Diabetes: its Symptoms, Nature, Pathology and Treatment, a Dissertation Submitted as a Thesis for the Degree of Doctor of Medicine in the University of Edinburgh, by Thomas Newton, Member of the Royal College of Surgeons of England, 1819, and Licentiate of Apothecaries Hall, 1819. 1851.
Definitive Thesis, on
Diabetes: its Symptoms, Causes, Treatment, etc.

In the following Essay, I have endeavoured to
to give a concise, but I hope a satisfactory ab-
short of the chief points which are known or,
least, are considered probable, as to the nature
and treatment of one of the most fatal diseases
in the Morbology. I shall throughout pay most
attention to the circumstances which may be
viewed as of a practical nature; and especially
to those which bear most the treatment of the
disease. But little, therefore, will be found in
the following pages of Bibliographical matter,
or of the literature, so to speak, of the morbidity.
I have been induced to take this course, by feeling
that any display of historical knowledge
would be received by the Medical Faculty as
idle parade and pedantry, as well as finding
only the elevation of time to the inestimable, to
dates, and the collocation of names, which time
would have been much more profitably employed
in attending to other subjects of my treat.
Some strengthened in this view by the consideration
that a period of more than 30 years, indeed in
a time entirely wasted, in a great measure
disqualify me for the necessary researches, to produce a history of the disease.

The Father of Medicine has remarked, Aphorism 33, Book IV, "When much urine is shed during the night, it indicates that the urine was created to sustain life; but in Aphorism 35, Book VI, "when the same on the surface is totally pure, its urine is a dangerous disease of the kidney."

In the 37, Aphorism of the same book he remarks that, "if a Stoical Dieter be seized with his cough the cure is his life. He does not, however, appear to have had any clearer notions of either Diabetes, or the Affection, which is now known as Bright's Disease. The word Diabetes is not found in Hippocrates or Celsus. But in the later Book IV, Culi I, Section 2, we find a short account of the affection, and some hints as to the symptoms and treatments. He mentions two varieties of the complaint, which probably would be found to be identical, respectively with Diabetes Insipidus (the Urine Ternus of Celsus) and Diabetes Mellitus (the Urine Crops). The word of Celsus are: "But when the urine is made beyond the measure of what is drunk, even without pain, causes wasting one day of it to be dispelled, there is need of specific and rubbing especially in the urine, or at the fires. The bath should seldom occur, and the stay not too long; the food as nothing at the wine distressed.}
and meditated; cold during the summer, lukewarm during the winter, and as little as may be (i.e., as little as the patient can manage will). The lower Bowel also to be elysedence or jujuped with milk. If the urine is thick, both the exercise and the rubbing ought to be more violent. The diuresis on the oath longer. There is need of light foods; the course (should be) the same. In each disease all things are to be avoided which are wont to increase the increase. Lightness is this account in omitting all mention of the frequency of the disease, of the presence or absence of fevers, and of any reference to symptoms, or causes. The directions as to treatment are wonderfully like - the similitude of being to identity to the means employed in the present day.

Amongst more modern physicians, the greatest of all, by scleremonious, mention Declites by name, but without noticing the peculiar or morbid state of the urine. In his account of Frederick Declines from the year 1675 to 1880, mentioned by John Deebey, M.D., London 1765, he says: "Sometimes it happens, though very rarely, that old men who have had a long time and have been badly treated by bleeding, purging, salt into a Decliter, even after the urine is fully cured, for their blood being weakened cannot concur and assimilate the juices brought to it, but refuses them off in prodigious quantity by the urine. Thus the strength of the Body is impaired and is in..."
were reached away. In this case it is impossible to state the intermural flux of the urine.

Potheroy, "Commentarii de Medicina," 1831, p. 74-5,
says that Diabetes is a very rare and very deadly disease, as described by the writers whom he has consulted.

He says that he had never seen 20 cases which were ever called Diabetes, and that many of these were not Diabetes at all. He states that

...some "mellitus" had no sugar or at least none that could be detected by taste or smell.

Dr. Forster, "Elements of Practice of Physic," 1771, though mentioning 'coagule' urine, does not state that there was sugar in it, nor the disease Diabetes.

D. Cullen in his Postology places the disease (which he calls Diabetes) thus:

- Class 1st: Nervoses - Disorders of secretion and motion, without primary Pyrexia and also without local disease.
- Order 2nd: Phrenic-Motoric motions of the intestines
- Lecture 3rd: Natural Functions
  - Genus 1st: Diabetes - Immediate flow of urine, seldom natural, of long continuance.
    - Species 1: Diabetes mellitus. Urine of the smell, colour, and taste of honey.
    - Species 2: Diabetes acquisitus. Urine limpid, not sweet.
    - Species 3: Symptomolaceae.
Dr. Mason Good has declared that:

2. Order 2. Catarrh, Affecting internal Surfaces.


Dr. Good, therefore, does not employ the word Debleu except as an English term. Reverting Parury Melletia.

It is needless to adduce other classifications. We cannot assert that neither Dr. Good nor Cullen had any idea of the true Pathology of the disease. Dr. Good is far less objectionable than D. Cullen. He expounds facts without attempting to explain them; D. Cullen has recourse to his favorite hypothesis.

Dr. Good at any rate, though like all of his time and many long after it, ignorant of the real nature of the disease, seized upon the most remarkable symptom. Such being a very brief account of the history of Diabetes, I proceed to describe the symptoms of the two forms of the disease. Undoubtedly, it is of necessity doubtful if Dr. Lecherides is ever an idiopathic affection.

The former has been only one case which resisted every mode of treatment. Nothing afflicting contentiously, to do good. Doubtless, many, perhaps all cases of Diabetes Lecherdes have really been nothing more than the large quantity of watery urine of low Ph. G. voided by nervous and especially by sentient persons. Still the disease may begin...
with to small a quantity of sugar as to cause
great difficulty in recognizing its presence, espe-
cially by the only means known to Debecker, and
others still later, 1782; - &c. &c. &c. &c. for it was
to be said that Diabetic Sugar would not be set
in the eyes nor stomach. Both of these statements
are wrong.

Causes of Diabetes. There are very various, very variable
and very obscure. These must unceasingly be
1. Gonorrhoea to tot the especially across the body; 2.
Moral and Malignant - Particularly by leucoderma
which keeps the kidneys constantly coagulated and
3. Disturbances of the Digestive Organs; 4. General
status, grief & c. & c. injury of the body, 5.
Vegetable Cures; 6. Any Pernicious debilitating
cause, as the Fever measles whereby children are
7. A change in the urinary circumstances.

In addition to these causes, Diabetes is unquestionably
heritable. Dr. Watson and Dr. Brown have witnessed
several instances, in children as well as in adults
so that perhaps, we may say to cause, e.g.
cool being applied, if Melle's Position exists.

Diabetes will follow. Whilst in an ordinary
case, 13 soucheber, Pernicious, or might be lightens.
However, whatever may be the cause of the disease, the
March of it is frequently slow and insidious,
though sometimes, complications may exist in
Diabetes.
Perhaps the earliest thing to attract the patient's attention, may be languor and debility, with a dry throat and frequent want of urine. Dr. Wilson says that the thirst, with dry and fissured tongue, were always the first symptoms. Sometimes the tongue is metempsychically red, with or without a bad taste in the mouth. Afterward, frequent micturation, watery, dry and hemorrhagic, bowels continued pale, black, and grayish. Appetite increased with great craving for starchy compounds. Then, after a variable time, and usually on taking cold or from unwholesome food, fever is set up. The head is more painful, all the symptoms aggravated, and in addition headache, low spirits, by which general reaction, coldness, intolerance (more or less) of light and sound, irritable temper, delirium, constipation, the face being pale and hard, in round balls. If the breath be now accidentally inhaled by the observer, it will be found in many cases to resemble the odour of new mown hay; and if the urine be examined, its specific gravity (1035-1050) will quite decide the case.

Logs of both sexual desire and power invariably come on. Ultimately the patient dies, either from broken heart from having to use too often, in the night, or from phthisis, from debility, or from apoplexy. As to the urine, it is plentiful always of a dark yellow colour, or greenish, with an odour resembling sweet whey or new milk, and with a sugary taste. Dr. Wilson says that it smells like apples.

It is always translucent and phlegmy, watery.
No difficulty can result from the presence of
fate, microscopic suspension, etc. The former can be dissolved by
heat; the latter removed by the latter.

Chemically, the presence of sugar is almost the
only change in the urine, and some of the other fats
remain often increased absolutely (particularly milk),
though of course, diminished proportionally to water.

Whence comes the specific gravity of urine "sine
mucrum potonian"? There can be but two sources of
this is cre, and Absorptions from the atmosphere, and
25 by absorption by gastrointestinal processes from the walls of the
the solutes (as the bodies of muscles, the belly and
veins, etc., as the liver, etc.) and endometrium into
the circulation. Undoubtedly the latter source
will account for much of the cre, for the body
loses not only in the weight of the solids but also
mainly especially in the proportion of the fluids seen
coming glory in the progress of the disease. It is
probable that absorption from the atmosphere by the
skin is even less than in the normal state, as the
skin must be touchingly in a very condition to prevent
transpiration. It is also rough and harsh,
qualities best suited to the performance
of either endometrium or exometris, etc., for absorption
or preservation. Accordingly, we find the latter
almost entirely left behind. The mucous membranes
of the pulmonary secret, however, can be shown
to absorb the water from the atmosphere. A boy in
the Middlesex Hospital, with his chest extended,
weighed 3 stone, 8 lb. 6 oz, 3 days or three hours had
weighed 3 - 9 - 0 - 2, making a gain of
one Pound one Drachm, after being weighed
the second time in April 1803 of being almost.
between the 1st and 2d, weighing another extensio.
more degree. The 1st of urine must on a great degree
loose, upon absorption of the solids, is that quantity
of the solid matter voided by the kidneys is enormous.
En 9 Pints of Urine at the Wt. Gr. 1040 contain nearly
a Pint and a Half of solid matter; more in 24 hours.
In some cases, 90 Pints and more have been
wooled in 24 hours, making, even if the Gr.
be taken at only 1040 - 4.5 Pounds of solid matter.
This, it is true, may be readily explained by the
increased quantity of food taken in by the Patient.
The Evacuation always present in Diabetes may
be referred to - 1. The disease - heart's action
on the solids and fluids of the body; 2. The very
imperfect digestion and assimilation of all
sorts of the food, but particularly of the Starch
Compounds. Some Part of the food must, of
course, be assimilated - otherwise the Patient would
die. The chief part is owing to the non-assimilation
of the foodstuffs, such as the Sugar, Gum,
Starch, etc. which are voided in the form of sugar,
in place of being combusted and eliminated
as Carbonic Acid and water. The formation
of Carbonic Acid and water by combustion is always
attended by the elimination of heat from the dimunition
of volume - Thus, the equation,

$$\text{C} + \text{H}_2\text{O} = \text{CO}_2 + \text{H}_2\text{O}\text{.}$$

Now, the formation of the Carbonic Acid, the latent heat
contained in the elements, and the latter of the
heat. As the oxidation of the C. and H. of the food,
and worn out (effete) tissues, is the essential cause
of the unusual temperature, and as the articles of food containing these elements are not oxidized at all, or very imperfectly, it follows that the animal warmth must fall. Again, the increasing disability incapacitates the patient from taking exercise, and the want of exercise reacts unfavorably upon the animal temperature. The thirst is evidently owing to the desire shown the syphilitic pathology. It was long suspected that the sugar was manufactured by the kidney at the expense of the liver, a doctrine supported by the fact that chemists could not detect it in the blood. June 31, 1867, could not for some years. It is now, however, admitted by all, that the sugar is formed in the stomach, viz.:  

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Mr. Gregor of Glasgow was the first to detect sugar in the blood, since the first to settle clearly that the kidney is only secondarily in fault. His observations I need not detail. They consisted chiefly in exciting diabetic and non-diabetic people to vomit after a meal. It is perfectly established that the sugar is formed in the stomach by the ferments, which contain diastase. The ferment which converts starch into glucose, or grape sugar, and the ferment which converts starch into fermentation, which ought to occur in the stomach. Quinquem is performed in the stomach.
The sugar thus formed in the stomach, lapse into the gastro-Intesine and thence into the liver, where it may be detected. Sugar formed in the urine, would pass into the thorax, duct, and give the sweet taste to the chyle.

The anatomical characters (bust modern observations) are very unsatisfactory and wholly inadequate to establish the cause of disease, much less the cause of death. The kidneys are enlarged, sometimes angorged, partly with two, more lobulated than natural, but most modern anatomical reveals nothing of importance. The stomach, often has inflammatory thickets or conglomeration. The interior glands have been found removed or even absorbed.

Diagnosis. This subject may be very briefly considered.

It is reduced to the question of presence or absence of sugar; for a constipated flow of urine does not constitute the disease. Occasionally for some days, the quantity of urine is not greater, or at least, not materially greater than in health. The diagnostic signs of the presence of sugar are:

1st. Ur. Gr. constantly throwing more than 1.033, when at 60° Fah. and taken in the morning after sleep (urine peperic and tangy). Effects of urine may cause the Ur. Gr. to 1.033, and an urine of high Ur. Gr. Sugar is always present (Dr. Poole). For cases just this, it is noted that temperature has been neglected.

1. For neutralize, add double Dr. Poole's urinometer marks 1.035 as the defect of point.

2. Take ½ of the preserved urine, add Pig. Potassa at high heat, and the sugar will appear in a brown friable state.

3. Take urine ⅓ add a few deters of 1 solution...
Cuprum. Copper: then by Jutthus Fij a very slight heat will cause the sugar to appear in Bo. 2. This precipitate will redissolve on raising the heat to boiling.

5. Evaporate the wine to a convenient quantity (or syrup), heat it, notice acids and of aldehydes produced, which may be known by its usual tests.

5. Charchison's apparatus for fermentation. This is very valuable, both for obtaining delicacy (as sugar may be detected in wine Fij), and for ascertaining the quantity of sugar present. For this purpose the Baroum Acidum officinalis is collected in a cubic inch jar. The proportion is 141 of sugar for every cubic inch by this method.

6. When deeper i.e. large proportion, it will concretion and crystallization spontaneously and readily on the leeway, thin, edge of chamber Schneider; looking like drops of lime.

6. Watkin mentions several cases of this kind, in one case fleas and worms were extracted to the intestines by the sugar.

7. Taste and odour. These though occasionally useful tests. The patient's taste, especially if in a wrecked chamber, may smell of the Arthur 12 or modified, or worse the breath.

Occasionally some days before the fatal event, the sugar misery disappears, and at some cases, then comes, eaten long before the case becomes advanced, he no longer remarkable in create in the quantity of the flour.

This remarkable decline of the essential symptom (sugary of the disease before death, is not peculiar to Declines, in most diseases often returning an insanity; the cough distressing in Psoritis.
The albumen in Bright's disease and other affections.

The symptoms of Diabetes are distinguished from Signs have already been mentioned. It may be said that the disease is not present if there is no sugar, but sugar may be present in the urine of a patient known who has taken, tasting a large dose of simple syrup, or sugar dissolved in water.

Diabetes Insipidus if by this we mean mere increased flow of urine undoubtedly will recover; and it is highly probable that the cases of recovery from Diabetes which are from time to time recorded in the medical journals, were cases in which either no symptoms were at all of the urine had been made, or that it was made by incoherent persons; or a mere evolution of symptoms whether from change of climate, change of season, winter to summer, change of diet, or the change induced by treatment.

It must be constantly borne in mind, that the essential character of the disease is not peptic but the presence of sugar. Now in all these cases which have been carefully watched, it has been found that with all the ordinary symptoms returned, or even increased, the urine returns its habits, yet, and sugar may always be detected, especially by the specific reaction.

D. Rous notes that he has one case where sugar does not known the usual termination of the case. and D. Watson mentions an instance in which, threat to year, glycosuria, constipation, fever,
in the tons, destruction of the roots were completely removed, and yet six months afterwards, the patient looks cold, and dies. Speedily carried off, having during the whole six months had his urine constantly of high A.G. and frothiness.

Diabetes insipidus. At the least a moisture of a whole house is not insecure, though not uncommon, Intul. Reported cases and cases of it, have probably been nothing more than the profuse drizzle of urine in nervous or hysterical people.

Treatment. Much little difference of opinion has been prevailed upon in certain sorts of the treatment of this disease. Celsius's directions remain in full force to this day. He B. T. not too long a stay in it. Foundation. Celsius's complements. Modern researchers have in truth added much to this measure of account, but have taken away nothing. Sydenham, Hippocrates, gives one of the long prescriptions of his day. Hebrew dot, Chinese, Barks, Sulphur, Acid, Pistil, water, lime water, frequent vomiting, but omnia obca gravis remedy, ut facultas ob sarcinale renem, but tells no more.

T. rotlo, in 1802, first suggested strongly on animal diet as a means of reducing the quantity of sugar present in Diabetes, and he relates special cases in the army in which the patients were made to eat immediately two loaves by being put entirely on animal regimen. At the Glazier's Hospital, list the value of this direction, by causing diabetic persons to take food containing saccharine, and then giving them
on Smith's, on another day he gave them really Annual Food, followed by Raw Bitter. In the first instance Fagge, or Vinegar were boiled in; in the second no trace of either was found.

Reading therefore the treatment into Dietetic and Medical, it is almost unaniemously agreed that the forms should be such as to maintain the strength and refresh the taste of the different tissues and organs without contributing material for forming Sugar. Thus Dr. Doll's suggestion has been adopted by all; and we should at once place the patient upon Annual Diet, including boar to prosecutor from Vegetables by the list of edibles of Cookery, causing him mustards, tuppules, and other edible Fungi by Celery, Bittersweet, and Mustard, thy Peppers, allowing him roast, boiled and stewed according to his fancy; and letting him drink through a Cask, flask, with Eggs, Rabit, hare, Thaenest, Partridge, Goose, milk etc. When, after invariable kindness at first, the patient becom changed for Vegetables, and when medicinal his health begins to suffer from being confined to Annual Food, we must give him Vegetables which contain the smallest portion of Elements capable of being transformed into Sugar. This allowance being made for the season of the year, we shou to give him:

1st. Cabbage, Cauliflower, Broccoli, Brussels Sprout, Turnip, Swede.

2nd Beans, Peas, 3rd Potatoes, which have not been fermented, and Glutten Bread, i.e. Bread made of wheat flour which has been deferrated by washing,
of its sugars, gum, and starch. This like the oat cake should not be fermented. Lastly when the desire for common bread is uncontrollable, it must be greatest to keep it stale, and stale better if toasted. Rice, Arrow Root, Taro, Chicory, Groat, and above all Potatoes, and Fruit, should be rigorously prohibited; as also Carrots, and Petrosites; a very slight infringement of these rules has greatly endangered the symptoms and hastened death.

As to drinks. Spirit, wines, especially British, cider, and Malt Liquor should be absolutely refused. They all act either as Diuretics, or contain Sugar or Starch, with Broth, Soups, Bracks, Bristol Water (containing Lime) should be allowed, and should be taken tepid, never cold. Muriate of Soda, Paris Water, which contains Bicarbonate of Iron, in permanent solution, has been found advantageously to relieve such Bristol Water, when seen to be debilitating has taken the name of Artificial Landridge Water, which contains Bicarbonate of Iron in permanent solution may be used.

Dr. Christie, cautions us against suddenly depressing a patient accustomed to large quantities of water, or drink.

It has occurred to me, that perhaps the necessity for drinking large quantities of water might be obviated in some measure, by the plan adopted by soldiers on a march viz. carrying a Bullet or Stone in the mouth. The Salivary secretion therefore having to be stimulated to keep it flowing,
A good toilet is a mouthful of water, and swallowing it a few times, followed by a glass of warm water at a time is very grateful; likewise a small piece of clean cotton wool soaked in water or destilled water acidulated with phosphorus acid, appears more than most things that painful irritation - a suggestion of the late Dr. W. Heath.

As to clothing it must be warm. The patient should be seated in a chair. He should be kept in a room of uniform temperature about 65° in winter, 70° in summer, with of course a constant change of air, without draughts. Every once short of fatigue, should be employed daily—lukewarm bath about 80° with fresh walk to endeavour to open the skin and ease the very cuticle. Dr. Waton strongly recommends the vapour, or hot-air bath. Change to a District climate, or to Madeira. In many cases heat the disease in checks to eight, it had recourse to sufficiently early. It has been found from time to time have suggested that some large building, such as the one now existing in Hyde Park, should be constructed and reserved from changes of the air; some large enough for exercise to be taken by patients in Diathesis, Diabetes etc.,

As to the medical means. In the very early stage, small bleedings have been recommended. It is obvious that the struma must not be greatly permitted. Cupping and leeching over the joints have often afforded relief especially in tuberculous states, will cause or red tongue and fever in the joints. Counterirritation to act upon the skin. Phenol which Dr. Watson says is a remedy to relieve pain, to check the action of the kidneys.
to promote digestion; to alay with, sup, and procure sleep. Cresote to prevent the formation of sugar in the stomach; Iron to support the strength and nourish the decayed blood; and lastly, to stimulate evaporation, are nearly all the drugs which have been found serviceable in Diabetes.

As to the closer of last, Thyrn is used in Doon's Powders, &c. Cresote the black, in some Mixture. Iron are used. St. John's Wort, or in the Stomach. Antimony, as aul. Potash, &c. The bile, &c. The broids must have Ignition, or Castor oil, Liver, opium, Rhus-tox. Mercury. Zinntester, Salts, &c. Besides these are indispensable in nearly every circumstance. By these means we may prolong life, if we cannot cure the disease, since we can greatly alleviate the most distressing symptoms rendering the remainder of the patient's life bearable.

To cure the disease, we must know why the Stomach secretes Deastake, why the convulsion of Starch into sugar in the Stomach, instead of the Duodenum causes Diabetes, i.e., the great secretion of urine. Since we must also be able to prevent the secretion of Deastake by the Stomach.

It is very remarkable that whatever feeding on Starch causes never produce Deague, even the same may cause the Deague to us, so the floor of urine owing to the affinity of Sugar for Water.