous and less varied. The alcoholic sometimes smells the odour of sulphur, of rats, or of putrified matter, at other times his food is sour, or he tastes wine or brandy or whichever is his favourite drink. The general sensibility with its differences of anæsthesia and hyperæsthesia takes part in the painful sensations. The patient feels and sees animals crawling between his flesh and skin, which he attempts to crush: or he imagines that he is surrounded

† Magnan, On alcoholism page 42 (trans)

by wine, or threads which he struggles to remove.

The skin is usually bathed in a profuse perspiration. The face is flushed or pale. The pupils dilated. The tongue is usually large and coated with a creamy fur. The pulse varies, in most cases, it is large, soft and diercrotous, at a later stage if the disease has taken an unfavourable turn it increases in rapidity, it may be to 130 or 140 becoming at the same time small and extremely feeble. The temperature generally oscillates between 101 & 102° Fah in simple cases of delirium tremens but in severe cases and in those which are likely to terminate fatally it may run up to 105, 106° or even 109° Fah. Muscular tremors are always present, at some stage of the disease, they may be general, or limited only to the upper limbs,

or the muscles of the head and neck. When he exercises his arms, they tremble, or if he is asked to put out his tongue, it is seen to tremble, or his legs in walking.
Besides, the ordinary tremblings, quiverings or fibrillar movements, of the muscles are often present, and are constant, but may not be obvious till the patient's limbs are grasped, and in some cases of delirium tremens there are besides these involuntary startings, which resemble the effect of an electric shock.
The patient may not know his friends or mistake them for other persons.
In all or nearly all cases, however severe the delirium, the patient can be recalled momentarily to himself, and can be restrained by the voice of authority.
In some cases epileptiform convulsions come on in the course of

of delirium tremens, ~~but~~ very rare when the spirits are pure, but if it is adulterated with absinthe, they are a very common occurrence.

In the majority of cases delirium tremens terminates favourably, within five or six days. The intellectual disturbance disappearing during the day at first, recurring but not so severe at bed time and after the patient has had some hours of peaceful sleep undisturbed by dreams or nightmare, quietude and strength are soon restored.

Dr Chapman of Paris classifies delirium tremens into two; - simple delirium tremens and febrile delirium tremens, the main distinction in the latter form is the rise of temperature without any apparent cause for it.

The prognosis may be looked at from two points; as to reason; and as to life. The activity of the delirium and the amount of the cerebral excitement generally, is far from being in direct proportion to the dose of the poison or severity of the attack.

First as to reason. We found that in patients who replace an insufficient diet by wine or brandy; persons who are constant tipplers; or those who live in unhealthy surroundings, that their sleep is troubled and unrefreshing; cerebral malaise, drowsiness and confusion of thought, irritability, excessive susceptibility to morbid impressions; illusions and vague ideas of persecutions remain. Patients who are hereditarily predisposed or who have by excessive drinking made a profound change in their

systems, are found to have frequent relapses, their consciousness being interrupted by delirious ideas assuming the form of partial delusions. These are the patients who pass gradually into dementia, or become general paralytics, or subject to any of the other diseases which alcohol produces.

Second as to life:. The circumstances which according to Magnan will foretell a fatal issue, are an elevation of temperature, when there are no abdominal or thoracic complications to account for it; the intensity persistence and diffusion of generalization of the motor disturbances; and the supervention of muscular weakness.

When the temperature after oscillating for a few days between 99° and 102° is found to rise to 104°

or 106° Fah, the prognosis will be grave and its gravity will increase directly as the increase or persistence of the elevation of the temperature.

An alcoholic may present an enormous trembling of the muscles of the arms, legs and body, but if they do not persist, or if they do not affect the whole of the muscles at one time, it is only a temporary effect. If they have affected all the muscles of the body, if to them be added shakings and especially quiverings and muscular undulations, and if all these persist without disappearing during sleep. Muscular weakness now appears. The pulse instead of being large and dicrotous, becoming increased in rapidity to 120 or 140, or so quick, that it can't be counted, getting at the same time small and feeble, the

is extremely grave. This and may come by coma, general weakness with the formation of bedsores, and sometimes epileptiform convulsions.

We see tremors and delirium independently of alcoholism sometimes in consequence of a severe injury, during a severe attack of pneumonia, acute rheumatism, pericarditis etc.

We see cases, where persons habitually ~~habitually~~ take excess of alcoholic liquors without any obvious appearance of symptoms, but if subjected to any depressing influence, such as indifferent food, fatigue, or an intercurrent disease, which destroys the physiological equilibrium, delirium tremens at once ensues.

The following case illustrates this. I.B. aet 41 Patient, has for some time taken little food, but habitually has taken but enough never to cause delirium tremens.

On the morning of the 11th April after a sleepless night, complained of pain in the left side. Found him in bed in an agitated & restless condition. Pulse 120 per minute soft compressible, and large

Complains of the oppressed breathing and pain on the left side.
Respirations 32 per minute
Pain varies in intensity, increasing on coughing or taking a long breath
Its area is rather diffuse, generally to the left and at a lower level than the nipple of that side. Sputum expectorated is small in quantity and frothy in character. Cough slight but very troublesome.
Physical examination:- The right lung front and back was normal in all respects. On the left side, there was a marked increase in pitch towards the base in front and back of the percussion stroke, but not absolutely dull in any part.
Over this same area the respiratory murmur was decidedly weak

Treatment. To be kept quiet, in room of an equable temperature, food in a fluid form of the [illegible], soup eggs, milk and gruel.

℞ Pulv Jalapae Co gr xv
fiat pulvis

Sig To be given now

℞ Liq^r Ammon Acetatis ℥ii
Spiritus Aetheris Nitrosi ʒiv
Potas Bicarbonatis ʒii
Aquam ad ℥viii

Sig ℥iv every three hours

M. [illegible]

No râles of any kind were heard in front, at the back near the angle of the Scapula a few localised mucous rales. V R and V Tone slightly diminished in intensity No pleuritic friction heard. Nothing abnormal was noted in the Condition of the heart. Liver was uniformly enlarged, dense and resistant. Splen seemed to be not abnormally enlarged. There was no ascites present non pain in any part of abdomen Tongue large, moist and furred, Bowels not constipated. Urine passed freely, fully an average quantity of an Acid reaction, heat, nitric and picric Acid, throwing down a small Cloud of albumen. Temperature in the mouth 101.4

Treatment. General treatment same as before

℞ Chloral Hydrat
Potas Bromidi āā ʒi
Syrupi Simplicis
Aquam ad ℥i

[illegible] [illegible]
Sig Take at bed time

5th Passed a restless night, had no sleep. He has an anxious restless look. Skin perspiring freely, Pulse 120, - lungs crepitant compressible. Bowels were moved twice during night. Today he explains that the pain in his side, (which is considerably better) was caused by striking it against a bunk, when he had a fall two days ago in the dark. Breathing oppressed 22 per respiration per minute. Cough not troublesome, little or no spit.

9 pm Slept some, towards night delirium has come on at intervals but he corrects himself immediately, hallucinations of the most painful characters. Tremors of the arms

and tongue and slightly of the head
Takes nourishment freely. He
is quite tractable.

6th Morning. Slept none last night.
Hallucinations of a painful kind
present this morning, dogs under
the bed clothes, frightful creatures
under the bed. Tremors of arms
legs and body. During night
complained of pains in various
parts of his body, flitting in
character, but one more fixed
and of greater intensity in the
left loins extending somewhat
to the front of abdomen.
Fomentations were applied, does
not complain of it now. On
being asked how he is? All right
now never better in his life. He answers
in an excitable manner.

Treatment
Tinkips Ext of Beef. Milk and
Soda water
℞ Potassii Bromidi ℥ii ʒii
Liq. Strychnine ʒi
Aquam ad ℥viii
fiat Mistura
Sig ʒii every four hours

Seltzer water, Milk

Treatment Stop mixture and give
℞ Tinctura Opii ʒii
Aquam ad ℥ii
Sig ʒij at once; ʒii every two
hours till sleep is produced

Respiration 28 per minute, breathing is not so oppressed when not excited. Pulse 120 per minute. Temperature 100 Fah. Sweating freely. Passes urine freely, no sediment of any kind discovered. Still slightly albuminous.

Night. Quite maniacal almost unmanageable. Got up from bed and had to be dressed. Hallucinations constant all day. Does not recognise his friends. Strikes them as they are bringing him to the police office. Slept none during day, although the room was darkened and two grains of bromide of potassium every four hours were given.

Took nourishment freely

Treatment

℞ Potass Bromidi ℥ii ʒii

Ammon Carbonatis ʒi

Liqr Strychniae ʒi

Aquae ad ℥viii

Fiat Mistura

Sig ʒii every four hours

7th Slept none last night although the two drachms of laudanum were taken. Not so furious today more tractable. Hallucinations still persist; accuses his wife of infidelity & blames his most intimate friends of unkindness. Did not get in bed all night. Breathing easy and quiet.

Much quieter all day, had a little sleep. Hallucinations still persist. Pulse 108. ~~Tremor has disappeared~~ Has no tremors when awake.

8th

Slept very little last night, is restless excitable, wanting out. Pulse 108. Temp in axilla 100.6 Heart sounds fairly strong. Skin sweating. Tongue slightly furred Hallucinations still troubling

Treatment: Same medicine repeat.
Seidlitz powder

him. Tremors and quivering present this morning. Stopped in bed today.
During day slept five and half hours. The trembling, quivering much more pronounced when asleep and with them shakings of the whole body as if caused by an electric shock. When awake none of these were perceptible, but could be felt on pressing the body. Urine passed to-day contained no albumen.

9th Slept during night (though much disturbed) from 11 pm to 6 am and from 7 to 9 am. Is more sensible this morning than any time since illness commenced. Skin moist Pulse 108, soft regular. Temperature in axilla 101.2. Thirsty. Much troubled with a short cough. Respirations

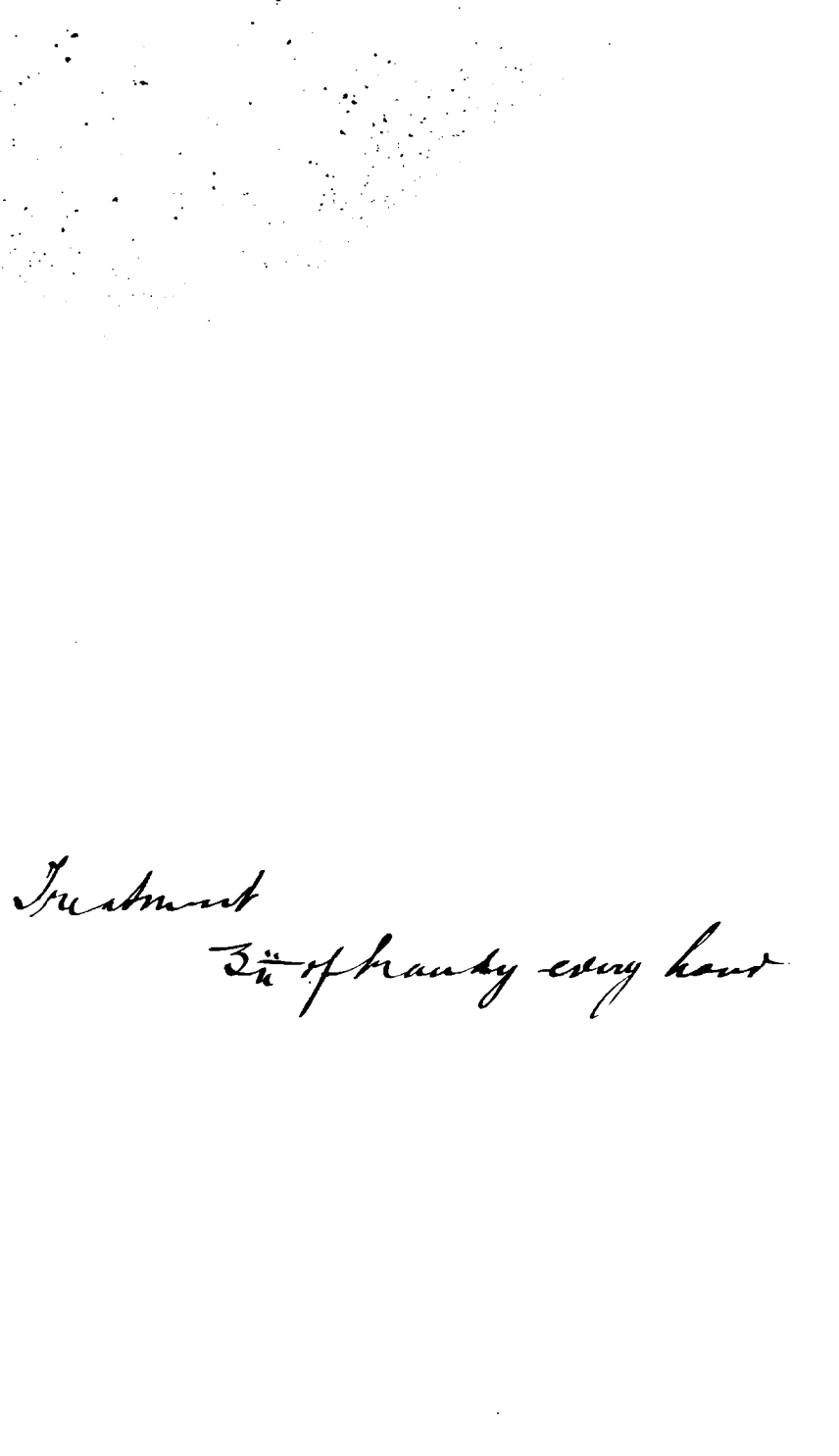
Treatment Beef tea, milk and eggs milk and soda water. Linseed meal and mustard poultice to left side

℞ Ammon Carbonatis ʒi
Liq Strychniae ʒi
Vin Ipecac ʒii
Aquae ad ℥viii
Sig ʒii every two hours

℞ Potassii Bromidi gr xxxv
Syrupi. Aquam ad ℥i
fiat haust

Sig To be taken every six hours if required.

much quicker being 38 per minute.
On examination. The Cause of this
is heard in sonorous and sibilant
rales widely diffused over both
lungs. Sputum small in amount & frothy.
10th Passed a very restless night
Complains this morning of pain
in the left side in the original place.
Breathing oppressed, 36 respirations
per minute. Pulse 132 small and
feeble. Temperature in the mouth 103.5°
The expansion of left side is
less than right and forward the
base front and back no move-
ment can be detected.
The percussion stroke is clearer
over this lung in front and back
till within one and half inches of
base absolute dulness occurs.
Over the upper part of lung many



râles are heard; sonorous, sibilant
crepitant and subcrepitant.
Respiratory murmur is entirely
lost over dull area and there is no
VR nor VF. Delirium with
hallucinations present this morning
Tremors of both arms have become
pronounced in character.
He has a short troublesome cough
with little sputum of a thick
glutinous character without the
least tinge of ~~the~~ blood colouring.

2 pm. Respirations 50 per min
Pulse 120 small and perceptibly
weaker than in morning. On
exploring trocar inserted a little
below and nearer the spine than
angle of scapula removed bloody
serum. Delirious still, but is anxious
about his condition and evidently

realizes the gravity of his condition.

At 7 pm somewhat in same condition, lividity of extremities pulse feeble 150 per minute. Jumps coming in convulsions, grasps the bed clothes with arms, legs drawn up & flexed, perspiring profusely Respiration quicker and shallower, at 11 pm, lividity more marked in extremities Continues in same state till 8.30 am when he died.

Surgical no post mortem could be obtained.

Note:- There is no reason to believe that this man had more than usual of alcoholic liquors when the slight attack of dry pleurisy caused the onset of delirium tremens. The delirium tremens was gradually disappearing

when bronchitis set in, on the night of the 8th. then during the succeeding twelve hours pneumonia and pleurisy with slight effusion took place. The heart gradually but surely giving way, death occurring within twenty four hours after the pneumonic symptoms had developed.

Chronic alcoholics are especially subject to headache, dizziness with heaviness, and a sense of weight in the head, hummings in the ears attacks of giddiness, and sometimes actual vertigo.

Besides the delirious ideas, illusions and sometimes even hallucinations which remain for a long time after the acute symptoms have passed away. Chronic alcoholics

are not unfrequently the subjects of melancholic
delirium and suicidal ideas.
Sometimes there comes on at irregular
intervals, with or without fresh excess
disturbance and a state of general
mania cal excitement.

The memory in some cases becomes
weakened, the judgement lost there,
the imagination becomes extinct and
lastly the moral sense is greatly blunted.
The subject is apathetic, indifferent,
stupified and ending in absolute
dementia.

In some cases the predominant
symptoms are due to degeneration
and irritation of the Spinal Cord.
There are pricking sensations in the
Skin, especially of the soles of the
feet and of the hands, with numbness
and tingling, abnormal sensations

of heat and cold, cramps, superficial and deep hyperæsthesia; there exists in fact all the symptoms of acute spinal paralysis.

The onset and progress may be reduced to very quick, as in cases reported by Dr Broadbent at the Royal Medical and Chirurgical Society July 12th 1884. The paralysis was at first chiefly manifest in the extensor muscles of the forearms giving rise to double drop wrist, but the fingers were also weak, and the muscles of the trunk were enfeebled. The knee jerk was lost, the sole reflex marked. The patient died within a week from asphyxia, due to the paralysis extending to the respiratory nerves and muscles. Dr W B Hadden reported similar cases at the Pathological Society of London on Oct 21st 1884. One of the patients had pharyngeal

of severe pain, starting in the great toe and passing up to the hip. The lower limbs were drawn up, and very painful if touched. There is no typical form of paralysis due to alcohol, it may take the most various forms, disseminated sclerosis, lateral amyotrophic sclerosis, or there may be paralysis of sensation along with the motor paralysis. Dr Magnan thinks that the right side is affected oftener with hemianaesthesia. Pain is a common feature, lancinating in character and hyperaesthesia so severe, that a touch causes agonizing pain. Dr C Allbutt of Leeds has noted, commonly in females addicted to the habitual use of alcohol, tibial pains somewhat nocturnal in character, without visible cause, the tibiae smooth, and no more signs of spinal disease than perhaps a slight ankle clonus.

Pathology and Morbid Anatomy

When alcohol is taken by the stomach or introduced into the system in any other way, elimination takes place by the lungs, kidneys, bowels and skin. The experiments of Dr Parkes and Count Wollowicz show that ~~[illegible]~~ one and a half ounces is destroyed in the body daily, but if more than this is taken alcohol appears in the excretions.

Considerable controversy and difference of opinion have arisen on the elimination of alcohol, the changes it undergoes in the system and the time that elapses before it is entirely excreted.

It may be stated here that alcohol in minute quantity, is very widely diffused, it is found in the air, in

rain water, and nearly all organic substances containing saccharine matter produce it. It has been found in the hepatic parenchyma and muscular tissues of dead animals before putrifaction had taken place. Dr Dupré in a paper read before the Royal Society and printed in the Practitioner for April 1872 showed that in the urine of a person who had not taken any alcohol for two years, a substance can be separated by distillation, which gives the reactions ordinarily employed for the detection of small quantities of alcohol.

Previous to 1861 when Messrs Perrin, Lallemand and Duroy had published a memoir on the elimination of alcohol, it was so held that it was oxidized in the system, and that

only a small portion of the quantity taken is eliminated unaltered. From their researches these Gentlemen came to the Conclusion, that alcohol accumulates in the tissues, especially in the liver and brain, and that it is eliminated by the fluid secretions, more especially the renal as alcohol. M. Edmond Bardet points out that if these experiments be correct, the urine in the twenty four hours immediately succeeding the taking of the alcohol, should contain such a quantity of it, that it would be distinguished by the alcoometer. In twenty experiments the results of this mode of testing are fair, except when the dose of alcohol is very excessive. When the Chromic Acid test is applied to the urines, in which the alcoometer gave negative results, decided traces of alcohol are obtained either immediately

† Une in Medicale Lyonnaise Novembre 1863

Method of examination of the urine adopted by Dr Dupré. The urine is distilled and redistilled until the quantity is reduced to about 20 p.C. made alternately acid and alkaline, and only one third of the quantity in the retort is distilled over. The final distillate is mixed with a slight excess of the bichromate solution (147 grams potass bichromate, 200 grms acid

r after some time.

Drs Anstie* and Thudicum in this Country and Schulinus abroad, after numerous quantitative and qualitative experiments were also forced to differ from the French observers; their experiments showing that the original opinion was correct, that a minute fraction only of the alcohol taken is eliminated unchanged by the excretory organs.

In the Practitioner for March 1872 Dr Dupré published the results of experiments he performed in 1871. After having abstained, absolutely for a period of ten days from all alcoholic drinks or other articles of diet containing alcohol. On the twelfth day, and on each of the twelve succeeding days 112 cub cent of brandy were taken daily, amounting

* Stimulants and Narcotics page 472
Anstie

Sulph for water to 1000 cub cent) in a well stopped flask, heated in a water bath for one hour. The acetic acid produced is separated by distillation and estimated by a standard solution of Caustic Soda. This process when carefully conducted yields accurate results. In two such experiments in which 01 and 0.025 grm alcohol were employed, the acetic acid obtained neutralised 20.1 and 5.5 cub cent of a deci-normal solution of Soda (containing one tenth of an equivalent of hydrate of Soda in one litre of water) corresponding to 0.0924 and 0.0263 grms of alcohol.

Examination of the breath.

By means of a suitable mouth piece the breath is blown through a Chloride of Calcium tube, and made to pass through a retort, in which water is kept

in all to 584.286 grms of absolute alcohol. The greatest care was taken that the experiments, and chemical analyses were correct. The total amount of alcohol eliminated by the kidneys during the same twelve days, taking the amount eliminated on the six days as representing the mean eliminative during the continuance of the alcohol diet, 0.4308 grms. The total amount of absolute alcohol eliminated during these days in the breath, taking the amount eliminated on the six days as the mean, and adding one third for loss, as shown by the alcohol experiments, 0.2208 grms. A second series of experiments performed subsequently gave virtually the same results viz that the amount of alcohol eliminated in the breath and urine

boiling into a Liebig's condenser. The alcohol is carried down by the condensed steam, and is estimated as described in the case of urine.

Check experiments by means of weighed quantities of alcohol evaporated in known cubic feet of air, show that in one case three fourths, and in another two thirds of the alcohol contained in the air was recovered.

is a minute fraction only of the amount taken. From these experiments Dr Dupré showed further that in the urine of a person who did not drink any alcohol for two years, a fluid can be distilled which affects the Chromic test as if alcohol was actually present in the treated fluids, and that this product is oxidized into an acid so like Acetic acid that it cannot be distinguished from it. He thought at first that it was ethyl alcohol; but the vapour tension. Specific Gravity, and amount of acetic acid produced are not such as a dilute alcoholic solution would yield. So that it is evidently a mixture of one or more alcohols. Dr Austin experimented on animals, and the conclusions he came to, were virtually

the same as Dr Dupré's. He gave a terrier dog weighing ten pounds in ten days 200 grains of alcohol. On the last day of this regimen the dog eliminated by all the channels of elimination 1.13 grains of alcohol. Another dog was treated with alcohol as above described, killed instantly and painlessly, two hours after it had received the last quantity 95 grains of Spirits. The whole body, fluid and solid contents were subjected to analysis, with the result of finding only 23.66 grains of alcohol.

As to the time taken for the complete elimination of alcohol from the system similar differences of opinion are held by the observers who have studied the subject.

Lallemand and Perrin held that

† Practitioner July 1874

The method and tests adopted by M Bouffard in the case mentioned by Dr Ingraham

The viscera was cut up, water added and pounded in a mortar to a pulp. Slowly distilled to one eighth passed over. Then M Barthelots test was applied in the following manner. Thirty cubic cent of the liquor

alcohol is not entirely eliminated for some days. Dr Parkes and Wollowicz, adopt at least partially the views of the Frenchmen, maintaining that the elimination may go on at least five or six days after the last dose of alcohol has been taken.

Drs Anstie and Dupré say that all the alcohol consumed daily is disposed of daily; and as it is not eliminated within that time, it must be destroyed in the system.

Dr Magnan records the autopsy of a man who had left off drinking seven days before death. The viscera cut up separately, water added and made into a pulp, distilled, careful analysis was performed with negative results.* Another case recorded

* Magnan On Alcoholism page 109 (Ma…

obtained by the distillation, in a test tube ~~was~~ ~~added~~ a few drops of benzoic chloride was added, warmed and shaken. The benzoic chloride begins the alcohol and forms benzoic ether, dissolving in excess and settling at the bottom of the tube. The supernatant liquid is decanted and on the remaining chloride a solution of potash is added, and the tube heated. The potash attacks the benzoic chloride immediately, and its odour disappears; but if benzoic ether be formed, it resists itself even when in a small quantity, by a strong and permanent odour resembling that of essence of bitter almonds.

To verify this, the bichromate and sulphuric test was subsequently applied.

by the same author, when three days and six hours, had elapsed since any alcohol had been taken. The same tests showed the presence of the poison in the liver and brain.[*]

We suppose these two cases that the time which alcohol requires to be entirely eliminated or destroyed in the system is between three and seven days.

What becomes of alcohol after it is taken? Is it a food? poison? or a medicine? What changes does it undergo, before it is ultimately eliminated? Only a very small fraction of the quantity taken passes unchanged.

In Liebig's celebrated classification alcohol was placed among food of the combustible kind, and was ranked as a heat forming aliment, capable of replacing, the oily

* Morgan, On alcohol drink page 124

starchy and saccharine materials.
according to this theory the union of
alcohol with oxygen within the body
generates Carbonic Acid and water
with the generation of heat. No doubt
in some states of the system notably
in the acute forms it is generally re-
cognized that alcohol acts as a true
food, and also in exceptional cases
such as recorded by Austie where
persons, who lived almost entirely
on some kind of spirituous fluid
without weakness or emaciation
resulting. These are certainly exceptions
rather than the rule.
Instead of alcohol being a heat
producer, it is easily seen by direct
experiment, that after the first stage
of intoxication, when the temperature
in the external parts of the body

rises from one half to three quarters
of a degree Fah.; there is a gradual
increase and continuance of all up to
death, when the temperature may
be reduced as much as seven degrees Fah.
Again Dr Richardson found that
in an animal when the extreme
stage of insensibility took place,
the amount of Carbonic acid exhaled
was reduced to one third below
the normal.*

Dr E Smith found in man
that the amount of carbonic acid
was reduced in the earlier stage
of alcoholic intoxication†. So that
we are bound to come to the con-
clusion that the ultimate change
alcohol undergoes in the body is
not into Carbonic acid and water
with the formation of heat.

* Cantor Lectures IV † Philosophical Trans 1859

The researches of Bouchardat, Lourbras and of Duchek appear to elucidate the stages of the chemical process, by which the transformation of alcohol into carbonic acid and water was accomplished. They held that the intermediate compounds were aldehyde acetic acid and oxalic acid.

This has been disproved, for no traces of aldehyde could be discovered in the blood after alcohol had been administered to an animal, whereas when aldehyde itself is given, it immediately appears in the blood. No traces of acetic acid has ever been observed in any of the secretions. It has been pointed out however that the slight increase of the acidity of the urine, during the use of alcohol may be due to some acid derived

$C_2H_5OH) + O = CH_3.CHO + H_2O$

alcohol — Ethyl aldehyde

$CH_3.CHO + HCN = CH_3.CH\{^{OH}_{CN}$

Ethidene cyanhydrine

$C_2H_4\{^{OH}_{CN} + NH_3 = C_2H_4\{^{NH_2}_{CN} + H_2O.$

Ethidene cyanamide

$C_2H_4\{^{NH_2}_{CN} + 2H_2O = C_2H_4\{^{NH_2}_{COOH} + NH_3$

Alanine

from alcohol, but what acid this is, has not been determined.

If a theory put forward by Dr Latham of Cambridge (on the transformation of alcohol, and on the formation of alcohol and Urea in the living body) at a meeting of the Philosophical Society of that City, and reported in the Lancet of April 1862, be correct the changes which alcohol undergoes in the system are extremely complex.

Ordinary alcohol is converted into aldehyde, thence into cyanhydrin and from it either into lactic acid or ~~alanine~~ alanine according to the wants of the system — that is according as ammonia is present or not at that stage of the transformation. Lactic Acid may be converted into acetic acid and formic Acid, or into aldehyde and Carbonic

$C_3H_7\{^{NH_2}_{COOH}$ is combined with $CO\{^{NH_2}_{OC_2H_5}$

alanine ethyl urethane

$CO\{^{NH_2}_{OC_2H_5} + NH_3 = C_2H_5.NC + CO\{^{NH_2}_{OH}$

urea

$CO\{^{OR}_{NH_2} + CH_2\{^{NH.CH_2}_{COOH} =$

urethane Sarcosine

$OH.R + CO\{^{N.CH_2-CH_2-COOH}_{NH-CH_2}$

alcohol methyl hydantoic acid

$= OH.R + CO\{^{N.CH_3-CH_2}_{NH-CO} + H_2O$

methyl hydantoin

acid. Or the cyanhydrin formed into an amido-nitrile may be converted into the amido-acid or glycine, which undergoing molecular transformation becomes ethylic carbamate or urethane, and is then decomposed into urea and alcohol. He pointed out how acetone aldol and crotonic aldehyde are derived from alcohol. He showed that when Sarcosine is administered internally it is eliminated in part as methyl hydantoin, which would be the result if an alcoholic carbamate were brought into combination with Sarcosine.

In another paper he shows the possibility of albumen being formed from the alcohols; through a combination of their cyanhydrins in certain proportions, together with

sulphurous acid, the resulting product having the composition

$C_{80} H_{103} N_{11} O_{15} S$. three molecules of which by condensation give the compound $C_{240} H_{309} N_{33} O_{45} S_3$, closely agreeing with Schützenberger's formula deduced from numerous analyses of egg albumen.

There are other evidences that alcohol is transformed in the system. From the breath of persons who have been drinking Alcohol, a peculiarly disagreeable flavour resembling onions, can sometimes be smelt so like the smell which Sulphur Alcohol communicates to the breath that it is probably due to it.

If so, then, in the system the ethyl alcohol $(C_2H_5)HO$ must be transformed into Ethyl Sulphydrate or Mercaptan $(C_2H_5)HS$

by having its Oxygen replaced by Sulphur, which is probably obtained from the bile. Some of the physiological effects which mercaptan produces, can be seen in some cases of delirium tremens if its symptoms are critically analysed.

Another point which may be referred to, is the fact that the tremors of delirium, are not produced on animals by the administration of pure methyl or ethyl alcohols, if however butyl and amyl alcohols are given, tremors are produced after the temperature of the body is depressed to the minimum in the third stage of intoxication, and persisted up till the death of the animal if the administration of the alcohol be continued. These two alcohols are less soluble in the blood, are less volatile

having a higher Specific gravity, their
radicals being richer in Carbon
and hydrogen. It may be suggested
as an explanation of this, that the
tremors are due to the adulteration
of common alcohol with potato
Spirits, added by the manufacturer
direct; or if the distillation be not
carefully performed, the heavier
alcohols pass over during the process
in Excess to him; or it may be,
that complete saturation of the
system by the lighter alcohols
produce them; or lastly that
in the system, the lighter ~~intoxicants~~
through its cyanhydrin, and its
amido acid getting an addition
of Carbon and hydrogen, be trans-
formed into a higher Carbamate
which is then decomposed into

into one of the heavier alcohols, and thus produce the tumors.

It is probable therefore that alcohol may be excreted, during any stage of its transformation, as cyanhydric cyanamide; or as one of the amido acids, leucine, alanine or ~~alanine~~ glycocine either alone or in combination with a base, and the evidence points to the alimentary canal as the channel by which the greater proportion of its products are excreted.

In most cases of death poisoning by alcohol, the poison will be detected in the Stomach by its odour, or in the tissues and secretions of the body.

Its odour has often been remarked in the brain. Dr Cooke has recorded a case in which the fluid in the ventricles of the brain smelt and tasted of gin, the liquor which had been taken. Dr Ogston of Aberdeen mentions a case of drowning during intoxication, where from ounces of fluid were found in the ventricles of the brain smelling strongly of whiskey. The smell has been remarked in the pericardium, on the surface and in the ventricles of the brain when it could not be detected in the Stomach.

Even when the odour is not detected in the body, cautious distillation of

the viscera, and removal of the water by dry Contents of potash. alcohol may be obtained to exhibit its Combustion.

The morbid appearances of persons who have died of acute alcoholic poisoning varies considerably. The villous coat of the stomach has been seen of a cherry red colour. The prominent parts of the rugae has also been found of a cherry red tint, the margins of the patches being more florid. On other Cases the stomach has been found quite natural in appearance. Dr Taylor noticed injection of the mucous membrane of the stomach and small intestines, but he seems to think this was not due to the last excessive dose, but to the habit of -

of peace & fine drinking.

The blood in the heart and great vessels is generally fluid and very dark occasionally coagulated. In the walls of the small blood vessels refractive granules have been discovered and even haematoidin crystals. Sometimes oildrops may be seen on the surface of the blood collected in a vessel. The lungs are sometimes found gorged by the dark fluid blood. In cases when death has been caused by a large quantity swallowed immediately before death the brain and membranes are found healthy. When death is caused by apoplexy induced by the spirits great congestion and extravasation of blood is found. There is usually some effusion under the arachnoid

membrane, occasionally minute injection of vessels, commonly more or less congestion of the larger veins and especially effusion of serosity to the amount of two or even four ounces in the ventricles of the brain.

When delirium tremens proves fatal, there is usually congestion of the cerebral membranes. Sometimes the cortical layer is rose-colored throughout its whole extent. The membranes may be easily detached. The spinal meninges are often congested more especially at the upper portion, but sometimes at the lower part of the canal when no congestion is present in the cerebral membranes. The vessels and sinuses are gorged; the grey matter of the cord is found injected

† Edin. Med. & Surg. Journal XL 282, 84, 93

In chronic alcoholics, the brain is often found atrophied general or localised. The cord may be in the same condition. In cases where paraplegia had been present for some time before death, no change could be detected ~~microscopically~~ Microscopically in the cord. Lancereaux and Drasch[illegible]d have recorded cases where the paraplegia was due to morbid changes in the peripheral nerves, there was evidence of neuritis of the radial and posterior tibial nerves. In Dr Baldwin's cases already referred to, the Spinal Cord was found quite normal, but the right Sciatic and to a smaller extent, the right median nerves were in a Sclerosed state, the atrophy of the nerve elements present, he took to be a Secondary condition.

The occurrence of cirrhosis of the liver and acute tuberculosis, in combination, in cases of alcoholic paralysis has often been noted, but what is the connection between these states, we are unable at present to state.

The heart is often found soft and yellow, due to fatty degeneration, in which state all the muscles of the body may be also. The liver is often large due to the same cause, as also the kidneys. Not unfrequently the liver has been found in a cirrhotic condition, and the kidneys in a state of fatty and degeneration.

Treatment

In cases of poisoning with alcohol as in that of most poisons the first object in treatment, should be its removal from the system, and to rouse the patient from his stupor. Emetics are not so effectual in this as in poisoning by other narcotics; so that the stomach pump should be used without delay. Very often the stupor is removed quickly and permanently by this act alone. When the cases are not thus relieved, the injection of warm milk into the rectum acts as an effectual stimulant and produces consciousness.

Cold affusion applied to the head has been found of great benefit, in cases where the heat is unnaturally great and that of the body not too low

Cases have been recorded, which recovered under this treatment, although the pulse was gone at the wrist, the breathing scarcely perceptible and the temperature of the body greatly reduced. Ammonia and Ammonia acetate have been found useful as an internal stimulant where the stupor is deep.

The treatment of delirium tremens consists, (1) in protecting the patient against himself and preventing him from injuring those who are about him. (2) To promote the elimination of the poison, and to maintain and restore the strength.

A person suffering from delirium tremens should be kept in a warm room apart, the brightest light of day excluded, and

the utmost quietness enjoined. The bowels should be moved by purgatives if constipated, in such cases enemata are sometimes required. Diluent drinks of a mildly diuretic and aperient nature should be given, and the addition of some bitter to them, will have a beneficial effect by aiding the digestion.

Nutriment should be given in small quantities, at short intervals, preferably in a fluid form, such as milk, broth, arrow root or beef tea Chocolate and coffee, eggs and meat, and especially the juice of meat. As to further treatment there are two views, formerly it was held by physicians that the only thing needful was sleep. But lately such eminent physicians as Dr

Laycock, Cairdner, Austie and Magnau of Paris hold that as the disease tends to get well within a limited time, and is of a low mortality, no medicines are necessary, and that their use is attended with danger. The line of treatment I usually adopt if necessary in any given case. I give Bromide of potassium in ten grain doses and Liq Strychniae in three minim doses every three or four hours. If patient has been sleepless for several nights, [illegible] maniacal, and quite unmanageable I recommend then opium or morphia unless contraindicated at first in one large dose say forty minims and doses one third of this strength to be repeated every two or hours if required

I have found from clinical

experience that Strychnia and bromide of potassium are of very great benefit, in cases on the borderland of delirium tremens. I have seen lately that M Dujardin-Beaumetz corroborates, he says, that by means of experimental researches, and clinical observation he has demonstrated that strychnia combats the symptoms of intoxication, also those of acute delirium; but neither prevents nor modifies the pathological condition of the different organs arising from the influence of alcohol.* Chloral has been strongly recommended, but Dr Magnan objects to it from its close affinity to alcohol, It is often used in combination with bromide of potassium; digitalis in half ounce doses of the tincture, and Capsicum in some cases is of use as a stimulant. Cinchona has been recommended in dipsomania. This is the treatment for an ordinary

* Brit Med Journ Jany 19th 1884

Case of delirium tremens. Cases occur occasionally, which are so manicacal, that they are unmanageable at their homes, and with them should be placed those which Magnan puts in his second and third division:- Those affected with alcoholic delirium, of slow convalescence and with many relapses, subjects for various psychic, to illusions and vague ideas of prosecution &c; also those which are hereditarily predisposed in whom convalescence is still more protracted, subject to delirious ideas assuming the form of partial delusions.

For these the proper places for treatment are special institutions, where they can be detained under experienced medical practitioners. They are those which in this country are classed as habitual drunkards. They often become the subjects of suicidal ideas

their constitution break down, they become demented, epileptics and paralytics. They procreate generally imbeciles, epileptics, or fools.

In this Country the arrangements for the treatment of such patients are wholly inadequate. The Habitual Drunkards Act, being insufficient for the purpose. This act was passed in 1879 and is entitled an act to facilitate the Control and Cure of Habitual Drunkards; and it defines an habitual drunkard as "a person who, not being amenable to any jurisdiction in lunacy is, notwithstanding, by reason of habitual intemperate drinking of intoxicating liquors, at times dangerous to himself or herself, or to others, or incapable of managing himself or herself, and his or her affairs". The clauses of the powers conferred by the act are fully provided against

To make the act of greater service it requires to be made a permanent enactment, and the difficulties encountered by patients seeking admission should be lessened. For at present unless a statutory declaration be made by two persons to the effect, that the applicant is an habitual drunkard, within the meaning of the Act, and on his own application for admission for any period not exceeding twelve months. The application must be further attested by two magistrates, who shall have satisfied themselves, that the applicant is an habitual drunkard, the licensee has no power to detain him or her in the retreat.

The power to commit habitual drunkards to retreats with or without their consent should be conferred upon magistrates.

Patients restrained within suitable institutions for a sufficient time, in the U: States and Australia, where these retreats have been

established for many years, the large majority are found to remain and are restored to habits of steadiness and sobriety.

Although precedence has been given the nervous system in this paper we know that alcohol is more hurtful to the chylopoietic viscera. The deaths due to disease of these organs induced by the habitual use of intoxicating liquors are four times as many as in those not so addicted.

When alcohol is taken in small quantity, the gastric juice is increased at first, probably by paralysing the tone of the capillaries, thus congestion of the gastric mucous membrane takes place. If a larger quantity is taken, instead of gastric juice a ropy mucus is secreted and digestion is stopped. When taken habitually a chronic catarrhal condition is induced in the stomach; an increase of the connective tissue between the glands; fatty and

Cystic degeneration of the Contents of the Glands and finally more or less atrophy and disappearance of these Glands. Clinically the worst form of indigestion is produced by alcohol, where remedies are of no benefit.

Its first effect on the liver is the same as we see in the external parts of the body, relaxation of the Capillaries inducing Congestion. If applied directly to the liver by injection into the portal vein it increases the amount of Sugar.

I have habitually if Cancer the deposition of fat Globules at the periphery of the hepatic Lobules. The Globules are at first small and are found deposited in the substance of the hepatic cells, but later by coalescence or by fresh deposition the hepatic cells are distended with their fatty Contents.

At a later stage it induces a development of embryonic tissue in the course of Glisson's Capsule, about the distribution of the portal Capillaries in the peripheral portions of the hepatic lobules, and in the intervals between the lobules. This embryonic tissue is gradually converted into connective tissue. In some cases it occurs mainly in the course of the larger branches of the vena portae, ducts and arteries; in other instances along the course of the smaller branches. In other cases the change affects the general texture of the liver, which by the compression of the tissue destroys many of the contiguous lobules. This adventitious tissue by compression maps out the liver, into areas which to the outer and sectional surfaces of liver gives that finely lobulated or

hobnail character which is indicative of the so called drunkard's liver.

The symptoms caused by the accumulation of fat in the liver are trifling, and is not to any characteristic. It can easily be made out that the organ is enlarged. We often see gastric catarrh and a liability to diarrhoea in these persons; indeed we may not be consulted till the disease is far advanced when the liver is in the cirrhotic state.

When the patient is in an emaciated condition, the abdomen distended from ascites, he is troubled with diarrhoea consisting mostly of bloody stools. Blood may also be discharged from ~~from~~ the stomach and by the kidneys. Jaundice is rarely marked. The more common termination is by gradual asthenia, ~~but~~ the consequences of the ulcers or bloody discharges;

Treatment. Beef tea milk, soup

Linseed meal and mustard poultice
to the back in region of kidneys
and to the right side over liver

Cream of tartar drinks.

℞ Magnes Sulphatis ℥i
Acid Sulph dil ʒij
Ext Ergot liq ʒii
Spt Aetheris Nitrosi ʒiv
Aquam ad ℥viii
[illegible]

Sig ʒiv every three hours.

of the ascitic accumulation, or pseudo-pulmonary
or heart Complications.

The following case from its history
and termination, I take to be due
to long continued intemperance.

J. M. aet 59 Publican

Had been complaining for sometime
of a gradual increasing drowsiness
looseness of the bowels, and pain in the
right side. For a considerable time
he had taken a small quantity of food;
no inclination for exercise of any kind,
sitting almost the whole day in his Chair
half asleep and awake. For some
years he has been troubled with dyspeptic
symptoms, and six months ago was
under medical treatment for what
was called "liver Complaint" There
was a slight improvement in his
Condition, but has not been well since

I found him in bed

lying on his left side, with eyes closed, limbs slightly contracted. Pulse small and weak 108 per minute. Temperature 101.4 Skin moist, tongue dry. He has an anxious look with yellow complexion, but no jaundice. He does not take much notice of anything, nor interest in his business, but answers questions intelligibly.

The abdomen is uniformly enlarged which makes it marked contrast to his otherwise emaciated limbs, no oedema in any parts. The abdomen is dull to percussion all over except a small area in the region of the umbilicus when patient lies on his back. Fluctuation is ~~felt~~ by the usual method. It is difficult to define the tense dulness, but by marking the patient

lie on his left side, it can be made out to be small about 2½ inches in the nipple line. No prominences can be felt on palpation. The pain which had been rather severe in this region some days previously, has been relieved by mustard poultices, but still a slight pressure gives rise to the feeling of some uneasiness.

The size of the spleen cannot be defined with certainty.

The looseness of the bowels has come on gradually, amounting now to about eight stools in the twenty four hours. The motions are mostly of a dark sooty colour, of a fluid consistence, occasionally distinctly bloody. No blood has been discharged from the bowels independently of this kind of motion.

Treatment on the 3rd day same but give

℞ Spir Ammon Acetatis ℥iii

Potas Nitratis ℥iii

" Acetatis ℥iv

" Iodidi ℥iss

Aquam ad ℔viii

Sig ℥ii every four hours in a wine glass of cold water

The urine is small in amount, varying from eight to ten ounces daily of a dark ky colour, neutral reaction depositing little sediment. The usual tests show a small amount of albumen no bile, no sugar.

Respirations 32 per minute quick, but on the least exertion, becoming panting. Examination of the lungs shows that with the exception of a few sibilant rales, there is nothing to record. The heart is by no means hypertrophied to any great extent, sounds natural in rhythm but weak. Has not been troubled with headache, nor vomiting, since illness commenced, nor had he any rigors, but towards night a profuse perspiration breaks out all over the body. There is no appearance of paralysis

of any of the muscles of the body.

It will be unnecessary to insert each days progress of this case as nothing of any note occurred.

The drowsiness gradually deepened into Coma, the patient dying on the sixth day from my first visit.

I urged no post mortem was performed.

Kidney. In almost all cases Alcohol produces a diuretic action, probably due to its paralyzing action. The degenerative changes which a long continued use of it induces are the same as in the liver.

Fatty degeneration of the glands, generally occurring in patches. This occurs in the parietes and in the interior of the intertubular vessels, and in the intertubular spaces; renal vessels and connective tissue;. Epithelial and embryonic cells of the tubules, and sometimes the whole cellular contents of the tubules become transformed into fatty granules.

In the cirrhotic condition, the organ is small granular, or nodulated, indurated often cysts are conspicuous on the surface. Capsule adherent. Contracted in size, and

to a smaller extent. the Connective tissue hypertrophied, more especially near the surface. Malpighian bodies and Convoluted tubes, changes and atrophied. Arteries are thickened, reduced in calibre and the larger ones ~~freq~~ often in an atheromatous state.

Heart. Whether we admit or not as correct the calculations of Dr Parkes and Wollowicz, that the heart was made to perform an excess equal to 15·8 tons one foot, by an amount of alcohol which some persons would call a moderate quantity, there can be little doubt but the nutrition of the organ must be affected. It has been said that soon hypertrophy of the heart takes place, producing valvular in-sufficiency. Later it induces weakness of the organ, owing to

degeneration of its muscular tissue. The elements of the muscular fibre are replaced by fatty granules and cells, or are themselves transformed into a modified muscular texture in which the power of contraction is greatly reduced.

Blood vessels: Alcohol produces on the blood vessels, the same kinds of degeneration as it does on the heart.

Blood. When alcohol enters the blood vessels, it acts on all the constituents of the blood. It can be seen that the Corpuscles run too closely together and adhere in rolls, their clear, defined outer edge, may become irregular, crenate or even star like in form, they may become oval or it may be truncated. These changes are due to the action of of the spirits, on the water contained

in the corpuscles. When the corpuscles are thus changed, their capacity to absorb and give off gases is impaired. To this may be due probably, the marked diminution in the temperature, which is seen when alcohol is taken by man or any of the lower animals in health.

The corpuscles in this state pass less easily through the minute vessels of the lungs, and of the general circulation and so impede the current, that local injury is produced. Alcohol acts on the fibrin in two ways; by destroying its power of coagulation, or it may induce a too great a tendency to coagulation. We have seen already that in some cases of delirium tremens fat globules may be observed floating on the surface of the blood.

Lungs. The vessels of the lungs are easily relaxed by alcohol, and as they are so exposed to the vicissitudes of heat and cold, the confirmed alcoholics are liable to fatal Congestion of these organs. Pleurisy and pneumonia are very common in these persons. It is said also to give rise to Chronic bronchitis and emphysema.

Skin. The superficial Capillaries become dilated, which soon subsides unless the dose is repeated; if it be a Continuous repetition, the congestion becomes permanent. In that case there arises a liability to patches of inflammatory redness, associated with infiltration of the affected tissue. There seems to be a special tendency to include the Sebaceous glands, which gives rise to prominent tubercles of a dusky

tint. The most common seat is the nose, cheeks, forehead and chin. In elderly people who are addicted to intestinal excesses, the nose and its immediate neighborhood forms a huge misshapen, lobulated pendulous mass. This is due to inflammatory hyperplasia of the cutaneous glands, the ducts of which are discharging or the glands may contain an accumulation of sebum from obstruction of their ducts; and not unfrequently they are in a state of suppuration.

Eyes. Alcohol as a cause injurious to the vessels. In those who use it habitually a liability to conjunctivitis is set up. On the crystalline lens it acts injuriously by producing opacity, ending in Cataract. Some distinguished Ophthalmologists hold that the abuse of alcohol is a predisposing cause of amblyopia

Another disease which is universally admitted to be connected in some manner with indulgence in alcoholic liquors; and which is characterized by the presence of uric acid in the blood in undue quantity, and its deposition in a crystalline form in the Cartilages of the joints, and in the fibrous tissues elsewhere, known by its effects of setting up inflammation of the parts.

I am unable to state anything from my own experience about gout for this reason, that while I attended the Western Infirmary, and during the five years since graduation, I have been in Lanarkshire I never yet saw a case of this affection.

I find by a very simple calculation, that in this neighbourhood there is 1 Cattle for the sake of milk

liquors to every 400 of the population. From this it may be inferred that, there is a good deal of intoxicating liquors drunk. It is difficult to state with confidence why gout should be so very rare in this place. The other factors which are supposed to affect its Causation viz long continued over-eating, especially of animal food and of rich dishes, and prolonged insufficiency of exercise are not common here.

So that I am unable to deny with Dr Garrod that alcohol has anything to do with its Causation, but a something else which is the result of imperfect fermentation. Indeed my experience would tend to show that, that something must be present in the fermented liquors drunk here. Nor can I affirm with the late Dr Cullen, as was said, Dr A B Garrod

Dr Murchison that it is due to functional disturbance of the liver, or with Dr Garrod that the kidneys are the organs in fault, or with Dr Ord that it is a disease in which there is a tendency to a special form of degeneration in certain of the fibroid tissues, derived by inheritance or acquired by habits of life; characterised by the excessive formation of urate of soda in the implicated tissues, whence it is discharged with the blood, and deposited in those parts, which are least well supplied with vessels and lymphatics.

I hope it will not be considered irrelevant to the object of this paper if an analysis of a report by a Committee of the Harveian Society of London on the mortality referable to alcohol be introduced.

The Committee limited the enquiry to London for several reasons. Instead of referring to the Registrar General's returns, which contain only the cause of death, not the cause of disease, the Committee got returns from practitioners, medical officers of infirmaries, registrars of hospitals and the Coroner for Central Middlesex of 10000 deaths. Care was taken that the cases should be of a representative character. In London in 10000 deaths about 7583 will on the average be certified by private practitioners, 1183 will occur in workhouse hospitals and lunatic asylums, about 646 in hospitals and inquests will be held in 686 Of the 10000 cases of which returns were sent the

Committee 7503 were private 1172 infirmary and asylum, 646 hospital, and 677 inquest. The returns show that in the 10000 cases 8598 deaths, with the causation of which alcohol did not enter, 1005 deaths accelerated by the abuse, 397 deaths wholly due to it, which gives 1402 in all or 14 per cent into the causation of which alcohol played some part. Assuming that this would apply to the Metropolis it would give 5870 and if to the United Kingdoms it would give over 51000 adult deaths due partially or wholly to alcohol. In the set of cases derived from hospitals, where none were admitted except from the evidence of a post mortem examination, the proportion was 1.55 per cent wholly due to the effects of alcohol; the inquests alone yielded 5.6 per cent: 2.133 in the infirmary cases and 4.317 in the private cases.

When the deaths were put in one category instead

of two, 11 per cent in the hospitals Cases nearly 13 in the infirmary and just 14 per cent in each of the others, were in a greater or less degree removed to alcohol.

They found the deaths due partially to alcohol were twice as common among men as amongst women 663 as against 342, but this proportion in deaths is not quite so large in the class wholly due to alcohol being 242 to against 155. These figures seem to show as the Committee suggest "that while disease from excess of alcohol prevails much more among men than women, its aggravated forms are relatively more common among women". Or they may be interpreted to mean, that there are not so many men left to maintain the proportion as there are of women and therefore the ratio falls. Another point brought out by these figures is as might have been anticipated the earlier age at which the deaths occur in

the intemperate, two thirds of the deaths partially, and three fourths of the deaths wholly due to alcohol, occurred between the ages of 30 and 60; whereas, in the adult population of the metropolis generally little more than half occur between 35 and 65. The returns show that 86 deaths occurred after the age of seventy, or it only in a modified sense can it be said that these died from drink. One of these was reported thus: Widow aged 82, constantly drunk for years died finally of congestion of the lungs. As to occupation it appears that out of 234 persons dependent for their living on various trades, no less than 104 were publicans, hotel keepers, wine merchants, their wives and persons in their employ.

As to the modes of death. These returns show a great preponderance due to diseases of the Chylopoietic viscera and liver. There were 257

referred to the liver, 19 liver and stomach, 23 stomach and haematemesis, 23 liver and kidneys, 17 heart and liver, 11 heart liver and kidneys, 7 to diarrhoea and 5 peritonitis giving a total of 362. These amount to 26.8 per cent of the 1402; whereas the deaths from these causes form only 4 per cent of the adult deaths in the general population of the Metropolis. To diseases of the nervous system 359 deaths were due, made up of 104 apoplexy and paralysis, 11 softening of brain, 6 general paralysis, 17 epilepsy, 36 disease of brain and meninges, 12 effusion on brain, 2 Convulsions, 3 disease of spinal Cord 47 delirium tremens, 1 to dipsomania, making 17 per cent; whereas in the adult population generally these causes account for only 12.36 per cent. But besides this the deaths occur at an earlier age than in the general population. The number of deaths referred to them are

highest in the decade 65 to 75 but these returns show that in the intermediate there were as many deaths between 50 and 60 as between 60 and 70. There were 95 deaths due to disease of the kidneys, albuminuria and uraemia or 6.7 per cent; whereas in the adult general population such deaths were only 3.22 per cent of the whole. This shows that there is an increase in disease of the kidneys due to alcohol. The deaths from disease of heart were 89 or 6.2 per cent of 1402, which is less than the percentage in the population generally 10.77. It is evident that the large abnormal increase of deaths due to diseases of the abdominal viscera, must lessen the number of deaths due to disease of other organs. As it is impossible but that the degeneration which alcohol is known to cause is hurtful to the heart.

184 deaths of the 1402 were referred

to phthisis yielding a percentage of 13.1.
In the general population phthisis accounts
for 20 per cent; so that these figures may
show that alcohol has no tendency to
develope this disease. The Registrar General's
tables show that while 46 per cent of the
deaths occur between 35 and 55; in the
intemperate 50 per cent occur between 40
and 60 years. Three men seem to die
of phthisis to one woman amongst the
intemperate, in the general population
the proportion is four men to three
women. Dr Hyde thinks these figures
may be interpreted differently from
the Committee's conclusion:- Phthisis
exacts its quota at an earlier age than alcohol
generally does, and thus alcohol minimises
the liability to this disease at a later age.
So that a person of a phthisical tendency
by fast care may pass on the

years at which its liability is greater but then if this person hurts his system by alcoholic drinks, phthisis sets in and thus causes deaths, which otherwise might not have taken place.

There were 81 deaths registered as due to pleurisy and pneumonia giving 5.77 per cent. The deaths from these causes among adults reach only 3.8 per cent in the general population.

To bronchitis, asthma, emphysema and congestion of the lungs are due 118 deaths or 8.41 per cent; whereas in the general mortality 15.5 per cent are due to these diseases, there being a preponderance of females, but in the intemperate the males are more numerous, which shows that there is really a liability to these diseases in them.

Diabetes and erysipelas gives 7 deaths each

which is a far greater proportion than in the general population. Asphyxia accounts for 5 deaths; accident which intoxicated 22, alcoholic poisoning 9; Chronic alcoholism 36; General infirmity, debility, exhaustion & apoplexy 20; Senile decay 13; in all of these the mortality is greater than in the general population except under Senile decay which gives only 9 per cent whereas "Old age" or "Senile decay" accounts for 15 per cent of the London mortality.

The committee conclude in these terms: "We find, therefore, upon the whole, reason to think that, in the metropolis, the mortality among any considerable group of intemperate persons will differ from that generally prevailing among adults in the following important particulars, viz a fourfold increase in deaths from diseases of the liver and the thyloparietic viscera; a twofold

increase in deaths from diseases of the kidneys; a decrease of half as much again in those from heart disease; a marked increase in those from pneumonia and pleurisy; a considerable increase and an earlier occurrence of those from disease of the Central nervous system; a marked decrease in those from bronchitis asthma, emphysema, and congestion of the lungs; a decrease mainly confined to those from phthisis; and a later occurrence or at least termination of the disease; a very large decrease in those from old age, with an increase in those referred to atrophy, debility, etc; and the addition of a considerable group referred in general terms to alcoholism, or chronic alcoholism, or resulting from accidents".