

THE OATMEAL DIET IN THE TREATMENT OF  
DIABETES MELLITUS.

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In 1903 Carl von Noorden<sup>1</sup> advocated the use in certain cases of diabetes of a diet consisting of oatmeal, butter and a vegetable albumin. This method of treatment is commonly referred to, briefly, as the oatmeal treatment—Haferkur. To judge from the paucity of reports from German and other clinics, von Noorden's claims for the diet are generally viewed either with indifference or skepticism. This paper will attempt to show what the diet is, the method of its use, the claims made for it by von Noorden, and how far these claims seem justified by the experience of others, including that of the writer.

*The Diet.*—The diet consists of 250 grams of oatmeal, 250 to 300 grams of butter and 100 grams of some vegetable albumin, such as roborat. For this latter substance, six to eight eggs—or the whites of the eggs—may be substituted. The oatmeal is cooked thoroughly with water for about two hours, the butter and eggs are well stirred in when the oatmeal is nearly "done." Or the whites of the eggs may be well beaten and stirred in after the cooking has stopped or even when the oatmeal is cold. Salt is added to suit the taste. This constitutes the food for one day for an adult. It is given in from three to eight portions, von Noorden advising feeding every two hours. He occasionally permits a small amount of clear coffee or a few sips of sour wine with some of the meals, to relieve the monotony. The oatmeal may be served as a rather thin soup or gruel, as a thicker mush or, as I have lately done, as fried mush.

*Von Noorden's Claims.*—The claims made are that in many cases of the severer types of diabetes, especially those in which the ordinary strict diabetic diet is failing to rid the urine of sugar, and when the persistence of the acetone bodies in the urine and the presence of suggestive symptoms make one fear that coma is impending, the use of this diet will cause a remarkable lowering in the amount of sugar passed and a disappearance of the acetone bodies. Subjectively, the patients are better. And, again, an advantage is seen in that an increased tolerance for carbohydrates develops and an amount of starchy food that before would have caused an increase in the thirst and saccharine polyuria, is now ingested without these unpleasant results, but with apparent benefit in the way of increase in weight and strength. The warding off of threatening coma and aid in establishing a carbohydrate tolerance are, therefore, the chief claims made for the diet.

*Selection of Suitable Cases.*—It is to be understood that no claim is made that the milder forms of diabetes, such, for example, as are commonly seen in the adult obese, are benefited. These patients may be made worse. It is in the severer forms, where emaciation, weakness, polyuria and glycosuria persist in spite of careful diet and where a study of the urinary content in acetone, diacetic and oxybutyric acids and ammonia shows acidosis with threatening coma that the diet has its greatest field of usefulness. And even here it is not to be looked on as infallible. In some cases it fails absolutely. In others it rids the urine of sugar and the acetone bodies, wards off coma, but no great degree of tolerance is established; in the most favorable cases the urinary signs of

acidosis disappear, tolerance is established, and a great improvement results in the general condition of the patient. It is to be noted, therefore, and expressly emphasized, that the diet is not one for indiscriminate use, and that selection of cases and individualization is essential. Unless this is remembered not only will there be great disappointment at results but there may be harm done, milder cases being made worse.

*Resumption of Ordinary Diet.*—The diet is to be maintained for one to two weeks. The resumption of the ordinary diabetic diet should be gradual. If too abrupt, increase in sugar and symptoms of coma may follow. I have usually followed the plan of cutting out one of the regular oatmeal meals and substituting for it, say, a cup of broth with an egg and some green vegetable, such as celery or lettuce. The next day the oatmeal is omitted twice and a little beefsteak or fowl is allowed, with, perhaps, some salad, spinach or cabbage. Gradually the return to the ordinary diabetic diet is accomplished, enough, however, of the oatmeal being retained to furnish a fair amount of carbohydrate. Then, feeling one's way, an occasional potato is added, sour fruits and, cautiously, perhaps a little bread, the urine being watched carefully all the time and close tab kept on the weight. The patient is thus gradually brought back to a strict diabetic diet, i. e., a proteid and fat diet with an amount of carbohydrate sufficient, if possible, to guard against acidosis and yet not sufficient to produce marked glycosuria. This can be accomplished very well in some cases; in others one must be content to see the patient hold his own in weight, pass urine free from diacetic acid, though it may contain, daily, a few grams of glucose. The important point, after all, is not so much whether the patient is passing sugar in the urine, as whether there is gradually accumulating in the body an excess of acid robbing it of its alkali, acting as a toxin, and whether the output of sugar, the daily loss of energy through the urine, is compensated for by a sufficient intake of food that is properly utilized.

Now, the oatmeal diet contains in round numbers 3,200 calories, fat 2,050, proteid 400, carbohydrate 775. The diet is sufficient, therefore, for an ordinary man, not over-active; sufficient to maintain bodily functions and even to allow for some loss in the way of sugar in the urine. In fact, without the oatmeal there is, perhaps, a sufficiency of heat units.

*Objections to the Diet.*—Objections to this diet have been urged. In the first place, it is not, to put it mildly, over-appetizing, and there may be difficulty in getting patients to try the diet at all or to continue it for two weeks. My first experience in prescribing it was far from encouraging. A lady of about fifty, reduced in weight to sixty-eight pounds, intellectually bright and intelligent, with a diabetes of a malignant type and progressing in spite of the utmost care in the dietetic and other management, said to me, after taking one or two meals of the von Noorden diet: "Doctor, I will die before I will taste another spoonful of that oatmeal mush." I may add that she had her way about it. In general, however, I have experienced little difficulty in putting patients on the oatmeal diet and in keeping them there for from one to two weeks.

In a few instances only, an early loathing of the food has occurred or a nausea and vomiting, making it necessary to stop sooner than planned or to cut out a few of the meals, substituting some non-carbohydrate food in their place. And in some cases the addition to the

1. Haferkuren bei Schwerem Diabetes Mellitus, Berl. klin. Wochschr., No. 36, 1903.

oatmeal diet of a little clear coffee, sour wine or something green, like celery, lettuce or spinach, has relieved the monotony and overcome the anorexia, nausea or vomiting.

A hint that has proven valuable was given me by a physician who was under my care for diabetes. He suggested that the oatmeal might be more palatable if it were made into balls like meat-balls or sausage cakes and then fried just enough to brown the outside a little; if it were, in other words, prepared after the manner of fried mush. The taste of the burnt or browned coating is rather pleasant and makes the food far more palatable than when it is served either as a rather thick mush or as a thinner soup or gruel. A little explanation to patients as to what one hopes to accomplish by the diet, thus securing their intelligent cooperation, is a valuable adjunct to the successful carrying out of the plan. It is often much more satisfactory to treat the patient in the hospital than at his home or in one's office. The objection, therefore, that the diet is intolerably unpalatable is met by care in the preparation and manner of administering the food, by securing the cooperation of the patient, as well as by the fact that experience shows that most patients can and do take this food for many days without complaint.

A second objection that the large amount of fat might increase the acetonuria is met by the clinical fact, supported by many observations, that the exact opposite happens, the amount of acetone distinctly lessens.

Again, the feeding of 250 grams of oatmeal, representing 150 grams of carbohydrate starch, would seem at first blush absolutely irrational and destined to aggravate the difficulty in every way. The answer again is that in these selected cases of the severer type the exact opposite occurs, the sugar diminishes in quantity, the acetone bodies are reduced in amount, thirst and polyuria are markedly lessened, there is an increase in weight and strength and a general feeling of well-being.

*Explanation of Action of the Diet.*—The explanation for all this is not easy. That a too rigid exclusion of carbohydrates may lead to acidosis and coma is a matter of common knowledge. Possibly the starch of the oatmeal may furnish the oxygen molecule that is needed for the process of oxidation by which the oxybutyric acid is converted, in turn, into diacetic acid, acetone, and finally into water and carbonic dioxide, this molecule of oxygen in the oatmeal being perhaps rather loosely bound or for some other reason easily available. The oatmeal, therefore, causes prompt increase in the oxidative process just referred to, with corresponding reduction in the acidosis with its urinary evidences.

Why sugar is not increased in amount is not known. Are all starches alike? Are the starches from rice, potato, wheat, rye, oatmeal, etc., identical chemically and structurally, and is their metabolic change in the body always one and the same chemical process? Mosse<sup>2</sup> accomplished remarkable results in diabetes by a potato diet; Dühring by a rice diet. Will the use of a single kind of starch or other carbohydrate be better tolerated than a mixing of the varieties? Or may it be, as von Noorden suggests, that one kind of starch, e. g., oatmeal starch, is better tolerated than another? Certain it is that in some of these cases of diabetes, undergoing treatment by the oatmeal diet, one can not indiscriminately and abruptly substitute another carbohydrate, such as

cane sugar or wheat starch, for the oatmeal. A prompt rise in the glycosuria is the result. These facts suggest interesting fields for investigation along the line of physiologic and clinical chemistry. That the oatmeal does not pass through the body unchanged is shown by the investigations of Lipetz from Naunyn's clinic, to be referred to later on.

*Practical Results.*—Von Noorden, in 1903, had an experience with this diet in about one hundred cases, reaching the conclusions already cited. He gives the histories of five patients representing various types from the standpoint of this diet.

CASE 1.—A boy of 18, on ordinary strict diet, passed daily 50 grams of sugar with acetone and diacetic acid. On the oatmeal diet the sugar disappeared, as did the diacetic acid; the acetone was represented by only the normal amount. There was an increase in weight. On gradual resumption of ordinary diet it was found that tolerance had been established, sugar not reappearing in the urine.

CASE 2.—Age 20. Coma seemed imminent. On oatmeal, coma averted, sugar reduced from 100 grams daily to less than 5 grams. Gain in weight. Yet tolerance not established for sugar again present in urine when ordinary diabetic diet is resumed. Net result, averting of coma and improvement in general condition.

CASE 3.—On oatmeal diet sugar greatly reduced and general condition as to strength, weight, etc., much improved, yet sugar never disappeared from urine.

CASE 4.—No influence on sugar output or on acetone bodies. Tolerance not established.

CASE 5.—Light case of diabetes, not tolerating oatmeal diet as well as ordinary diabetic diet. "Light cases without diaceturia, according to my experience, tolerate the oatmeal treatment poorly and show a lessened tolerance if the diet is persisted in for a long time" (Noorden).

Sigel,<sup>3</sup> from Ewald's clinic, concludes that the oatmeal diet is a valuable therapeutic agent. His first case is instructive.

A patient of 33 years, on a carbohydrate-free diet, passed daily 50 to 70 grams of sugar. Bicarbonate of soda did not influence the output of sugar or acetone. After a week of oatmeal the sugar was 16 grams. Then peameal was used instead of oatmeal, and the sugar rose to 74 grams. Then on ten days of oatmeal it dropped to 4 grams. The patient was then gradually brought back to the ordinary diabetic diet, containing, however, considerable oatmeal gruel. Sugar was passed in amounts varying from 20 to 40 grams a day, but there was a distinct gain in general bodily condition and the acetone bodies were absent from the urine. An interesting feature of this case, and one seeming to point toward an essential difference between the starches as found in various foods, is the intolerance of this patient for the peameal and the tolerance for oatmeal.

In a discussion of Dr. Tyson's paper, read before the Section on Pharmacology and Therapeutics of the American Medical Association, 1907. Dr. G. M. Linthicum, of Baltimore, cites a case that he had treated in which a diabetes of a malicious type, in a boy of 8 years, was checked, at least temporarily, by the oatmeal diet, though it had resisted the restricted diet and drugs.

Not all observers report favorably on this method of treatment. Lipetz,<sup>4</sup> from Naunyn's clinic, seems convinced, *a priori*, that there is something wrong about the paradoxical statement that such a large amount of carbohydrate as 250 grams of oatmeal can be given to a diabetic and the sugar not increase but actually disappear. He investigated to see whether the starch was absorbed, whether the patients were not in reality living solely on the fat and proteid of the diet. He convinced himself that the starch does not pass through the al-

2. Rev. de Méd., xxii, p. 107, 1902.

3. Berlin klin. Wochschr., No. 1, 1904, p. 19.

4. Zeit. f. klin. Med., lvi, 1905, p. 188.

mentary tract unchanged. He suggests the possibility that through intestinal bacterial action the oatmeal is changed into some form—lower fatty acids and oxyacids—that when absorbed is incapable of transformation into sugar, perhaps even in some way lowering the sugar output. An increased number of bacteria in the stool of some patients who were on the oatmeal diet favors, he thinks, this hypothesis. His practical results—the treatment, as it seems to me, not carefully carried out nor for a long enough time—are not as favorable as von Noorden's. He has seen acidosis lessen and glycosuria diminish, but finds no permanent improvement and no advantage over the ordinary diets. In coma the main reliance is placed on heavy doses of alkalis. He attributes the good results of the oatmeal treatment to the fact that in spite of a rich carbohydrate intake little or no carbohydrate is absorbed as such. Whether the absorbed products of fermentation of the carbohydrate exercise a specific action he can not decide, for he rather contradictorily remarks, he has never had a good result.

Magnus-Levy,<sup>5</sup> in discussing Langstein's paper, spoke rather disparagingly of this treatment, saying that in severe cases he has had none too happy results. Langstein<sup>6</sup> from an experience with children in Heubner's clinic has been favorably impressed with this treatment; he believes that the oatmeal diet brings about results that can not be obtained with other carbohydrate.

Mohr<sup>7</sup> says he is firmly convinced that with the oatmeal diet good results are often obtained. In the same discussion Hirschberg emphasizes the value of this diet in lessening acidosis, though he has seen failures because of the inability of the patient to ingest the food for any great length of time.

*Personal Experiences.*—My own experience with this method of treatment can not be stated statistically. An early intense skepticism as to the power of the stomach to tolerate twenty to fifty monotonous and far from tempting meals, an inability to understand the disappearance of sugar from the urine when such large amounts of starch were fed, and a failure to grasp the explanation of the paradox that the severe case is made better while the mild case is made worse by the same treatment have yielded when the trial has been made. Yet the wonder at it all still remains. Explanations as to how this is brought about are far from satisfactory. The carbohydrate that may be compared to a poison for some mild diabetics has a helpful effect on the severer forms, in which forms it would seem to have its harmful influence counteracted by some substance, perhaps the acid bodies, and these substances in turn, also toxic, have their baneful effects neutralized by the carbohydrate, i. e., they seem mutually antagonistic or antidotal.

CASE 1.—A man, 37 years of age, with neuralgic pains in his back and legs and local symptoms due to a small ischio-rectal abscess, was unaware that he had diabetes. Symptomatically, the case was a mild one, there being little or no complaint of great weakness, and no known loss of weight from his normal 130 pounds. Inquiry elicited the fact that he had for several years drunk water freely, at times one or two glasses an hour, and was subject to boils. Polyuria was not noticed. Examination of the urine, Jan. 1, 1906, showed 6 per cent. of sugar in the 1,800 c.c. of urine; i. e., 108 gm.; sp. gr. 1.040; diacetic acid present. The table shows, in brief, the result of the treatment:

Date.	Diet.	Amount of Urine, c.c.	Specific Gravity.	Amount Sugar, gms.	Diacetic Acid.
1906.					
January 1.	Full ward diet.....	1800	1040	108	+
January 3.	Ordinary diabetic non-carbohydrate diet with two slices of bread daily....	.....	.....	.....	.....
January 7.	Ordinary diabetic non-carbohydrate diet with two slices of bread daily....	2300	1033	115	?
January 9.	Ordinary diabetic non-carbohydrate diet with two slices of bread daily....	1400	1030	98	0
January 11.	Oatmeal diet.....	1200	1032	8.4	0
January 18.	Oatmeal diet.....	.....	1020	2.0	0
January 19.	Oatmeal diet.....	.....	1025	1.5	0
January 20.	Oatmeal diet.....	.....	.....	.....	.....
January 21.	Oatmeal diet with meat once daily, coffee once a day; celery, lettuce and cabbage.....	.....	1022	1.5	0
January 22.	Oatmeal diet with meat once daily, coffee once a day; celery, lettuce and cabbage.....	650	1020	0	0
January 23.	Oatmeal diet with meat once daily, coffee once a day; celery, lettuce and cabbage.....	770	1015	0	0
January 24.	Oatmeal diet with meat once daily, coffee once a day; celery lettuce and cabbage.....	800	1015	0	0
January 28.	Oatmeal, two or three times a day, with proteins and fats more freely.....	.....	.....	0	.....

This is one of the cases in which, though the type was apparently mild, the result of the diet was favorable. The doubtful Gerhardt reaction, it will be noted, had disappeared from the urine on the ordinary diabetic diet.

CASE 2.—Mrs. M., 62 years old, fleshy. Psoriasis for two years. First noticed thirst three years ago. Comes for treatment for constipation; mucus in stools; vague abdominal and general pains. In the oatmeal diet the sugar was reduced from 106 gms. to *nil*.

Here, again, a case of moderate severity shows a favorable result, both in the elimination of sugar from the urine and in an increased tolerance.

CASE 3.—In a male of 66 years, with a diabetes of mild type that had existed for six to seven years, the small amount of sugar, less than 2 per cent., disappeared under the von Noorden diet, but the patient left the hospital with a trace of sugar that appeared when the ordinary diabetic diet was resumed.

CASE 4.—Within a month, in a long standing diabetes of the mild type, the oatmeal diet has slightly reduced the small amount of sugar (40 gm.), but has not caused its disappearance.

In several office patients suffering from mild diabetes I have tried this plan of treatment without producing any marked effect on the glycosuria. In my cases, therefore, of the mild type, the oatmeal diet has occasionally caused a prompt disappearance of sugar from the urine and has seemed to be of service in establishing tolerance; in other cases sugar has promptly reappeared when other food has been added to the dietary, i. e., no tolerance has been established; in still other cases no impression has been made on the disease. So far, however, I have seen no evil result from the use of this diet, even in the milder cases that von Noorden classes as unsuitable for this plan of treatment.

CASE 5.—A man, aged 51 years, had passed sugar almost constantly for about three years. Thirst and polyuria had, at times, been extreme. He was greatly emaciated and very weak. Ordinary diabetic diets had been tried, but there had been little or no improvement. On the oatmeal diet, the sugar entirely disappeared in eight days, the urine became normal in amount and specific gravity. A moderate tolerance was established, so that on cautiously adding bread and potatoes to the ordinary diabetic diet no sugar appeared for a time and there

5. Deutsche. med. Wochschr., No. 12, 1905.

6. Deutsche med. Wochschr., No. 12, 1905.

7. Mohr in discussion of Langstein's paper. *Ibid*.

was a gain of 4 pounds in weight. The patient expressed himself as feeling better than since his diabetes began. Sugar, however, appeared when a fuller diet was taken, and to-day, while the patient is able to be actively at work, he notices neuralgic (neuritic?) pains, is somewhat weak and is 8 pounds lighter than after the Noorden diet. Another oatmeal course would probably be of benefit.

CASE 6.—A man, of 58, consulted a surgeon, in 1903, for a carbuncle on the back of the neck. Sugar was found in the urine and only partially disappeared under a non-carbohydrate diet. This fall, 1907, the patient again returned because of a sluggish ulcer of the foot. He was weak, greatly emaciated, thirsty, and was passing 75 gms. of sugar a day. I advised the oatmeal diet, with the result that the sugar was reduced in four days to 3 grams. Mere traces were present during the next two weeks, though he was gradually brought back to a proteid and fat diet, some oatmeal and potato also being allowed.

CASE 7.—In a male of 42 in the County Hospital with marked polyuria, emaciation, asthenia and excessive thirst, there was always, even under a strict diabetic diet, over 4 per cent. of sugar. On one examination the interne reported 12 per cent. Acetone and diacetic acid were present. There was, in addition to the diabetes, a complicating apical tuberculosis. The patient was losing ground rapidly. On the oatmeal diet the urine decreased in quantity from 3,800 c.c. to 2,000 c.c., and the sugar and acetone bodies disappeared. Four weeks later and after ordinary diet had been taken for several days, he succumbed to an acute pulmonary edema (acute miliary tuberculosis?).

CASE 8.—E. D. M., 42 years old, an alcoholic, was admitted to the Cook County Hospital because of a foot-drop from neuritis, presumably diabetic in origin. He developed also an ischio-rectal abscess that was treated surgically. Emaciation and weakness were marked, and to judge from the symptoms, diabetes had existed four months and had been progressing rapidly. The urine at one time amounted to 7,830 c.c., and sugar 313 gms. per day. Diacetic acid was abundant. On rather large doses of codein, heroin, antipyrin and bicarbonate of soda, all given at the same time, with a proteid diet, to which a little white bread was added, there was a marked improvement, the sugar being reduced to 22 gms. But in a few days it went up to 52 gms. November 6, 1907, I suggested a trial of the von Noorden diet. The urinalysis of November 9 is 2,000 c.c.; sp. gr. 1.014; no sugar. This was the first time in four weeks that no sugar had been found. For three weeks, and though ordinary diabetic diet has been resumed, there has been no sugar found, or only very small amounts. Diacetic acid has not reappeared.

Nothing has been more surprising or more gratifying than the effect of this diet in the diabetes of the young, a form notoriously hard to manage and of unfavorable course. I have seen in the last twelve months four girls under 17 years of age suffering from typical diabetes mellitus. In each case the disease had been recognized by the attending physician and a strict diabetic diet only had been allowed. Some amelioration of symptoms had followed, but there was still in each case much thirst, polyuria and glycosuria, and the patients bade fair to go the usual way of the youthful diabetic. In each instance the response to the oatmeal diet was prompt in that the amount of urine became decidedly less, its specific gravity was reduced, and in three of the cases sugar entirely disappeared for a time. Thirst was less annoying, there was a gain in strength and weight.

In one case (Case 9) the diet was poorly tolerated, nausea occurring, and I judge from the doctor's letter that there was very early a relaxation in the matter of diet and a return of all the old symptoms. The disease in this girl of twelve began suddenly, three weeks before, with extreme thirst, increased appetite, rapid loss in weight, languor. She had passed as high as one gallon

of urine in a day and it was rich in sugar and of a specific gravity of 1.045. The doctor writes: "Our patient got along nicely while she was on her diet, which I have found lately was only a few days. The parents did not watch her carefully and she ate things that were forbidden." This emphasizes the fact that the determined co-operation of the patient, together with that of the friends in attendance, is extremely important in the carrying out of any dietetic régime in diabetes. This is particularly true in the case of children, who should be watched carefully. In general, the hospital is the safer place for the initiation of any rigorous diet. The first few days of strictest diet are best passed under the eye of the nurse who is cold to entreaty and unflinching in her duty.

CASE 10.—T. D., a girl of 15, was brought to me by her physician, Feb. 7, 1907. Symptoms would indicate that the diabetes had existed four or five months. There was always sugar, even on restricted diet, and the thirst, fatigue and progressive emaciation, with persistent saccharine polyuria, showed that the case was progressing unfavorably. After twelve days of the oatmeal diet the doctor wrote: "To-day's urinalysis is as follows: Sp. gr. 1.012, slightly acid, no albumin and absolutely no sugar." This patient's tolerance was increased by the diet, and for a long time no sugar was present in the urine. But gradually, on the fuller diet, sugar has appeared. Nov. 25, 1907, her physician wrote that she was not doing so well. She had gained 3 pounds in weight, but was weak; the urine contained sugar and some albumin: sp. gr. 1.032, and amounted to 3,000 c.c. for twenty-four hours. The prompt response to the strict diet was, however, most gratifying. Another rigid course should now be prescribed so that tolerance may, if possible, again be established.

CASE 11.—Elizabeth B., 10 years of age. Two months ago had a slight indisposition attended by a little rise in temperature, some epigastric tenderness and a faint yet distinct icterus. (Query: Was there some acute infection of the pancreas at this time?) Six weeks later she became thirsty. Her father, a physician, examined the urine and found 4,000 c.c.; sp. gr. 1.040, with a large amount of sugar. On a restricted diet the amount of urine came down to 1,500 c.c., but it had been for two weeks persistently high in specific gravity; always contained about 5 per cent. of sugar. The child was weak. She was brought to me Dec. 27, 1906. Aside from a barely palpable liver and a confirmation of the doctor's urinalysis, diacetic acid being found, the examination revealed nothing worthy of note. The oatmeal diet was begun at once. Jan. 2, 1907, she came to me again. The urine for twenty-four hours was 1,000 c.c., and contained some acetone but no sugar. The sugar had entirely disappeared after three days of the oatmeal diet.

June 14, 1907, I again saw her in the office. The report showed that no sugar had been present in the urine from January 1 to June 1. Then for three days there was a little sugar. On the von Noorden diet the sugar had again promptly disappeared. The patient looked well; weight, 70 pounds. She felt strong and was attending school. There was no nocturnal urination. The amount of urine during April and May had averaged 30 ounces. Then at the time of the reappearance of sugar the amount had run up to 48 ounces. Daily examinations had been made for six months. The diet had been the diet described in the quotation from the letter of February 25.

Nov. 20, 1907. "Yours of the 18th instant at hand, and in reply will say that Elizabeth has continued in much the same condition she was when you saw her last. Occasionally a little sugar shows in her tests, which are still made every day. The sugar, however, is never present for more than three days at any time since ten months ago. The last two times it was not present for more than twenty-four hours. She has gained 8 pounds in the last ten months and is going to school. Her appetite is quite variable, eating about one good square meal in the day. Her bowels are quite regular, color dark to light brown. Urine about 32 to 40 ounces in twenty-four hours. There has been on the average about one day in the week

showed  $\frac{1}{2}$  of albumin on boiling; but it should never when she has a pale, tired expression, dark color under the eyes and complains only of being tired. I feel very anxious about her at such times, yet even then there is no sugar present. The tenderness over the pancreas has not returned and she never complains. Only when she has those bad days, if asked, will say she is tired. She is eating gluten bread twice a day and buckwheat cakes for breakfast, fruits and nuts as she cares for them. Meat and eggs all we can induce her to eat—no milk except cream in weak tea or weak coffee. I have never put her on the von Noorden diet but one week since you first saw her, and that was eight months ago. I feel very anxious about her at times when she looks so pale and languid."

This result is, it seems to me, remarkable. It is better than any other obtained by me in the case of diabetes in a child on other diets. One can not say that recovery has occurred; one may join with the father in hoping for it. But an amelioration of symptoms with such a marked general improvement would stamp the treatment that was efficacious in bringing about such an effect as a most valuable one.

I am sure Dr. Croftan, who also saw this patient, will agree with me in ascribing to the oatmeal treatment the sudden checking of the onward progress of the disease; and this must be one of the cases that has induced him to say<sup>8</sup> very aptly: "No case of juvenile or adolescent diabetes should be deprived of the benefits of the oatmeal cure."

CASE 12.—M. B., aged 17 years. Thirst and polyuria noted Oct. 10, 1906. October 20 her physician found approximately 5 per cent. of sugar in the 6 quarts of urine. On a strict diabetic diet the amount was reduced to 5 pints. November 23, when I advised the use of the oatmeal diet, there were 400 gms. of sugar in the 5 quarts of the preceding twenty-four hours. Within four days the urine was reduced to 1 pint, with a trace only of sugar. Up to February, 1907, she averaged 2 to 3 pints of urine in the twenty-four hours, there being no sugar for about seven weeks. During this time she was on the more liberal diet.

On February 13, 1907, there were 52 grams of sugar in 1,300 c.c. of urine. This again disappeared on the oatmeal diet. To condense the subsequent history, using the words of her physician, as long as she was careful about diet, she did well, sugar generally ranging from 0.5 to 2 per cent. For seven or eight weeks after the oatmeal diet was begun there was no sugar whatever. The parents insisted on her dancing in public against the protests of her physician, and grew careless as to her diet, the case finally passing into the hands of an advertiser and being lost track of, the last record, Oct. 2, 1907, showing 5 per cent. sugar in a specimen, with a specific gravity of 1.033, and containing acetone and diacetic acid in abundance.

In conclusion I would in the main confirm von Noorden's claim for the oatmeal diet. While occasionally the stomach will rebel and refuse to tolerate this food for any great length of time; while the diet is not suited to all cases, being of least avail in the milder forms; while it fails even in some of the severer types, and while no claim for a cure of diabetes can be made, this diet still remains a most valued therapeutic agent for the warding off of impending coma in the severer types of diabetes and for assisting in the establishment of a tolerance for carbohydrates. In the milder types of diabetes I have so far seen no ill effects follow its use, but the benefits have been trifling. My experience in using it in the diabetes of moderate severity has in general been favorable, it being of especial help in establishing tolerance for carbohydrates. In the diabetes of children, if employed early, it seems to exert an usually favorable influence.

## THE IMPORTANCE OF AN OCULAR EXAMINATION IN PREGNANT WOMEN MANIFESTING CONSTITUTIONAL SIGNS OF TOXEMIA.\*

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AND

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The value of an ocular examination in renal disease and in degeneration of the blood vessel walls is now generally recognized by clinicians, and no study of a patient suspected of either of these conditions is regarded as complete without ophthalmoscopic aid. On account of the liability of pregnant women to disease of the kidneys, obstetricians not infrequently request an examination of the eye-grounds when albumin appears in the urine, and in event of changes being found there, give due consideration to them, for retinitis albuminuria gravidarum is a well recognized disease, and its prognostic and clinical importance is properly valued.

Pregnancy may, however, be complicated by a serious toxemia and the urine not show any trace of albumin. This happens when the liver, or other organ apart from the kidney, is unequal to the task put on it by the excessive tissue changes which accompany pregnancy, or when the kidneys, though diseased, have not as yet excreted albumin. This atypical and often obscure form of toxemia manifests itself in early pregnancy by pernicious vomiting; later in persistent headache, failing vision, *muscæ volitantes*, epigastric pain and restlessness. Repeated examinations of the urine for albumin being negative, the obstetrician is thrown off his guard, and regards the symptoms as local and of no particular import until convulsions occur.

It has been claimed by some that though the urine does not contain albumin in these latent cases of toxemia, a toxic state of the system may be diagnosed by the consequences of faulty metabolism, which may be obtained from the urine by the quantitative estimation of the urea excreted. The practical experience of one of us (Hirst), however, does not substantiate this assertion.

In the first place, it is impossible to estimate the quantity of urea ordinarily excreted in the urine which goes to the fetus; again, without an examination of all the urine, feces, and other excreta in any twenty-four hours, no accurate idea of the relative amount of urea in the urine can be formed; and finally, the amount of urea found in the urine of any patient, from day to day, varies within such wide limits that any conclusions are misleading.

Careful studies which were made on groups of patients at the maternity of the University of Pennsylvania, have indicated the unreliability of the urea test, for it was found that the urea varied from 0.1 per cent. to 3.5 per cent. in these patients, each of whom received exactly the same amount of food. Though the estimation of urea as an independent test is misleading, it is undoubtedly of value when taken into consideration with the presence or absence of albumin, as when albumin is present the urea percentage probably will be below normal; thus, in the test cases just mentioned, it was found that those patients excreting an average of 3.5 per cent., or about 35 gms. a day, were those whose urine