Diabetes Mellitus
Its Symptoms, Pathology, and Treatment.

John Morrison

In being treated as annex can be joined...
Diabetes Mellitus.

History.

We are not quite sure whether this disease was known to Hippocrates or not. Certainly he does not mention it by name, but in his Hippocrates he includes among those named which he says pertain to the urine like mela. He also in several other places calls pallorness and this great quantity of the urine a bad symptom. Galen is the first to mention Diabetes by name, calling it Mallichea Hydroops. Urine profusum. Diabetes. a Depressus. He says it is a disease of much rare occurrence and compares it to Aesculpea saying that as Aesculpea is caused by acting upon the limbs, their being unable to retain the fluid, so Diabetes is caused by acting upon the Kidneys, their being unable to retain the urine; and that as in Aesculpea the appetite is often seen, so in Diabetes, from the Kidneys having a peculiar potential than natural to milk, drain milk from the blood, there is often great thirst.
Retains says, that diabetes is something miraculous not very common among men. That the urine is not much changed in quantity in this disease but always very bloody and pale. That it is a col.

Alexander Helciosus says that diabetes is caused by weakness of the st. ventriculi power in the kidneys so that they drain off the mea of the body without measure.

Up till the 17th century all authors seem to have been ignorant of the presence of sugar in diabetic urine.

Within me, the fire who funds the flame of the 17th century pointed out that the urine of patients afflicted with this disease was distinctly sweet. He says, "What some authors affirm of the drink being again discharged little or nothing altered, is very far from being true. For the urine in all the cases that I have seen I and I believe it will universally hold
good) differed not only from their origin and from every other drink in the
natural body, but was like an ice that had been mixed with honey or milk sugar
and had a wonderfully sweet taste." He also states that he does not think the effect
is caused by an attractive power in the kidneys themselves but is due to an
effort of the blood which becomes as it were melted down and is thus copiously
dissolved into a state of sensibility, which is removed by the kidneys. That by the slow
absorption of serum the blood becomes thicker and excessive thirst is produced.
Its cause of its true nature, he says, is that the contents of the blood in its mixture
is so loosened and in a manner dissolved that the water particles can not be
retained by the bladder, but that quickly
breaking from their connections and
leaving impregnated with saline matter
may run out by the very patentest
outries of the kidneys: in the mean time
that the blood may be diluted and regu
from aspinulating. Other operations both from within and without are seized into it, and thus with considerable effort the processes are constantly forced into a more rapid action. He thinks it difficult to understand how the urine is sweet, but suspects that this is due to certain sulphurous particles which are pulled out from the colliquation of the medullary parts, combining with the other salts that are combined with the urine.

It is strange that Agdenham who knew about the same urine does not mention the sweetness of diuretic urine.

Cullen says that the proximate cause of diuretics was no little known that he could not support any rational method of cure. He thinks it likely another that the proximate cause of the disease was some fault in the assimilatory powers.

Helden who tried about the same time says that it seems to him to depend on a disturbance of the whole frame produced...
from some severe malady different in different people and not from any fault of the

Dr. Matthew Dobson of Liverpool first established by experiment that the sweetness of wine was due to the presence of sugar.

Nello was the first to point out that Fabriacus articles of food increased the amount of sugar in the wine and that an animal chel diminished it. Hence he recommended abstinence from vegetable food.

Farham says, that all matters capable of the

From certain saccharine particles, being from some circumstance unknown to us very imperfectly digested, and thence affording an incomplete and insufficient chyme are not fully assimilated when they enter into the general circulation with the mass of the blood, but have their sugar so slowly and weakly oxygenated as to be readily ousted again by the excorbing action of the Indiges, not from any fault in the Indiges themselves, but from the.
regular and natural exercise of their junc-
tions in separating from the
imperfect blood such matters as are
not perfectly combined with it.

Wound thought that malaria was owing to
the malassimilation of the saccharine
principle, that one of the most frequent
exciting causes was cold and moisture,
that malaria was another fertile cause,
that a hereditary tendency to diabetes
existed.

Ambrosio, of Milan, and Dr. Charles Mat-
land in 1835 and 1836 first detected
sugar in the blood of the diabetic.

Symptoms.
The characteristic symptom is a saccharine
condition of the urine.

It is a disease peculiar to man as far
as yet known; it seems never to exist
naturally in the lower animals, though
a disease resembling it very closely has
been artificially produced in them.

Most believed that there was a stage which
preceded the occurrence of sugar in the

mine, characterized by the urine being very dense and abundant, coated with lithrates. This is very uncertain. Usually the urine is passed in great excess, as much as 20 quarts and up. odd have been known to be voided in one day. This great quantity of the urine is generally the circumstance which first attracts the patient's notice. The thirst is another very prominent symptom. It denotes an unusual quantity and his appetite becomes aversive. At the same time he feels that he is losing strength and flesh. The skin is dry and harsh. The mouth clammy, the tongue coated with a white, frothy mucous. The patient loses sexual desire and power.

The urine is passed in excessive quantity, is usually very pale and clear, though occasionally turbid, with a sweetish odor which some have compared to near oman hay. The specific gravity is usually high and may be taken as a pretty corne.
index of the amount of sugar in the urine. It has been stated that the quantity of urine passed is often greater than the amount of water drunk, but the experiments of Dr. Parker throw considerable doubt on this. He says that the quantity of water passed is actually less than the quantity of water contained in both food and drink. And that this is especially true when long periods are taken into consideration. If the calculation is only made for a single day, some of the water included in the previous day may be passed out and give rise to an apparent excess of urine passed over that drunk.

The usual range of specific gravity of diabetic urine is from 1.030 to 1.050 but it may be even higher. The specific gravity varies generally with the amount of sugar, and at the same time it sometimes occurs that a urine of high specific gravity may contain less sugar than one of lower. Even its containing a larger quantity of other constituents.

It has been stated by some that sugar is
abundant or nearly so from diabetic urine, but this is a mistake: the actual quantity is so great, though of course as the amount of urine is much increased, the proportional quantity of it is much diminished.

The colour of the urine is generally pale, but this is liable to vary according to the state of the patient: in a healthy animal with the colour may be hardly distinguished from that of healthy urine, while in a mixed state the urine is almost always very pale. The urine formed while fasting orarker than that excited after the ingestion of food.

Most authors state that the urine is always very clear, but there are certainly some cases, (one or two such have come under my own observation,) in which the urine occasionally presents a muddy appearance. There are several cases on record in which albumen has appeared in the urine during the presence of diabetes. In connection with this it may be stated that Bernard has
found that urination of the urine usually
occurred at the same time than the
most urination which caused sugar to
appear, it caused the occurrence of albumen
in the urine.

Vatt says that cholitis urine sometimes
contains a little blood.

Pest asserts that sometimes a milky fluid
like urine seems mixed with it.

This is a very prominent symptom, often
the craving for fluids is insatiable. This
is easily accounted for by the large loss of
sweat from the kidneys. The thirst is
generally in proportion to the quantity of
sweat passed. Vatt is of opinion that the
presence of sugar in the blood, increasing
its density, as well as the loss of water
has a direct effect to do with the thirst.

Vatt says the thirst in cholitis increases by
indulgence in fluids.

The appetite is almost always excessive
incapable rumblingly of being satisfied.

Sometimes these patients will eat enormous
quantities. In the hands of an experienced

may often notice their extreme weakness to make preparations for dinner.
As small this is owing to the immense loss of nutritive material they sustain from
the kidneys.
In some instances diabetes the appetite does not seem to be much increased throughout
the whole progress of the case.
The skin is normally dry and harsh often
showing a tendency to crack. Sometimes
in severe diabetes great frequency on the
head excoriation.
The mouth is dry. The tongue often changing
and loaded with a white pearly mucous
in it, may be red and very clean. There is
sometimes a sweet taste in the mouth. As
there is no sugar in the saline coma,
none thought that this was due to the
presence of sugar in the blood.
The gums are often spongy, bleed readily,
and detached from the teeth which are
very liable to fall out.
There is a peculiar odour from the breath
which Watson compares to the smell of
In the fall, ripe apples, and in the spring, they may

The cones are often covered and the fruit dry and hard. In some cases the patients are natural, while others patients are a tendency to diarrhoea, which may even become excessive.

There is often an irritation of the stomach from the great quantity of mucus present, and its surjet may become inflamed and sore. Uneasiness, in the stomach, in the abdominal region, and sensations after meals are pretty common.

There is often great depression of spirits, the temper may be affected and the patient unnaturally irritable.

Aphthous of the mouth is not an uncommon symptom. This may be due either to cataract or anemia, without any obvious cause. The former being much the more common.

Loss of smell is one of the symptoms which are apt to occur when the disease is very intense.
Fever, delirium is a symptom which may frequently be noticed, and which has come under my own observation. The patient frequently fell asleep at all times.

The patient had been seen as subject to attacks of delirium, which came on at the same time as the chills, and seemed connected with it.

Epilepsy is occasionally present. Edema of the lower extremities has been occasionally noticed.

Convulsion is a symptom that is usually very well marked, and sometimes extreme. It is caused not only by the want of proper assimilation of the food, but by the actual loss of moisture which takes place.

Colic of the body and especially of the lower limbs is not an infrequent symptom. Delirium is very marked in most cases. There is constant restless and inability for sustained exertion. When the patient is made to walk, his lower extremities are seen to be weak. His gait is shuffling and undecided. He often complains of dull pains in the
Each hour lends etc., with a sense of fatigue in those parts. The debility is very often the first symptom and is very often out of proportion to the emaciation so that something more would seem to be required to account for it.

Many says that the presence of sugar in the blood seems to have something to do with this, that in a case which the medical man

the man fell pretty strongly on an en
dined chic., but immediately after he had a
look of mixed grief, complained that he seemed to have no life energy in person in his

There is a peculiar physiognomical appearance in their histories, difficult to describe, but which may be easily recognized after having seen a few cases.

It is curious that when the diabetic is att

ached with a severe form of an acute

chicken pox, the measles may en-

fully disappear from the skin, to reappear

woman in recovery from this com-

lication.
Causes

Welles thought their disease was owing to some
acid poison being formed from bad food,
especially the constant and excessive use of
cider ale in acid mines. Diseases and long-
continued sorrow, consumptive affections, etc.

Premies and irregularities of the animal
spirits, also the said might penetrate and
beurish this morbid disposition. He mentions
the case of a man who fell into an in-
curable state of which he died in a
month from drinking Rhine wine. He
says, ye 20 days.

Indispending causes. Disease is predisposed to in
the stomach, less frequent in women
than men. Rarely occurs in infancy
in old age. Malassimilation of food seems
to predispose in some cases. Most says
residence in a cold and damp situation,
in a malacius climate, especially if at
the same time accompanied with a flow of
unmuttered stuff in the for free use of sugar.

General excress also; the for free use of
mercury in such any cause having a
Tendency to lay the foundation of juvenile life with malnutrition. Any cause of ill-health may be stated to be a possible causing cause.

Exciting Causes. Todays exposure to cold, attacks of rheumatism, or fainting, drinking of cold water when heated, concussions in injuries of the head, mental anxiety or distress may be exciting causes of diabetes. Cutaneous eruptions precede it, and in connection with this it has been noticed that sugar in the urine generally accompanies carbuncle and malignant ulcers.

Really however, the truth seems to be that of the causes of diabetes we know very little.

Terminations.
The most frequent termination is in a sort of death, which many think is not due to diabetes but to a chronic inflammation induced by the presence of sugar in the blood. However, there seems no reason to doubt that the diabetes is not due to tuberculosis.
Dianbets may carry off the patient.
Recovery occasionally occurs but is not com-
Mon. The rules that the disease once established tends to shorten life. Sometimes though, observation shows jaundice, arthritis, and ulcer present together. JAUN 10 21:23 appearing on the urine, and then the disease may be next at bay.

It may also terminate by chills of the skin and jaundice, by apoplexy, by an affection of the stomach brought on by improper or by overdistension of the organs. In such matters induced by taking cold drinks when febile. In inflammation been excited by exposure to cold and speedily assuming the typhoid character. Occasionally it is said to terminate in incurable distress and in various other affections. (1st) 

Jaundice may also terminate in a gradual atrophy connectid with prostration of the vital powers.

And modern appearances

Dr. Wilks considers that the urine presents a peculiar appearance. It is from a thick porous
remains and dark in colour. There is an al.

Most all cases has a peculiar appearance
which may compare to a nectarine mixture and on standing will allow a copious column to fall which consists of columnar epithelium and yellow amorphous, or granular matter. The lungs are often studded with tubercular cavities, having a deposit round them due in part measure to a chronic inflammation. The intestines may be imperfect or chronic inflammation.

The fluid is transeptal channeled of these organs is sometimes found.

Tests for Sugar

The principal are: the Taste, the Specific gravity, the alkali, the copper, the ferment, and the fermentative tests.

1. Taste. This is the oldest test of all, and was the one which Wells employed. From it is discarded, as we have much better and more a practicable means of determining.

2. Specific gravity. If the urine is of a specific gravity below than 1030 we may be almost certain it contains sugar, more especially if at the same time the colour is pale.

3. Alkali. The urine is forced into a lit. late
and half its bulk of liquors potassae added. Then the test is ended for some little time. If sugar be present, the liquor becomes darkened of a cherry brown colour, and if the amount of sugar be large the colour of boiled sugar may be perceived. If a weak acid be now added the colour disappears. When the quantity of sugar is large, this test is a very good one. But when there is only a little sugar present the difference of colour is difficult to appreciate, and besides there exists a fallacy that the liquor potassae may contain lead derived from a vessel glass bottle, and so on addition a sulphide of lead may be formed giving to the liquor a brown or less dark colour. So that in the whole it is not a very reliable test.

4. Copper test. This is the test in most universal use. There are several modifications of it; the principle however is the same that free protactile of copper being present in the liquor, as reduced in the presence of sugar to sulphide and turned down as a yellow or orange red precipitate according to the

\[ \text{This change is due to the formation of melanin and} \]
amount of sugar present.
Sometimes test solutions are used with some organic reagents to keep the oxide of copper in solution. The reagents generally used being tartaric acid. Boner's solution contains bisulphate of potash, and carbonate of soda. Debler's neutral bisulphate of potash. Thence Frommer's test seems to be the one most and the best. If a little of the urine in a test-tube is added a drop or two of a moderately strong solution of sulphate of copper, sufficient to give a bluish tint, then a considerable quantity of lemon tartaric, causing a greenish precipitate at once, which, if the urine contains sugar, disappears on adding urea, forming a deep blue solution. But if the urine is normal, remains unchanged.
In heating the precipitate of sugar is present. The yellow and oxide of copper is thrown down.
Frommer's test has been said not to be as the like as some of the other forms of copper test, but it seems delicate enough for
all practical purposes.

An objection to Békési's test is that the solution will not keep very long, so that when used it must be recently prepared.

Gallacis with the copper test. Cellulose, large acid, reduce the copper to cuprous, but this depends on there being any sort of conjugating them. Chlorophyll causes an abundant precipitate. The gallacis seem of no practical importance. The presence of ammonia presents a precipitate. If it has been expelled by boiling, albumen also present, it, and Pavy considers this due to the ammonia evolved in the destruction of the albumen by the potash.

Bismuth test. A small quantity of powdered trisulphate of bismuth is added to the suspected urine, then an excess of benzine. Protasee, and the resulting mixture is heated for a few minutes. When if there be sugar present the deposit will become quite black from the reduction of the bismuth. This is an excellent test and seems quite equal to the copper.

Fermentation test. The urine is mixed
with精神 and placed in a test tube. Which must be filled to the top: then a test tube is introduced filling closely by means of a cork. one end reaching nearly to the bottom of the test tube, and the other being placed in a glass. The test tube is then fixed into liquid action and left in a warm place. If sugar be present fermentation begins in a few minutes, and the generated gas displaces the liquid in the tube, which becomes transferred to the glass. For ordinary purposes this is enough, but if we wish to be very accurate, we may adjust the flask after fermentation is completed, mix the product with caustic potash, and distilled water, and then alcohol is obtained, usually strong enough to burn, or at any rate strong enough to produce an emerald-green color, with dichromate of potash and sulfuric acid.

Quantitative analysis of the wine.

For this a copper solution should be used, composed of liquor pissance, tartrate of potash and sulphate of copper, of such a strength that to a grain of sugar is required to convert...
the whole of the oxide of copper in 100. minutes
into each other.
In most cases of chalco, the copper contains too
much arsenic to operate conveniently when alone,
so it is diluted with 4 times its bulk of water.
100 minutes of the best solution are put in a num-
china capsule, with a bit of solid caustic potash,
about the size of a pea; this addition causes
the precipitate to fall in a dense form, and
allows the colour of the deposit to be more easily
seen. The capsule is then placed over a spirit-
lamp and made to boil gently, while the
diluted wine is poured into it drop by drop
from a graduated tube, and the quantity
used is then read off. The tubes should be just
unthreaded and no more. The tube used should
be a pipette graduated in minims, made so
as to allow the wine to escape drop by drop.
The whole wine passed in 24 hours should
be mixed together.

Thus, suppose the quantity required to neutralize
the wine contains 34 minutes of the diluted
wine. This contains to a pair of sugars and
the amount of sugar in the wine is found.
By the rule of proportion.

\[ \frac{34}{0.5} : : 37 = \frac{m}{480} : : 7.05 \]

In the uncountered urine the quantity will be 7.05 \( \times 5 = 35.29 \) in the ounce of urine.

The passed 100 g in the day.

\[ 35.29 \times 180 = 6352.20 \] in the 24 hours.

Pathology

For a long time this was very obscure, and still a great deal of doubt exists as to
the true nature of this disease.

In Matthew Flinders' ship detected sugar in
the urine. Amelung and Dr. Charles
Maltland obtained sugar from the serum
of the blood. Sugar has since been detected
in the blood, saliva, the sweat, and the
stools. Sugar occurs in the blood and
urine of healthy persons in very small
quantity, especially in those advanced
in years.

The ancient authors seem to have considered
Acanthus as a mode of dropsical affection
of the kidneys. And the root instead of
being ground into a sweet candy was ground
into the ducts of the kidney. Read as...
called the excreta discharge of the urine to a malady state of the liver and bile. Cullen, Home and D'Herin thought that the stomach and intestines here at Jailla the food being imperfectly digested and assimilated. More perfunctory that he passed the sugar was formed in the stomach. By feeding fasting on a purely animal chic and after a little tasting the contents of their stomachs, which the found to contain sugar. This sugar excreted was derived from the blood by means of the pancreatic juice.

Gately Claudie Bernard of Paris has thought inwards an ingenious theory of Bernard's theory. He says that one of the natural functions of the liver is to generate sugar irrespective of the nature of the food. In animals after death he found that the liver was impregnated with sugar, and as also the blood of the hepatic veins, and right side of the heart. In men he examined the liver of healthy individuals and one diabetic. He found sugar in all, and in 4 he determined the quantity. In the 3.
Healthy persons the average weight of the liver was 1,401 grammes, and the weight of sugar was 22,037 grammes. In the diabetic the average weight of the liver was 2,500 grammes, the weight of sugar 53,500 grammes. He consid-
erized sugar was secreted in the liver and then entered the blood, as the formed is in the hepatic and not in the portal vein. This sugar goes through is destroyed in the lungs forming a heat. Producing material, and is considered the liver an organ which pro-
spores material for oxygenation in the lungs. He found that sugar existed in the liver of animals and entirely on vegetable food. He showed the formation of sugar may be shown to take place after death. A stream of water passed through and over a liver till all the sugar was washed out and it gave no reaction with the tests, and then the liver was all acetic. When examined some time after it was found to contain sugar. This he said showed the sugar formation was not due to any vital activity, but merely to a chemical force. The sugar forming material
has been isolated and called by him the 
\textit{glycopenic matter}.

Parry's theory. Dr Parry of Guy's Hospital has 
misappropos a new theory which runs, 
\textit{The preferable}. He says that the liver does 
not actually form sugar, but a material 
very apt to pass into sugar under various 
circumstances. This material he calls amyloid 
substance. This amyloid substance is formed 
in the hepatic cells; it is allied to starch 
in chemical properties, but still more to 
hepatine; when pure it is a colorless 
and inodorous tasteless neutral body with an 
amorphous, peculiar appearance under the 
microscope. It dissolves in water to a consid 
erable extent though rather slowly, and the 
resulting solution when concentrated is transparent, 
though somewhat opalescent when diluted. It is 
insoluble in alcohol, acetic acid which precipitate it. 
\textit{Its chemical formula is C\textsubscript{12}H\textsubscript{22}O\textsubscript{12}. Its mole} 
\textit{mass is a deep wine red colour with Iodine. It is 
very readily changed into sugar. It does not 
produce any effect with the sugar tests, but after 
heating with a mineral spirit or after prolonged 
heating.}
contact with many animal substances as blood, salivary pancreas, etc. Here, sooner or later, an amber
34 temperature, particularly found, converted into sugar.
To procure it, a piece of tissue is taken from the animal immediately after death, plunged into
boiling water for a few minutes, to check the process of transformation; it is then ground
in a mortar, mixed with a moderate quantity
of water and boiled. The decoction is filtered
and mixed with 5 to 6 times its bulk of
alcohol; a precipitate appears consisting of
the amyloid substance, which is collected on a
filter, washed with alcohol and dried.
To render it pure it is dissolved and boiled
in a solution of starch. It is precipitated with
alcohol and washed; to get rid of the alkali
it is re-dissolved, neutralized by acetic acid,
and the acetate of starch and excess of acetic
acid removed by filtration and washing with
alcohol. This amyloid substance is produced as
a result of the ingestion of sugar and starch.
Many have shown that the liver of dogs is doubled
in size under a vegetable diet, and nearly doubled
under an animal diet with sugar.
The proportion of amyloid substance in the liver of three fed, on an animal diet varied from 4.14 to 10.55 per cent. The average being 7.43 per cent. In a vegetable diet from 9.14 to 25.30 per cent. The average being 17.23 per cent. In an animal diet with sugar 12.53 to 17.55 per cent. The average being 14.5 per cent. In 3 of these last cases the sugar was prior to such excess that glucose sugar was detected in the urine. In a rabbit fasting for 3 days, the amount of amyloid substance in the liver was 1.3 per cent. In another fed for 3 days on starch and peas sugar 15.4 to 22 seems improvable that sugar should be there.

Joined into amyloid substance in order to come back to sugar again in a state of health. Amyloid substance is also found in the liver when no sugar has been taken, though in less amounts, so probably it is derived from some of the other elements of the food, as well as possibly from the albumen meta. morphosis of the textures.

This is no doubt of the accuracy of the facts as recorded by Bernard with regard to the detection
of sugar in the brain, but his experiments were performed after death and should not there be taken to represent the ante-mortem state. Many have shown that the results derived from experiment both as to the brain and the blood before and after death do not correspond. Bernard's results were derived from examining the arterial blood of an animal during life, and the blood of the hepatic veins and right side of the heart after death, but to compare the two conditions correctly we should examine the blood from both sources during life. There is no doubt that during life only a trace of sugar is present naturally in the right side of the heart. Many found that when a catheter was introd. into the right side of the heart during life, there was only a trace of sugar present but after death a pretty large quantity in the right side of the heart. In the living animal the amount of sugar in the arteries is not greater than in the arteries. Between is there any discernible difference in this respect, bet. seen the blood of the hepatic vein and that in the right side of the heart. So then
During life there does not exist as a healthy
process the formation of sugar which becomes
liberated, though after death and in some mutat-
states during life sugar is produced.
Analysis of the liver in an animal may after death
shows a considerable quantity of sugar, but this
has been found not to exist during life.
If an animal is killed and a piece of the liver
removed as hastily as possible, and frozen by
placing it in a freezing mixture; then cut into
small pieces frozen, and thrown white ice
little by little into some boiling water so that a desicator
of the liver is formed. This desication contains
a good deal of amyloid substance but no
sugar in merely a trace, but the rest of the
liver is found to contain abundance of sugar.
When the frozen liver is exposed for a short time
to a temperature of from 90° to 100°0 sugar
can speedily be detected. When the liver is
plashed into boiling water the result is nearly
the same as when frozen. These effects are due
to the transformation of the amyloid substance
being arrested as shown by the fact that
when the liver comes little time after death
is frozen or plunged into boiling water it is found to contain abundance of sugar.

When potash was injected into the liver immediately after death, only a trace of sugar was detected; when a little interval was allowed to elapse prior plenty of sugar was found, so that the potash did not destroy it but only prevented its formation. If this experiment be performed on parts of the same liver, like results will be obtained. Cadaverous alkalies act in like manner. In cold-blooded animals as frogs after death no sugar is found in the liver at a low temperature though there is plenty of amylloid substance; but when the liver is subjected to a temperature of about 90° a abundance of sugar is detected. In the optic and spinal when the animal is dead the liver contains plenty of amylloid but no sugar; but if it have been allowed to die, or have been kept for some time out of water, or if the liver be moderately heated plenty of sugar is found.

When the spinal end of a warm-blooded animal is divided just below the region of the
Phenic senses, the temperature of the body falls, the tissue is found without sugar just after death, but abundance forms some time afterward. The low temperature of the body seems to retard the transformation of the amyloid substance. When the heat is artificially restored, the tissue behaves in the usual way.

The amyloid substance then is formed in the liver: during life its conversion into sugar seems not to take place. The blood only presents a trace of sugar during life, and the liver at the instant of death only contains a trace of sugar. The vital force seems to prevent the transformation of the amyloid substance, and as soon as that is with drawn the change takes place in the manner described before at a moderate temperature, probably through the agency of a ferment. Davy relates 2 cases in which the livers of an old and rather thin test contain sugar for some time after death probably from the absence of this ferment, as sugar was quickly formed on the addition of saline.

We are ignorant of what becomes of the amyloid
Substance during life, but we never that it can be transformed into something other than sugar from the fact that if carbonate of soda is added to the injected into the portal vein in a few minutes all the amyloid substance disappears but no sugar is formed. Amyloid substance can not be mixed with the blood without passing into sugar. The blood acting as a ferment both in and out of the body, so that if it passes into the blood in the healthy state it must yield be changed into something else, as if it passes into blood as amyloid substance diabetes will be produced. There is no evidence that sugar is destroyed in the circulation either in the lungs or in any other part, as the trace naturally found in the blood is found equally in all parts. Sugar can not exist in the blood to any extent without passing off by the kidneys which are constantly removing the trace of sugar naturally found. Amyloid substance does not pass into the blood as amyloid because it is contained in the liver cells and has a low diffusible...
Jones through animal membranes, but under certain circumstances it does pass. In this respect it has a great resemblance to albumen which will only pass through an animal membrane under pressure.

Artificial Diabete: In animals partial or wholly by which congestion of the liver is produced will occasion a saccharine state of the blood and urine. Heat muscular efforts by which the liver is compressed have been observed to cause the same thing. As when the veins are divided sugar appears in the urine from the interference with respiration causing congestion. In man sugar in the urine has been noticed in cases where there is obstruction to the flow of blood, in pertussis and pneumonia. In pertussis in addition to congestion of the liver and other organs the liver is evidently compressed. When the portal vein is tied the blood becomes saccharine and also the urine; as that a portion of portal blood seems necessary to hold in check the saccharine metamorphosis; when this is with the respiration of the liver is inten-
and the amylloid seems to degenerate into sugar. When the hepatic artery is tied as well the urine becomes saccharine and the blood as no circulation is going on through the liver. The injection of acids, ether, ammonia, nitrate of mercury are said to cause sugar in the urine.

Dundall has found that if puncturing a certain spot in the medulla oblongata sugar appears in the urine. This only lasts a few days. He thinks it acts by exciting the glycosenic juncture but it seems rather to act by diminishing nervous force. When the medulla is divided and respiration is kept up artificially the urine becomes saccharine. Division of the cord does not cause this even as high as the 2nd or 3rd cervical vertebra. Operations in the brain may also be performed without producing sugar in the urine, after the cranial nerves are divided. So that the nerves once governing the production of the amylloid substance seems derived from the medulla oblongata. When both the cord and cranial nerves are divided no sugar occurs in the urine.
an ulcer to appear when the trunk of the sympathetic in front of the spinal column is divided: but when the phrenic which a company the cuttral artery are cut across, ulcer is detected, when the four central arteries are also tied but not unless. The liputure of the arteries alone does not produce it. The removal of the superior cervical ganglia produces ulcer. The vessels from all their sources is quite temporary. The introduction of 200 grains of carbonate of soda into the mouth accelerates the production of sugar. Any cause which suspends the function of animal life as the vitriol poison. Especially while the vagus ganglia are intact may cause melancholy.

Dr. Nash says that the area in ulcer may be double or triple its normal amount. The increase in the ulcer is some peculiarity causing excessive melamorphosis of tissues.

In alcohol there are two well-marked classes of cases, which are probably due to different causes. 1. The curable by abstinence from use, marine article of food, which occurs principally in men advanced in life, and which occurs
Due to the metamorphosis of pachyaimum principles, this passing through the liver unchanged.

It is which are inestimable and defy alteration by diet, which occur principally in younger patients, where usually in addition to or without the metamorphosis of pachyaimum articles, the amyloid substance in nature forms into a nucele while in the liver cells, or forms as amyloid into the blood, and consequently becomes more vital. Unfortunately the latter class is far the most numerous.

Dietetics in many cases at least seems the result of some nerves affecting. By nerves I mean thinking of in the following.

8 When nervous injuries are inflicted in the nerves system, anger is produced in the system, so nerves then in a carbohydrate nerve, etc., etc.

This has been in some cases in man. In a case recorded by Parry where a fatal injury to the brain.

Nerve along with produced dietetics, however the metabolism was not influenced. In three other cases which the records, in one under this case, in another case, dietetics followed a severe injury, in two under the care of Dr. Barton and full in followed
Hemiplegia.

In cases of diabetes, nervous symptoms are very frequent. To this list may be referred weakness more than mere emaciation. Subsequent to depression of mind, coldness of the extremities especially the toes, fits of coldness, epilepsy, acute headache, amnesia, and delirium.

In many cases diabetes seems associated with the sthenous choleraic, in which there seems any often deficient nervous energy.

In some cases assimilation of the saccharine elements takes place up to a certain limit but not when this is exceeded, when sugar appears in the urine.

Diabetes then would seem to be an affection of the liver, in which, within the sugar absorbed by the radicals of the portal vein, genes through the liver unchanged into amyloid substance, or in which the amyloid substance is converted into sugar within the hepatic cells, and transudes through their vessels into the blood, or where the amyloid substance genes as amyloid through the
all cells, and becomes changed into sugar in the blood. In all these cases the sugar in the blood is necessarily removed by the kidneys. Perhaps in many cases some affection of the nerves system has something to do with the disease. Some of the complications which occur seem in fact due to the loss of nervous energy.

In the first class of cases when saccharine articles of food are not taken the sugar is excreted, and so a sort of cure is brought about by abstinence from these articles.

In the second class, as the amyloid substance is the source of the sugar, and as this is formed from nitrogenous articles of food and from the waste of the tissues, as well as from saccharine food, it follows that abstinence from saccharine food will only alleviate not cure the disease. Here two classes seem in fact two distinct affections attended with the common symp.
tom of albumuric, different in their pathological.
ical nature, the first due to the common trans.
version of sugar into amyloid, the second
As the unnatural conversion of amylopectin into sugar in the hepatic cells occurs in the blood. Perhaps the second class may be subdivided according as the conversion of the amylopectin occurs into sugar into the hepatic cells or as it passes through the cell wall into the blood which acts as a ferment, but becomes changed into sugar. But if this distinction exists, we can not distinguish the difference during life, or indeed after death either.

Complications

Diabetes. This is the most common cause of death in diabetes. Many consider it not a true diabetes but a chronic inflammation, which he ascribes to the presence of sugar in the blood; but it seems that the intercellular deposit does take place though not so much at the apex as in ordinary cases, but none equally dry. Initiated through the lung, and associated with a good deal of chronic inflammation. This seems to depend a good deal on impaired nervous force as you
would expect this to operate pretty equally on all parts of the lung. Perhaps the primary lesion in these cases is impairment of mucous film causing congestion of the lungs.

Dissection:
This is not uncommon even causing death: after death postmortem vascularity of the mucous membrane is found. Notably this is also due to impairment of the mucous

Functions.

Extract.
This is not an uncommon symptom and is especially interesting as experiment has shown that it may be produced artificially in animals by injection of serum into the systemic. Dr. Neil Mitchell found that the injection of myx. beneath the skin of a frog caused death in a few hours, and produced an opacity like cataract in the eyes. When the serum was injected in less amount then to cause death the eyes still got opaque, and when the animal was placed in water for 24 hours the opacity was removed. He also noticed that the same effect was produced by
soaking the eyes of frogs or their lenses in sugar, and that the cataract disappeared on immersing the lenses in water. He
attempts from these circumstances that the cataract was due to mechanical disturbance of the form and relative position and con-
tent of the component parts of the lens.
Dr. Richardson tried the effect of a great many solutions and found that with the exception of solution of potassium, all he tried with a density above 1.445 that of the blood produced the same effect. He says that as soon as the blood separated from the solution an abnormal density, cataract was induced and lasted as long as the blood maintained its abnormal state.

Dr. Duncan of Edinburgh was one of the first to notice that in diabetes there was a tendency to cataract. Dr. McNemrie also noticed the connection between them. But Dr. James of Guy’s Hospital was the first who gave any regular detailed ac-
count of diabetic cataract. His description is as follows: "The cataracts are symmetrically
developed on both sides. The lenses are remarkably increased in their anterior posterior diameter so as to encroach upon the depth of the anterior chamber, and even to interfere mechanically with the free play of the iris. The opacity has attacked several strata of the crystalline lens at once, leaving into immediate spaces for a while translucent. The colour and bulk of the cataract has invariably indicated their soft consistence which was proved by operation in two cases. The ocular affection only arises after considerable duration of the cataract, and in no case is there reason to suspect further disease of the eyeball. Under these circumstances, we may operate. 2 operations may be done. I Solubilium but this is very apt to come about from deficiency of the aqueous humour. 2 linear extraction but this is liable to be followed by destructive inflammation, on the whole aqueous the latter is the preferable. No doubt that cataract is a symptom of an
advanced stage of diabetes, and the portable
prandial measurements must occur in all cases may
be that different constitutions are differently
susceptible to the metabolic action of sugar.
Defective vision in diabetes is also associated
with amaurosis. Here is first difficulty in
the diagnosis at an early stage, but the
following are. The principal distinguishing
symptoms according to Dr. Wadsworth

1. Amaurosis: the failure of
night occurs earlier in the disease than
cataract does; 2. It has been accompanied
by pain or uneasiness in the eyes, or pho-
tone moves in the ears, or general
headache; 3. The failure of night early
noticible continues to such making very
gradual advance, or in some cases after
being stationary for a time is lessened.
4. There is nothing to be seen in the eyes
as account for defective vision: in cataract,
1. failure of night is not an early symptom;
2. there is no ocular pain or pain in the
head generally; 3. the right once affected
soon improves, yet rapidly worse;
4 when advanced at all the cataractous appearance is distinct.
Perhaps the amaurosis is due to defective innervation. Dr. Negri thinks it is caused by the state of the blood, but may it not be that the amaurosis and the state of the blood are both caused by the present condition of the nerves junctions. Hicks considers it due to a milky state of the blood to what he calls an abnormal albumen being present in the humours of the eye and altering their transparency: but I think there is no proof of the existence of opalescence in the humours, and 2 there is no proof that such a substance exists in the blood.
In diabetes insipidus, albumin and anemic diseases probably either resulting from the defective innervation or giving rise to it, there is a similar failure of sight, though not exactly the same in nature. Probably then the amaurosis in diabetes is due to deficient innervation, the same cause which produces the weakness, languor, obscuration blindness in the limbs.
Treatment.

The first thing to attend to is a proper treatment, says Boll, and the first thing to be attended to is diabetes in such.

The object of treatment, and to prevent the elimination of sugar or to restrict it within as moderate limits as we can.

Blood-letting has been used. 160 or 170 lb. have been taken in a year weeks. Sir Henry Mansell found blood-letting of service when the disease was recent and the strength unimpaired. I do not think there is any practitioner who would dream of bleeding, purging, vomiting, lead, wine, silver, copper to have had any influence on the elimination of sugar. An alkaline plan of treatment has sometimes been thought useful. In this latter case sometimes been useful; in latter there been given with acid and some times with saline, especially in improving the defecation. Certain mineral waters, especially Wicky have been thought
useful. It is curious that in diabetes it is extremely difficult or impossible to render the urine alkaline. Opium has been given to the extent of 100 grains in 24 hours; it does seem to lessen the urine a little, but probably only by lessening the appetite and preventing assimilation of the fluid taken. Opium with warm emulsion is useful in promoting the cutaneous function. A great tolerance of opium exists in this disease. In the early stages treatment of acute cholera of urine has been said to be useful. However, in the whole drugs seem to be of little or no use. Mr. Peirce and Co. has lately proposed two methods of cure. 1. Abstinence from liquids as much as possible. This is a very disagreeable regimen and does not seem to be of the least use. In fact the giving of fluids seems rather unadvisable, than otherwise as well as agreeable to the patient. 2. Administration of mercury. Dr. Moane tried it in the feverous symptoms and in all it appeased the symptoms very much.
Regan in says that sugar in the economy is necessary to life. Therefore in diabetes it is rational to give sugar, as the patient is continually losing large quantities of it. There is certainly no doubt whatever that the administration of sugar is highly prejudicial in this disease.

Pills was one first to try an apophtegm diet, but he complained his patients entirely to animal food, and in consequence they very soon lost weight of it, and would not permit. He says 2 out of 19 patients were cured by this. Campbell says it is necessary to abstain from all amylaceous foods as well as from every kind or liquid containing sugar or any substance readily convertible into sugar. Regulation of the diet is indeed the only means by which we may hope to cure this disease, or alleviate the symptoms with any reasonable chance of success. The dietetic should be arranged as much as possible to nitrogenous and fatty food, and all amylaceous and saccharine articles should strictly be avoided. Bread
which contains a large quantity of starch of course can not be allowed, and as it is an article that patients find it very difficult to do without, various substitutes have been devised.

1 Gluten Mead. This is made of the gluten of wheat flour. The objections to it are that it is not a very agreeable thing to take, that the starch is often not carefully removed from it, and that it is very liable to cause nausea.

2 Bran Mead. The bran from which should be thoroughly washed to free it from starch and then finely powdered. The mead is made into cakes with eggs, butter, and milk. The cake should be eaten with plenty of butter, or it may be made into loaves with eggs and milk. An objection to this is that it is little nutritious, and by its being indigestible in some people causes irritation of the intestines and diarrhea, but it does seem preferable to the gluten mead. First introduced the use of finely powdered bran, but Campbell got
is finely powdered by being first well washed and dried.

Almond meal. Both gluten and bran bread do contain a certain amount of starch. Very not very much the almond meal. The meal of almond meal contains, according to Beck's analysis, bread oil 56.0 per cent; hen fat
sugar 6.0; gum 3.0; albumen 24.0; seed coat 5.0; woody fibre 4.0; malac 3.5; acetic acid and (27) 0.5. Almond is emollient and nutritive but in their ordinary state difficult of digestion; the reason of this is that they are dense and with difficulty acted on by the soluble juices, so having them finely ground will do something to remove this. They contain a large quantity of oil and this is especially useful in edibles and agrees very well. The sugar and gum can be easily got rid of by keeping a substance as unexceptionably as animal food. By
washing with boiling water slightly acidulated with tartaric acid, the acid preventing the other constituent from being washed away. This is finely ground, made into crumbs,
Biscuits and leaves along with eggs, and there are much more agreeable than either then in gluten cakes, as well as having a better effect in keeping down the sugar. Since they contain no saccharinic Principles.

I cannot do better than here subjoin the excellent table of dieting for the diabetic given by Dr. Page, though one or two things in it I wish might be altered with advantage. Milk might be freely allowed as the sugar it contains is not liable easily to pass into urine. Sugar: and salted meats might be prohibited as they tend to increase thirst.

Table of Dietary: May eat:

Butcher's Meat of all kind except

Steak: Bacon or other salted: Fried

or cured meats: Poultry: game: Fish

Of all kinds: Fresh salted and cured: Animal

Sausages Not McCormick. Keep tea and broth: The almond meal is a gluten substitute for meal.

Eggs dressed in any way: Cheese: cream. Cheese:

Butter: cream: Greens: Mushrooms: Water: cress:

Mustard and cress: peas lettuce: celery

and radishes:parsley: jelly: hashmeal: fruit
sweetened; bland and mangle made with cream and milk: curdled made without sugar; nuts of any description sparingly.


The treatment of the complications must be conducted on ordinary principles: when there is moisture you may give more cold water if the desire be drank. If there be a constipated state: in that case you can do nothing: no cathartic you
might expect, but the results of operation are most unsatisfactory in these cases, and in most perhaps the next plan is to let alone especially when the patient is in a very debilitated condition.

Appendix of Cases.

1) James Jeffery, aged 28, married. In 3 years, a married man. Admitted into ward 17 Nov 24th. Has been at 14 weeks. Has been a healthy man before, and his father and mother, brothers, and sisters are all alive and healthy. Had 3 children, 1 died of consumption, 1 maddened (one says), and 1 alive. 14 weeks ago he had what his medical attendant called jaundice, and he noticed that his ears, nostrils and hair after confinement, especially of the legs. Then he noticed that the ate more and drank more water than he used to do.

February 3. Has a feverish attack. Arouses at 5 a.m. 10 a.m. complains a little of pain in the chest, coughs a few times, sneezes a few times at night. Takes 270 cc. of wine. Does not eat quite so much. Drinks about 30 cc.

(2) James Primrose, age 48. Married, native of France. Admitted Jan 21st, has been ill 11 months. Has been a healthy and robust man. His mother and one of his sisters died of yellow fever. He noticed first that he ate more than usual. Then that he was drinking more. Then he noticed that he began to put on weight at quick in the legs. Then the weakness extended to the arms. Then that he gained a great deal of weight. Had to get up in the night to make water. He used to sweat a good deal at night.

Present Note: Patient coughs with a white mucus. Breaths has a sweet odour. Does not eat quite so well as he used to do. But the cough is disappear. Does not sweat much. His skin is pink and clear. His legs are cold from the knees downwards. His back is a little colic, but not much affected. No other symptoms. Complains a good deal.
Y. Point in the head. Her ears of pedullness.

July 27. Much about the same, but this night
is rather better. Has only had one fit of sep.
menas since he came in.

(3) Priscilla MacQuen. Age 21. A recent pic
has been all 3 months. Admitted Jan 6th
into ward 1/4. Fatigue and weakness alone and
reality. 2 out of 8 written, and written dead
in infancy. She was noticed that she was
sick in the morning and had headaches.
Then nurse Fink came in and the headaches
went away. Then she noticed that she gained
a peak deal of weight. Had to put more air
in the night. She has not menstruated for 4
months. Then weakness came in especially in
the legs. 3 weeks ago she began to cough and
spit up a good deal.

Present State. Pale and thin. Skin dry.
shining. No affection of right hand and
arm. No peak deal. Does very little. Feels the
cold a peak deal in the legs and feet, especially.