The chief difficulty in arranging the daily *menu* of a diabetic patient is the bread, and for it various substitutes have been advised—bran bread, gluten bread, and almond biscuits. Most of these are unpalatable, and the patients weary of them rapidly. Too many of them are gross frauds, and contain a very much greater proportion of starch than represented. A friend, a distinguished physician, who has, unfortunately, had to make trial of a great many of them, writes: "That made from almond flour is usually so heavy and indigestible that it can only be used to a limited extent. Gluten flour obtained in Paris or London contains about 15 per cent of the ordinary amount of starch and can be well used. The gluten flour obtained in this country has from 35 to 45 per cent of starch, and can be used successfully in mild but not in severe forms of diabetes."

Unless a satisfactory and palatable gluten bread can be obtained, it is better to allow the patient a few ounces of ordinary bread daily. The "Soya" bread is not any better than that made from the best gluten flour. As a substitute for sugar, saccharin is very useful, and is perfectly harmless. Glycerin may also be used for this purpose.

It is well to begin the treatment by cutting off article after article until the sugar disappears from the urine. Within a month or two the patient may gradually be allowed a more liberal regimen. An exclusively milk diet, either skimmed milk, buttermilk, or koumyss, has been recommended by Donkin and others. Certain cases seem to improve on it, but it is not, on the whole, to be recommended.

Medicinal Treatment.—This is most unsatisfactory, and no one drug appears to have a directly curative influence. Opium alone stands the test of experience as a remedy capable of limiting the progress of the disease. Diabetic patients seem to have a special tolerance for this drug. Codeia is preferred by Pavy, and has the advantage of being less constipating than morphia. A patient may begin with half a grain three times a day, which may be gradually increased to six or eight grains in the twenty-four hours. Mitchell Bruce, from a series of elaborate observations, concludes that morphia is decidedly more powerful. In a patient at the University Hospital, Philadelphia, on whom I made a large number of observations on the comparative value of these drugs, morphia appeared to be much more potent. Patients take with benefit up to five or six grains in the twenty-four hours. The expense, too, must sometimes be taken into consideration: the cost of six grains of codeia daily would be twenty-five cents, whereas the same amount of morphia would cost only ten cents. Not much effect is noticed unless the patient is on a rigid diet. When the sugar is reduced to a minimum, or is absent, the opium should be gradually withdrawn. The patients not only bear well these large doses of morphia, but they stand its gradual reduction. Potassium bromide is often a useful adjunct. The arsenite of bromine, a solution of arsenious acid with bromine in glycerin (dose, three to five minims after meals), has been very highly recommended, but it is by no means so certain as opium. Arsenic alone may be used. Antipyrin may be given in doses of ten grains three times a day, and in cases with a marked neurotic constitution is sometimes satisfactory. The salicylates, iodoform, nitroglycerin, jambul, lithium salts, strychnine, creasote, and lactic acid have been employed.

Of the complications, the *pruritis* and *eczema* are best treated by cooling lotions of boric acid or hyposulphite of soda (1 ounce; water, 1 quart).

The *coma* is an almost hopeless complication. Inhalations of oxygen have been recommended, and lately the intravenous injections of a saline solution, as practised by Hilton Fagge. The three per cent solution of the sodium bicarbonate has generally been employed. The treatment has not, however, been satisfactory. Of seventeen cases, collected by Chadbourne, in only one was it successful; in seven there was temporary improvement; and the best that can be said for it is that it may give the patient a few hours of complete consciousness. Injections should be made as soon as possible after the appearance of the coma.

VIII. DIABETES INSIPIDUS.

Definition.—A chronic affection characterized by the passage of large quantities of normal urine of low specific gravity.

The condition is to be distinguished from diuresis or polyuria, which is a frequent symptom in hysteria, in Bright's disease, and occasionally in cerebral or other affections. Willis, in 1674, first recognized the distinction between a saccharine and non-saccharine form of diabetes.

Etiology.—The disease is most common in young persons. Of the 85 cases collected by Strauss, 9 were under five years; 12 between five and ten years; 36 between ten and twenty-five years. Males are more frequently attacked than females. The affection may be congenital. A hereditary tendency has been noted in many cases, the most extraordinary of which has been reported by Weil. Of 91 members in four generations, 23 had persistent polyuria without any deterioration in health. Injury to the nervous system has been present in certain instances, and the disease has followed sunstroke, or a violent emotion, such as fright. Traumatism has occasionally been the exciting cause. The injury may have been to the head, but in other cases the lesion has been to the trunk or to the limbs. The disease has followed rapidly the copious drinking of cold water, or a drinking-bout; or has set in during the convalescence from an acute disease. Tumors of the brain and lesions of the medulla have been met with in a few instances. Cases of polyuria have been accompanied by paralysis of the sixth nerve. Maguire has seen an instance after meningitis in which paralysis of the sixth pair occurred with it. Bernard, it will be remembered, discovered a spot in the floor of the fourth ventricle

of animals which, when punctured, produced polyuria. Lesions of the organs of the abdomen may be associated with an excessive flow of urine, which, however, should not be regarded as true diabetes insipidus. Dickenson mentions its occurrence in abdominal tumors; Ralfe, in abdominal aneurism. I have noted it in several cases of tuberculous peritonitis.

The nature of the disease is unknown. It is, doubtless, of nervous origin. The most reasonable view is that it results from a vaso-motor disturbance of the renal vessels, due either to local irritation, as in a case of abdominal tumor, or to central disturbance in cases of brain-lesion, or to functional irritation of the centre in the medulla, giving rise to continuous renal congestion.

Morbid Anatomy.—There are no constant anatomical lesions. The *kidneys* have been found enlarged and congested. The *bladder* has been found hypertrophied. Dilatation of the ureters and of the pelves of the kidneys has been present. Death has not infrequently resulted from chronic pulmonary disease. Very varied lesions have been met with in the nervous system.

Symptoms.—The disease may come on rapidly, as after a fright or an injury. More commonly it develops slowly. A copious secretion of urine, with increased thirst, are the prominent features of the disease. The amount of urine in the twenty-four hours may range from twenty to forty pints, or even more. The specific gravity is low, 1·001 to 1·005; the color is extremely pale and watery. The total solid constituents may not be reduced. The amount of urea has sometimes been found in excess. Abnormal ingredients are rare. Muscle sugar, inosite, has been occasionally found. Albumen is rare. Traces of sugar have been met with. Naturally, with the passage of such enormous quantities of urine, there is a proportionate thirst, and the only inconvenience of the disease is the necessity for frequent micturition and frequent drinking. The appetite is usually good, rarely excessive as in diabetes mellitus. The patients may be well nourished and healthy-looking. The disease in many instances does not appear to interfere in any way with the general health. The perspiration is naturally slight and the skin is harsh. The amount of saliva is small and the mouth usually dry. Cases have been described in which the tolerance of alcohol has been remarkable, and patients have been known to take a couple of pints of brandy, or a dozen or more bottles of wine, in the day.

The course of the disease depends entirely upon the nature of the primary trouble. Sometimes, with organic disease, either cerebral or abdominal, the general health is much impaired; the patient becomes thin, and rapidly loses strength. In the essential or idiopathic cases, good health may be maintained for an indefinite period, and the affection has been known to persist for fifty years. Death usually results from some intercurrent affection. Spontaneous cure may take place.

Diagnosis.—A low specific gravity and the absence of sugar in the urine distinguish the disease from diabetes mellitus. Hysterical polyuria may sometimes simulate it very closely. The amount of urine excreted may be enormous, and only the development of other hysterical manifestations may enable the diagnosis to be made. This condition is, however, always transitory.

In certain cases of chronic Bright's disease a very large amount of urine of low specific gravity may be passed, but the presence of albumen and of hyaline casts, and the existence of heightened arterial tension, stiff vessels, and hypertrophied left ventricle make the diagnosis easy.

Treatment.—The treatment is not satisfactory. No attempt should be made to reduce the amount of liquid. Opium is highly recommended, but is of doubtful service. The preparations of valerian may be tried; either the powdered root, beginning with five grains three times a day, and increasing until two drachms are taken in the day, or the valerianate of zinc, in fifteen-grain doses, gradually increased to thirty grains, three times a day. Ergot is recommended by DaCosta. Ergotin may be employed. Large doses are required. Antipyrin, the salicylates, arsenic, strychnine, turpentine, and the bromides have been recommended. The constant current may be used—one pole on the loins, the other on the nape of the neck.

IX. RICKETS.

Definition.—A disease of infants, characterized by impaired nutrition and alterations in the growing bones.

Glisson, the anatomist of the liver, described the disease accurately in the seventeenth century.

Etiology.—The disease exists in all parts of the world, but is particularly marked among the poor of the larger cities, who are badly housed and ill fed. It is much more common in Europe than in America. In the colored race it is frequently seen. It is a comparatively rare disease in Canada. In the larger cities of this continent it is frequently seen at the clinics, but in comparison with Vienna and London the contrast is very striking. In these cities from 50 to 80 per cent of all the children at the clinics present signs of rickets. Want of sunlight and impure air are important factors. A starchy diet, too much cows' milk, and the indiscriminate feeding, so common in the children of the poor, are important agents; but something is required beyond these, for children of healthy parents, who have an ample quantity of the proper food, may become rickety. It seems probable, however, that the combination of defective food and bad air plays the most important *rôle*. Prolonged lactation or suckling a child during pregnancy are accessory etiological factors.

There is no evidence that the disease is hereditary, but there is probably a form of fœtal rickets. It is doubtful, however, whether the changes met with in this are identical with the post-natal disease. In these babies,