Alcohol

As physiological action
and
Specific constitutional effect—alcoholism.

There is no agent, either medical or poisonous, that has occupied the attention of scientific minds to the extent that alcohol has, nor is there one in which action—beneficial or otherwise—that has been so much controverted. Its general and more visible action on the body to health have long been recognized, and of late years the most eminent authorities in physiology and therapeutics have studied it especially, and many works the result of their experiments and observations have been published by physicians of all nations.

To attempt to add to the observations resulting from such searching inquiry would be presumptuous, and it is not my intention to consider alcohol as a food or as a poison or to consider its use as a stimulant in medicine. In this paper I mean merely to notice the action of the alcoholic principle on
principle on
the healthy tissues of the body generally, and on
the various organs individually, dwelling more
minutely on its accumulative toxicological effects;
and enumerating the diseases which it either directly
induces or gradually predisposes to.
The conclusions are taken from cases not only in hospital
and dispensary patients where from co-existing or pre-
existing constitutional disease and debilitated condition
of body resulting from various causes, the phenomena are
greatly modified, but also from cases of patients in
the higher walks of life.
In talking of the action of alcohol, it is necessary
to state that alcohol in a very dilute state, or in
the form of the various spurious liquors is meant.
A very small quantity of absolute alcohol or very
or artificial spirits acts as a nervous irritant on the part
it is directly brought into contact with, and taken
intra-murally or injected directly into the venous system, it
either kills instantaneously by paralyzing the nerve
centre or produces coma and convulsions before death.
First let us look at the action of a small
quantity of alkohol taken in any of its usual forms.
Locally it is instant and astonishingly
and promptly it is resolved into irritative, dilatative, contractive and antispasmodic effects. 

The irritative effect is produced as seen by the reddening of the mucous membranes with which it is brought into direct contact. The antispasmodic effect may be demonstrated by applying it to the skin, where it first redness and then cools. The reddening appears of the lining membrane of the stomach of animals treated with small doses shows alternate red and white spots. Promotely the irritant effect is also stimulative, which may vary from a few minutes to an hour or more according to the strength and quantity of the dose. During this period there is often a general physical and mental excitement shown by the performance of more fatigue resistant with apparently little effort and by rage and with hauteur. The excitation is stimulated the irritant action being reduced stronger and more frequent, and the nervous system is also stimulated; and this is more easily produced when the brain has been excited beforehand. This is succeeded in some cases by an after-period of depression but the general rule is that there is no subsequent depression or harm resulting from the greatest stimulus of all. The general effect of large doses is a more decided nature of the irritant and excitant action, which is more pronounced and is immediately followed by a more obvious depression of the
Depression of the brain first and then of the circulation and consequently of the digestive and of every important function of the body. This is manifested by impairment of thought, impairment of speech, incoherent speech, stottering, gait, followed by speechlessness, insensibility, suspended consciousness, irritable and with dilated pupil and slow respiration, breathing, most of the symptoms being similar to those of narcotic poisoning.

This gradual phenomena therefore which may be observed in any case of alcoholic drunkeness do not in truth as much as the functional disarrangement of organs and organic changes produced in the tissues by the long continued use of alcohol, as in many properly speaking cases of chronic alcohol poisoning. Before this condition is reached, or before there is any organic disease like symptoms found in a patient who for a considerable period has become accustomed to keep up the stimulating effect of alcohol and to follow a low of appetite, loaded with food, persistent thirst, irregular action of bowels, flaccidity, also inability to endure some physical exertion or mental fatigue, and nervous excitability.

All symptoms of chronic alcoholic poisoning are brought about by the actual presence in the blood of the ethanol principle which thus
Subject was a quit cat. 19 who has swallowed more than a pint of new rye whiskey night 19. Post-mortem made at Edinburgh police office May 172.
which thus
sends its influence in very part: and (as we shall see)
from the fact of its determination to the cerebral parts
it affects in addition the function of the nerves springing
from that centre. The tendency is for it to be eliminated
of the latter place by the lungs, skin, or principally by the
kidneys. A fit of intoxication is often preceded by during
strang when large quantities of alcohol are thrown out in the
breath. In the urine however, the greatest amount passes off
and it may be set rid of more abruptly by vomiting.

In the only fatal case of acute poisoning by alcohol I
remember, the post-mortem phenomena usually described were
observed. The lining membrane of the stomach was of a dark
red colour, this being confirm to that organ alone, and more
apparent towards the pyloric orifice beyond which it did
not occur. When the skull-cap was removed a decided
spirous red colour was felt. There was no hypertrophy of
the membranes or inflammatory adhesions but the brain
was much engorged and there was a large amount of
serous fluid below the arachnoid and in the ventricles.
That in the lateral ventricles was found by the usual tech-
tique, and was a large proportion of alcohol.
Let us now consider the typically the action of alcohol on the
tissues of the body and on the various organs. When introduced
Direct absorption.
When introduced into the stomach rather in a large dose or in repeated small doses. It must be borne in mind that liquids generally and a liquid like alcohol especially, do not undergo the chemical changes to which solids are subjected when taken into the stomach. Instead of being subjected to the action of the saliva, mastication, theVault, fat, and intestinal juices, in short: undergoing the operation of digestion, they pass directly into the blood by a simple act of swallowing. There is an anatomical fact in reference to the position of the gastric absorbing upon which I propose often is not cited and which is often overlooked. I would wish to call attention to the relation of the cæcal, and the blood vessels in this locality. The gastric vessels (from the division of the cæcal ane) run along the two curvatures of the stomach to supply the coats. Then below them, they still divide into small branches in the sub-mucous, arrosoal coat, and pass between the tubules of Ranvier on the surface of the Mucous coat. The absorbing from a network between the arrosoal muscular coats, or between the layer of cæcal, of the internal surface and the tubules (gastric or jejunum) according to the difference of their epithelial lining. A scanning microscopical section of these structures, we see the capillary joining mucous loops which run up
which run up between the tubuli and distributed in the mucous lining close to the surface. I have not met with a preparation demonstrating the existence of tubuli in this situation, and I believe no trace of them has been seen. As they lie deeper that is with the whole thickness of the secreting structure below them and the internal lining of the stomach, and this point to the great facility of the passage of alcohol directly into the blood. Thus it does and that in a less altered condition than it would be were it acted on by the secreted juices. It is then carried by the coronary, superior mesenteric, splenic, veins by the time passes through the liver to the heart. Hence to the lungs or what is now eliminated is carried back to the heart from which it is distributed in the arterial blood to all parts of the body. Thus it arrives comparatively unchanged in every part and in every organ of the body which are thus directly affected by the actual presence of the poison in them and then an irritated tissue which is crew of time may become badly nourished and have its function impaired. The action on the blood itself is determining. According to Huxley and German pathologists generally the development of the red corpuscles is arrested and their decay hastened. By consequent loss of vitality nutritive power. In examination of these cases I have examined the blood of persons suffering from debility the receiving
midst grace or alcohol, and I have found a departure from the normal constitution of forming new cells, with an increase of white corpuscles. In a case of churning of the liver as many as 14 columnal corpuscles were to be seen at any time in the field of the microscope, while fatty corpuscles were to be found like the liquor flatusis of the corpuscles themselves were fatty degenerated and the alkalinity of the blood was increased. In this condition the blood is less able to take in oxygen and give out for it is easy to understand that thus it arrests the process of town and retards the carrying away of the absorption of waste tissue. Thus we may question if the inhibition of the antiseptic action of alcohol is desirable since it is degenerates tissue which is degraded.

To act on the tissue generally. Alcohol tends to produce fatty degeneration of the tissues, and this is the most constant result. Yet only do we find muscular tissue voluntary and involuntary thus metamorphosed but very tame and often is more or less subject to it, brain, heart, liver, kidney, etc. This process as is well known is clarified under the pathological kind of impaired nutrition variety in the transformation of the albuminoid constituents of the tissue into fat. It is in the heart that we must firmly mark with this as caused by alcohol. In appearance a heart thus affected is uniformly paler and has pale spots throughout its substance. In the gel
Selective accumulation actin.

On the train.
it is soft and flabby. Microscopically the fibers are seen to have lost their striated appearance, and contain fat granules. (An advanced stage of sarcoma is one of large masses of fat and oil globules.) In the kidney fibers it first makes its appearance as small granules in the cells, then the nucleus and all wall are destroyed. In the brain it is met with in the condition known as "Edema of the Brain." In the arteries it is also met with as a rule beginning in the connective tissue cells of the internal coat.

Like many medicinal remedies which not only act on a particular channel but are determined to one particular local, alcohol has an inherent power of selecting a particular organ and tissue for the seat of its special operation and it is now well known that it piano in cerebral matter by the principle electrolysis. This has been found by French pathologists to be twice as great for the brain as that for the liver when next in order it is found to accumulate. A post-mortem examination of the brain of persons used to a long continued over-indulgence in alcohol shows a congested state of the capillaries of the cerebral substance by the theory of the micros. These vessels are supposedly brought into this condition not being able to rid themselves of the injurious in the usual way, are relieved by Gross medicament into the arachnoid spaces below the arachnoid membrane and into the cerebral ventricles. This naturally sets up
a great amount of cerebral irritation and consequently all the important
functions of the body are vitiated with. In this congestive stage
apoplexy and epilepsy may occur if it passes or to the inflammatory
stages. Delirium tremens convulsions shaking palsy, paraplegia are
likely to result.

As small doses long continued, of certain
agents e.g. Trich, Atropine or Arsenic produce at first no
notions but even a beneficial result. Of ultimately a condition of
plumbism, arsenicism or Mercury, So oft repeated indulgence
in alcoholic drinks produces an action which because it is brought
on by nothing new is specific and the resulting constitutional condition
is one of Alcoholicism. The actual presence of alcohol in the
brain has been referred to as a case of acute poisoning. For pressing the
same localization takes place when it is used in small doses con-
tinuously and repeatedly. At an acute stage the effects occur so does
it in chronic. It is not entirely eliminated from the system but a
certain amount remains behind that chiefly in the cerebral paren-
chyma each such dose produces a like accumulation. This poisoning
of the grey matter of the brain develops a constitutional condition
morally similar to an acute and attended by phenomena
of uniform character to all. There is a fact confirming to
the view of its true accumulation. There is no drug when action is so
much modified by habit. A person habituated to its use would
become very much less susceptible to its action so that he would
Alcoholism

[Handwritten text with multiple paragraphs]

[Abraham Lincoln's signature is visible at the bottom]
we would expect them to become, in time, insusceptible to the stimulating or rather exciting effect; and this is the case. He may go on for a long period gradually increasing his daily allowance until the proportionate effect of the apparent dose is reached, until a certain stage is reached. This is when it has accumulated to the extent that the whole system is charged with it until it fails; he is intoxicated. When this stage is reached, a very much less quantity will produce an effect or even greater result than the large amount previously indulged in. That the whole system is so it were saturated with the poison is manifest from the familiar example of the dressing to thread of the most trifling wound or even abrasion of the skin where the veins or a person thus intoxicated or the irritable nature of any pre-existing one or ulcer in what we part of the body. Every keen surgeon knows how liable such wounds are in thousands are to take on supplicative action. Profy may also be taken from the dangerous and acute character which inflammation always assumes; the great liability such patients have to succumb to attacks of fever. Having thus determined that alcohol by acting on and accumulating in the cerebrum, liver, and by disturbing the functions of the body, produces such a condition of system that a smaller quantity will produce a more violent and lasting result, let us consider the more important ailments induced by this condition and preclude such effects altogether.
This disease may be defined as one of the manifestation of the specific toxicologic effect produced by long continued and often repeated doses of alcohol. It is produced in every by the initial poison in alcoholic drinks which have been shown by Dr. L. C. B. Reed to be not only the predisposing but the directly exciting cause. After the above writings of such nature little remains to be added to their observance except to confirm from case to case pathological treatise. The primary lesion is in the cerebellum itself, which then the is not necessarily affected than the entire plan of the system disorder.

The prominent symptoms are digestive disturbances, pale tongue, hyaline, moist skin, scanty urine, and pulse high. There is also restlessness and a nervous excitability of manner, with a cessation of the desire to drink. The symptoms which follow are well known and are sleeplessness, muscular tremors of the hands and tongue, and twitching of the facial muscles, and the tremor which is characteristic being not violent but slow, slight, and apprehensive. The hallucination of sight, hearing are also constant and the anxious expression of face is marked. Dr. L. C. B. Reed considers that these phenomena are due to the condition of the blood and he has found it in the principal alcoholic drinks. Thus as we have seen, all of alcoholic poisons of the blood is imperfectly cured. This is no doubt a pathological condition during the premonitory stages but an opportunity of examination at this time is seldom afforded. In past years examination of
examination of
fatal cases where the characteristic delirium hallucination have
supposed we naturally expect to find some thing more than signs
of mere cerebral irritation. In such I have found hyperemia of
the meninges especially of the arachnoid with inflammation adhering
to the other membranes of the dura mater to the three of the pia
mater to the brain substance. In some cases we attempting to stop
the last part the convolution portions of the cerebral peep
came away. The cerebral itself is usually no tisicle the con-
volutions are shrunk. These conditions, along with opacity and firm
character of the membranes we would very expect to notice in
when history showed rondeau drinking that they are a cry presed.
The previous is not only subarachnoid and into vessels but
into the cerebral substance itself.

The theory that the sudden exciton from the usual stimulas has the
direct exciton cause of delirium tremens has exploded. It arose
from the fact that one of the prominent symptoms is the psychic
derangements and as delirium to drink is produced. In account of the
the subject then for some time previously to the exhibition of the new
apparent symptoms entirely give up his usual position.

Delirium tremens is another form of disease to which he
abuse of alcohol may lead. It is caused by heavy drinking for a short-
period until a sort of Mania is produced. When this to mange the
the drunk for more strong drink so strong as to find the patient
Read the patient

to perform dangerous & violent acts in order to obtain it.

The delirium is wild and raging, muscular terrors are usually found. The skin is dry that the pulse is strong & thick. These symptoms are popularly supposed to be those of delirium tremens but they are quite characteristic of this form of mania as we may call it— which also differs in pathologic structures from deliria tremens. In this the patient must be put under restraint. While

the delirium tremens, restraint must not be employed as it increases the irritability & induces a tendency to violence. The expression

of face or each is distinctive. In the one it is anxious with a

look of expectant dread, while in the latter it is bulk & rage.

The pathologic condition may be traced at the symptoms

point to a great amount of vascular excitement, but the action

is not to fall of alcohol in delirium tremens, in patient never.

The loss of alcoholic is not developed. In the form as

in delirium tremens, tends to produce money. The strong craving

for more drink who yielded to produce nausea vomiting

after which rapid recovery takes place. In delirium tremens we can

have seen that is no change for drink for more unless

apparate the symptoms after recovery. Thus we are guided

to treat without stimulants.

A fibril attack with delirium of a low hypnotic for is sometimes bi-

surgically as the result of an injury to a patient who has been
Action in the stomach
who has been
in a state of alcoholution at the time. This is the delirium
haematurium of Dupuytren. I have not met with a well defined case.
It would be a difficult task to relate the symptoms
and pathology of the many disorders resulting from the action
on the nervous centre of alcohol. Suffice it to say that among
the most frequent are apoplexy, epilepsy, the various cerebral
softness (giving rise to paralysis), convulsion, shaking palsy & insanity.

Space does not admit of the consideration of the disorders
in the various organs induced by the abuse of alcohol for each
is a study in itself. I shall only mention one of the most
important and with, and that is that of the stomach.

From the irritant action of alcohol and from the fact that
when drunk by frequent indulgence on an empty stomach it is rarely
so that a certain amount of inflammation will be set
up after each dose. A Braunkart represents an St. Pantius
showed that the contact of alcohol with the walls of the
stomach was followed by an increased secretion of fluid
which he found was not gastric juice like the ordinary
mucus. This direct irritation with congestion and stimulation
to increased secretion results in chronic gastritis which
soon produces thickening and induration of the coats.

This I have noticed with narrowing of the
pyloric but never to the extent of ulceration and
Action on the liver

Cirrhosis

Pathology of cirrhosis
preparin as is sometimes described, we have 9 som
a case of gastric scirrhous as resulting from thi
hepatic exudate, etc.
The liver as we have instructed may, in common with
the tissues of other organs, become partly degenerated
one of the results of impaired nutrition. Yet there is
an affection of a chronic nature, not with in this
organ, which must not be passed over. Refer to Cirrhosis.
This is, in short, a chronic inflammation of the smaller
tissues in the portal liver, and even of the organ
we have seen that alcohol is directly absorbed and
is carried by the portal vein thru the liver. This I
am inclined to agree with, that the basis that the
affection is due to the direct irritatin of alcohol
in the liver. The pathology is in the liver,
At first the organ is congested & constantly enlarged.
This congestion occurs intermittently, alternating
contracts and relaxes, the hepatic lobes. The bile
secretion continues, being thus subject to con
continuously irritation and pressure bears hypertrophied
consequently contracts drawing the capsule, ligament
with it so that the surface is irregular, and hence
the term 'cob-nail'd liver. At this stage the Whole
Case of cirrhosis of liver
organ becomes contracted and smaller. Many important secondary symptoms result from this contracted condition of obstruction to the circulation, such as dropy of the limbs, ascites, enlargement of the spleen, &c.

A well-marked case is described was for some time under my care. Patient was an Irishman in a hurry, and was in the daily habit of inhaling large quantities of spirit, ale, and that精神 were therefore the fluid in the stomach and the liver was heated and properly freed to that. There was every facility for the alcohol being rapidly absorbed and exerting its influence on the tissues. On the contrary, his first symptoms were fatty diarrhoea immediately followed by yellowish discoloration of the conjunctiva and other indications of jaundice. Some days after he complained of pain in the right hypochondria. On auscultation the liver was found to be enlarged, soft, and pulsating. The deep dullness in the mamillary line was the chief site. There was considerable ascites. The circumference of the abdomen at the umbilicus being forty-two inches; the patient also suffered from nausea, vomiting. The character of the urine was the secondary affection, as the dropy of the abdomen. The limbs and the relaxation of
Removal of
the optila. One week after admission when the
enlargement of the liver had been absorbed and
the octila removed the effect subsided was about 37/10
by the external application of iodine and other means,
the ascites was considerably reduced. This was undoubtedly
owing to the circulation being more obstructed from
hypertrophy of the connective tissue & compression of
the veins and heart. The optila also was found to
be released to about 3 3/4 in. from the upper to the
lower end, and that was a marked increase
in the number of the past fluid corpuscles. As
many as from 14 to 16 of these corpuscles were
in 1 cc of a time in the field of the microscopes.
The remaining corpuscles affecting the digestive system
were white may be traced to the action of alcohol
and urines, at first the presence of cyanide
resulted. The latter may be diminished secretion and
increased alkalinity of the blood, but little if
alteration of the stomach, in addition to prevent
purging is the result. In the kidney we find
splety absorption 9 as a rule the urine is the
capillary of the Malpighian bodies. In the urine
albumin + phosphates said to a great extent and
great extent, and
diabetes is not unfrequently part with.
In short, by the long continued use of alcohol
the nutrition of the whole system is impaired and the
vitality is consequently lowered, so that, before an organ
leaves us to this is great functional derangement.
In this state of life as it were any demand
for serious exertion on the part of an organ
it is unable to perform its function or the per
formance of it is followed by organ disorder.
I shall conclude with a quotation from Preedy: "in
the treatment of alcoholic diseases without stimulant or spirits."
"The habit of excessive use of alcohol by man does not
afford all individuals alike. Some decline as rapidly by the use of
alcohol as other organ to which they may have a hereditary or con-
stitutional liability; others in fever or inflammation where
they have no stamina to contend against; others
by adopting or paralyzing the direct effects of a
drink; of some for hereditary predisposition or other
harm are very devoid to speed the many ways of a
deformable existence. In Man's idea of a
permanent paralysis of the system. Some feel drink
again by onset of acute or chronic destructive, viosa,
scaps all their ill and live a to ever age.
The greater number who are now being removed from society by the disease situated suffer more or less from attacks of delirium tremens.

Signed: Anderson A.B. & C.R.

University of Edinburgh 3, 1878.