The starvation method versus gradual carbohydrate reduction as a time saver in the treatment of diabetes / by Henry A. Christian, M.D., Boston.

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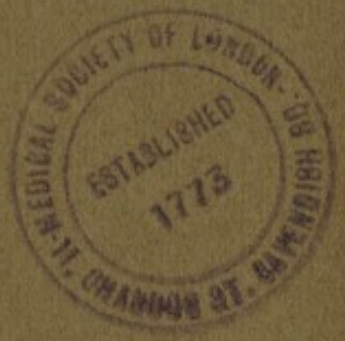

BY

HENRY A. CHRISTIAN, M.D.

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THE STARVATION METHOD VERSUS GRADUAL CARBOHYDRATE REDUCTION AS A TIME SAVER IN THE TREATMENT OF DIABETES.

By Henry A. Christian, M.D., Boston.

[From the Medical Clinic of the Peter Bent Brigham Hospital.]

A large proportion of the diabetic patients coming to our hospitals are wage earners or housewives, only in part incapacitated for their regular duties. A small proportion are advanced cases no longer able to work. To the former, days saved in their treatment are of very great importance. Incidentally days saved in treatment are economies in hospital administration, which allow the benefits of the institution to be bestowed upon more individuals per annum. In both ways there is a marked gain in shortening the time required for treatment in any disease. With these facts in mind let us examine our methods of managing diabetes from the point of view of time.

Today in treating a diabetic we seek first to grade the case according to severity, second to get the patient's urine sugar-free, and third to establish his limits of tolerance to glucose-producing foods, and so far as possible to increase this tolerance, and in doing this we desire to avoid risks to the patient and to maintain the patient in as good a state of strength and comfort as possible. For the first we find out the patient's excretion of glucose and acetone bodies when ingesting some standard diet containing known amounts of protein, carbohydrate and fat.

Usually such a diet contains about 100 gms. of protein and 55 gms. of carbohydrate.

To get the patient sugar-free the method followed until recently has been the gradual reduction of the carbohydrates of the diet. Lately, following the investigations of Allen,[1] diabetic patients have been starved until they are sugar-free. Starvation has been complete in some cases; in others thrice boiled green vegetables[2] have been given. At times alcohol has been allowed to supply some calories during the period in which the patients were being starved.

To establish the limits of tolerance, to the diets of sugar-free patients gradually are added known amounts of carbohydrate and protein; the amount being determined by the continuance or not of the absence from the urine of glucose.

Without attempting to discuss the theories underlying metabolism in diabetics, the time element in getting the patient sugar-free by each of these two methods will be illustrated by consecutive cases admitted to the Peter Bent Brigham Hospital. The earlier cases were treated by a gradual reduction in the carbohydrate intake; the later by Allen's starvation method. In each method the first two or three days were used in grading the severity of the case by studying the excretion in relation to a standard diet. Though taken in succession, none of these cases happened to be of the type grouped as severe. In fact, the figures given show the results of treatment only in mild or moderately severe diabetics.

In Chart I appears the approximate duration of the symptoms of the disease and the day on which the patient got sugar-free.

[1] Allen, F. M.: The Treatment of Diabetes. Boston Med. and Surg. Jour., 1915, Vol. clxxii, p. 241.

[2] The vegetables are boiled through three waters, throwing away all the water. Nearly all starch is thus removed, and the most severe cases generally take these thrice-cooked vegetables gladly and without glycosuria.

CHART I.—DIABETIC CASES—GRADUAL REDUCTION OF THE CARBOHYDRATE INTAKE.

Med. No.	Duration of Symptoms.							
1651	4½	months	Sugar-free	on	the	7th	day
1661	2	years	"	"	"	"	19th	"
1676		?	"	"	"	"	14th	"
1737		?	"	"	"	"	7th	"
1766	2	years	"	"	"	"	9th	"
1786	7	years	"	"	"	"	20th	"
1880	8	years	"	"	"	"	2d	"
1911	4	years	"	"	"	"	11th	"

STARVATION METHOD.

Med. No.	Duration of Symptoms.							
2046	10	months	Sugar-free	on	the	4th	day
2115	6	years	"	"	"	"	3d	"
2252	3	years	"	"	"	"	3d	"
2317	2	years	"	"	"	"	3d	"
2375	1	month	"	"	"	"	1st	"*
2394	5	years	"	"	"	"	3d	"
2490	6	months	"	"	"	"	5th	"
2219	3	weeks	"	"	"	"	4th	"

* Starved as soon as admitted to the hospital.

Of our series of recent diabetics the average duration of the treatment by the gradual reduction of the carbohydrate intake was for these patients 8.9 days between the time of admission and the first day on which the patient's urine was sugar-free. By the starvation method the average for the same thing was 3.2 days, which time includes in all except one case, one or two days of a diet given with the view of standardizing the severity of the diabetes in these cases. Had these patients been put on a starvation diet on admission then the time would have been reduced by one or two days.

Particularly interesting in this connection is a group of cases which were in the hospital more than one time and so were subjected to both methods of management. The first time carbohydrates were gradually reduced because this

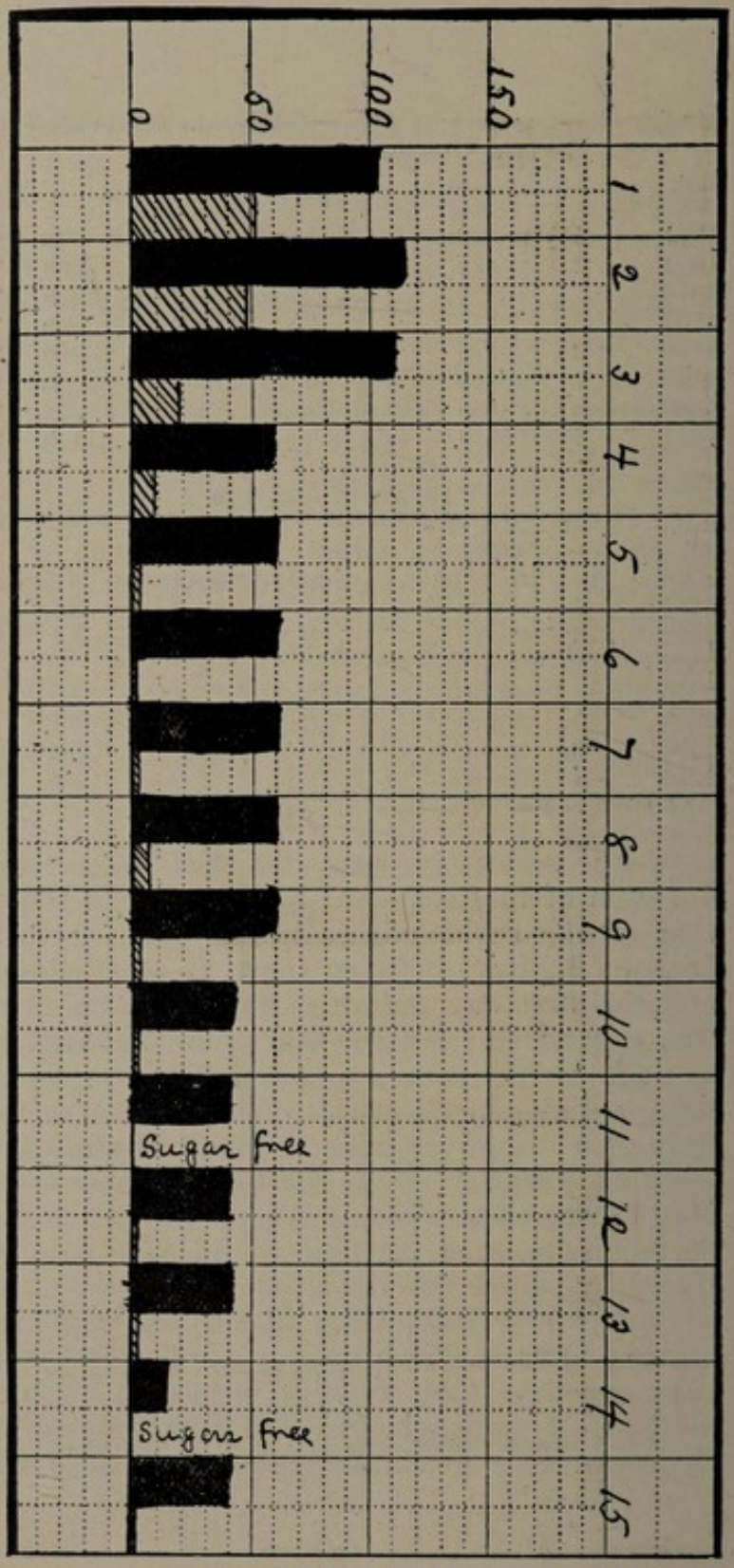


Chart II.

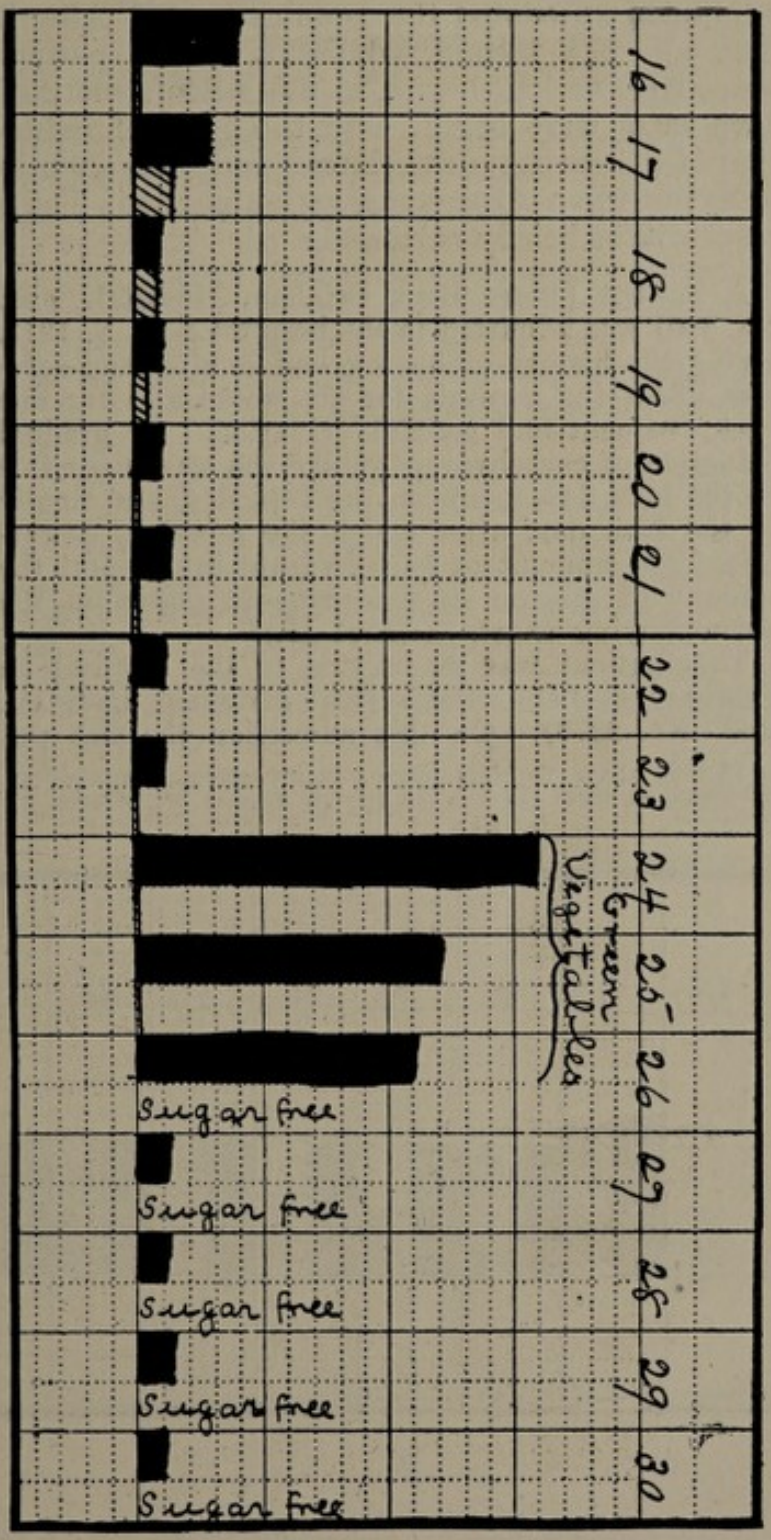


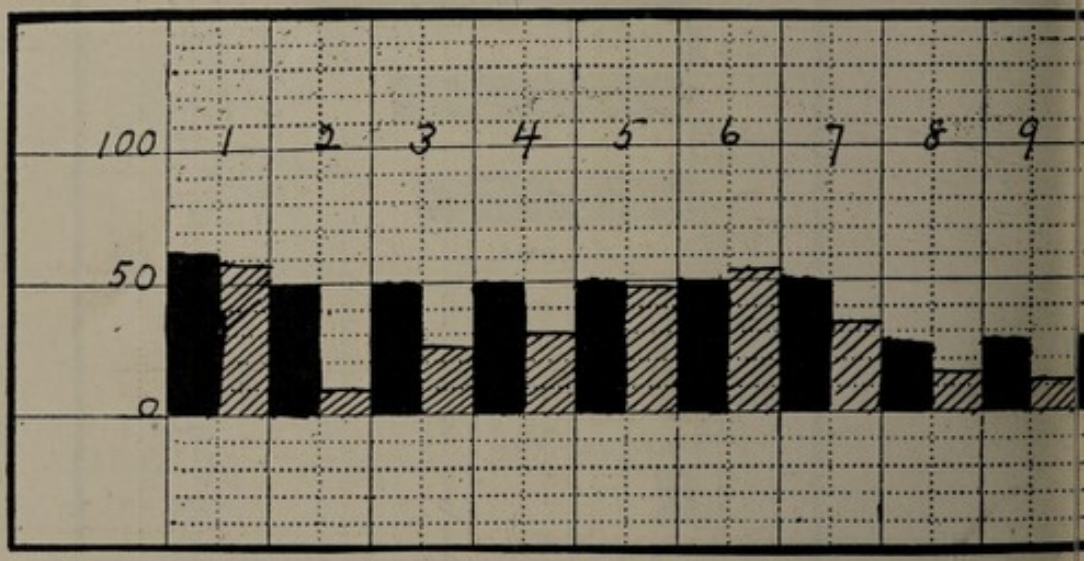
Chart II. (*Continued.*)

admission antedated the publication of Allen's method. The second admission of the patient was after we had begun to use Allen's method. Two cases were begun with the gradual reduction of the carbohydrate intake and subsequently were put upon Allen's starvation method. These cases will be briefly reviewed.

A patient (Peter Bent Brigham Hospital, Med. No. 330) was admitted to the hospital Sept. 9, 1913, giving the history of having had itching and soreness about the genitals for six weeks and for one week frequent and painful urination. By gradual reduction of carbohydrate intake she was sugar-free on the 11th day, again on the 14th day, and finally on the 25th day, after which she remained sugar-free. The amount of carbohydrate intake and the amount of glucose in the urine is shown in the accompanying chart. (Chart II.)[3]

This patient was readmitted to the hospital on February 3, 1915 (Peter Bent Brigham Hospital, Med. No. 2276). On this admission she was put

[3] In these charts the solid black columns represent carbohydrate intake in grams and the hatched columns glucose in the urine in grams.

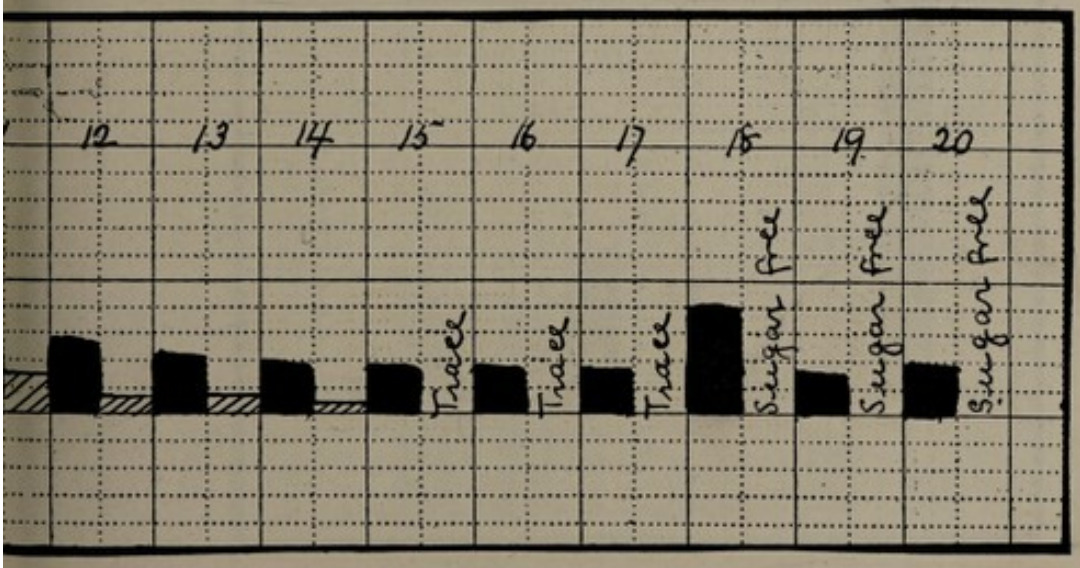


on the Allen starvation treatment, and on the 3d day of her stay in the hospital she became sugar-free, as shown by the chart. (Chart III.)

In a similar way another patient (Peter Bent Brigham Hospital Med. No. 1230) was admitted to the hospital on May 21, 1914, giving a history that eight years previously sugar had been discovered in her urine. By the method of gradual reduction of the carbohydrate intake this patient did not become sugar-free until the 18th day. She was admitted to the hospital a second time (Peter Bent Brigham Hospital, Med. No. 2245) on January 29, 1915, and by the starvation method became sugar-free on the third day.

A third patient (Peter Bent Brigham Hospital, Med. No. 942) was admitted to the hospital March 12, 1914, giving the history that sugar had been found in her urine three years before admission, since which time she has been constantly annoyed with headaches, thirst, polyuria and for a somewhat longer time she has had an ulcer on the left leg. By the gradual reduction method she became sugar-free on the 15th day. (Chart IV.)

This patient was readmitted to the hospital (Peter Bent Brigham Hospital, Med. No. 2509) on



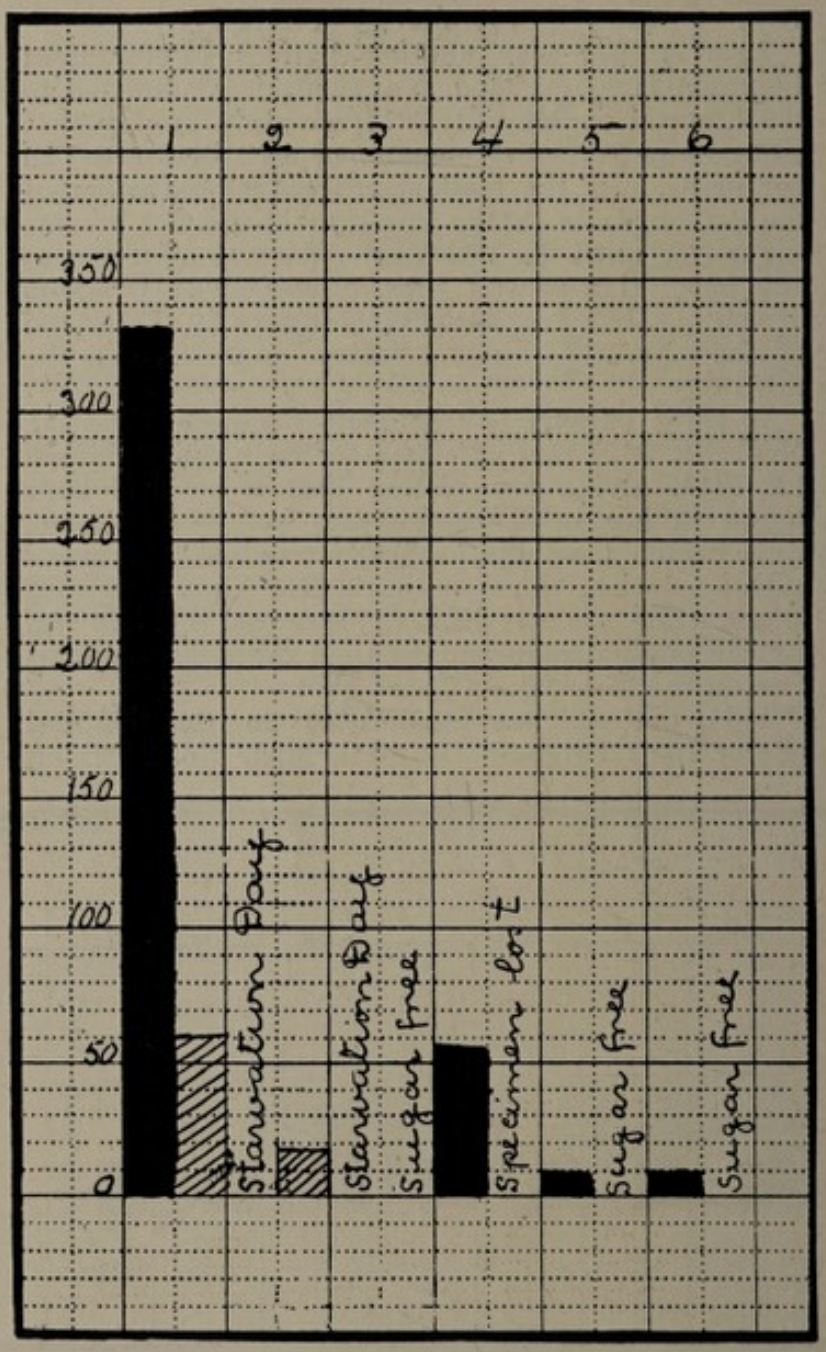

1
2
3
4
5
6
350
300
250
200
150
100
50
0
Starvation Day
Starvation Day
Sugar free
Specimen lost
Sugar free
Sugar free

CHART III.

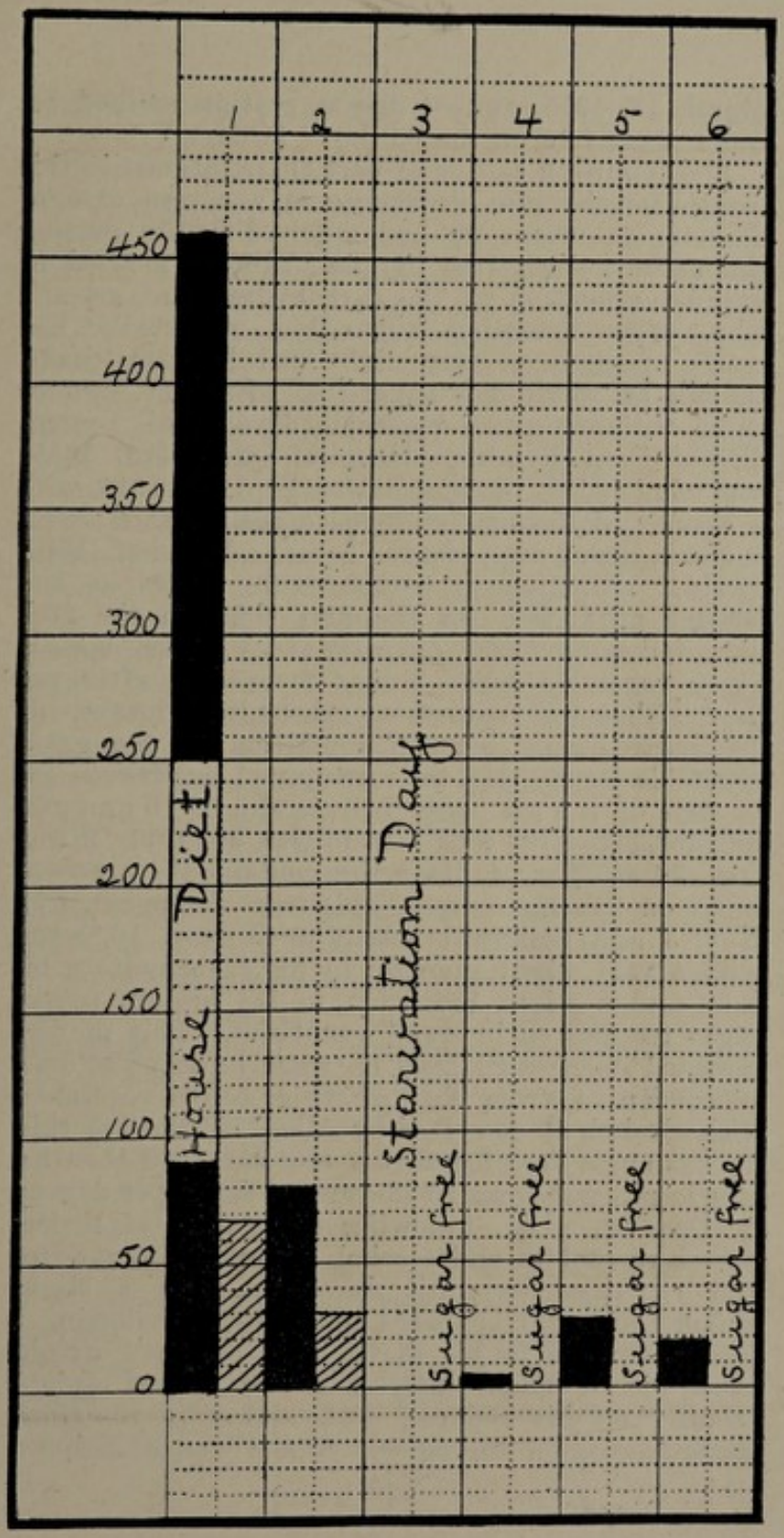

1
2
3
4
5
6
450
400
350
300
250
200
150
100
50
0
House Diet
Starvation Days
Sugar free
Sugar free
Sugar free
Sugar free

CHART V.

March 18, 1915, and on the starvation method became sugar-free on the 3d day. (Chart V.)

The following case is of particular interest in this connection because it represents a severe case of diabetes in whom we had much difficulty getting the patient sugar-free by the ordinary method of gradual reduction of the carbohydrate intake, and who, after becoming sugar-free, repeatedly had traces of sugar on very slight carbohydrate intake, though he would get sugar-free after one, two or three ordinary green vegetable days. This patient (Peter Bent Brigham Hospital, Med. No. 1655) was admitted to the hospital on Sept. 17, 1914, with a history of having developed excessive thirst with polyuria about nine months before admission. With gradual reduction of carbohydrate intake he had become sugar-free for the first time on the 25th day, following three ordinary (not thrice boiled) green vegetable days. Sugar reappeared after two days with a very moderate carbohydrate intake. It disappeared only after a repetition of the green vegetable days. He then remained sugar-free for 11 days on a 5 gm. carbohydrate and 65-70 gm. protein intake. This took him to Oct. 30, 1914. From Oct. 30 to Nov. 4 his urine contained a trace of sugar on this same diet. This trace disappeared on Nov. 5 and remained absent until Nov. 16, when with a very slight increase in his carbohydrate intake and a slight reduction in his protein intake sugar reappeared in small quantities. This picture repeated itself until Dec. 15, when he was put on a succession of seven days of thrice-boiled vegetables with alcohol, as described by Allen. Following this, he was sugar-free for only a few days and then began to put out from 10-12 gms. of sugar per day up to Dec. 29, when, following three days of thrice-boiled vegetables and alcohol he became sugar-free and remained so until Jan. 13, when a slight amount of sugar appeared in his urine following a slight increase in his diet. This patient's weight chart was of much interest as he gained weight steadily on his reduced diet, and only remained sugar-free when his caloric intake was so reduced

following starvation days that his weight made only slight gains.

Somewhat similar is the following patient (Peter Bent Brigham Hospital, Med. No. 1963) who was admitted to the Hospital Nov. 27, 1914, with a history of polyuria beginning four or five days before admission. On a gradual reduction of carbohydrate intake, this patient was still putting out sugar in his urine 17 days after admission on a diet of 10 gms. of carbohydrate, and 50-60 gms. of protein. He was then given a day on which he had only thrice-boiled vegetables and alcohol. On the second day of this he became sugar-free. However, he was kept on this diet for four days, but when he was returned to a 10. gm. carbohydrate and 90 gm. protein diet sugar reappeared, but promptly disappeared on a repetition of the thrice-boiled vegetable days. Subsequent to this he remained sugar-free on a 10 gm. carbohydrate and 60 gm. protein diet and established some tolerance, so that he eventually was sugar-free on a diet of 30 gms. of carbohydrate and 80 gms. of protein.

In all of these cases fluid, carbohydrate and protein intake were charted in relation to output; the patient's weight was noted; the caloric intake; acetone, diacetic acid and ammonia excretion, etc., were quantitated. However, in the present paper only the glucose excretion has been considered in relation to the time element. In Chart I it will be seen that it required of each patient, with the exception of one exceedingly mild case, a stay in the hospital of from 7 to 20 days before the urine became sugar-free when carbohydrates were gradually reduced, while by Allen's starvation method the same thing was accomplished for all except one patient in 4 days or less. The difference in results obtained from the two methods is shown especially well by the cases treated on two admissions approximately one year apart. In these three patients it re-

quired 25 days, 18 days and 15 days respectively to render them sugar-free by the method of gradual reduction of carbohydrate intake, while each was sugar-free on the third day by the Allen starvation method.

It will be seen that by this new method of managing cases of diabetes introduced by Dr. Allen the time required for rendering a patient sugar-free has been greatly shortened. It is done, too, so far as we have observed, with very slight inconvenience or discomfort to the patient. What of the third aim of a diabetic treatment, the establishment of an increased tolerance? It has seemed to us that tolerance is as rapidly acquired after the starvation method of getting the patient sugar-free as after gradual carbohydrate reduction. This being true, Dr. Allen's methods have shortened very materially the time of hospital stay required of cases of diabetes of moderate severity, and in this respect have improved greatly our means of managing diabetics. Dr. Allen himself has pointed out the value of his methods in managing cases of very great severity. They seem to us to be thoroughly safe methods to apply in treating any case of diabetes.

SUMMARY.

The starvation method of Allen for rendering a diabetic sugar-free, in addition to being a safe method, has shortened very materially the time required to get a patient with diabetes sugar-free, and so permits of a large part of the patient's stay in the hospital being devoted to building up the patient's tolerance for carbohydrates. To put it another way, the method saves for the patient and for the hospital one or two weeks of time.