

They become larger than is necessary to carry on the usual work associated with the ordinary duties of life. When they leave the athletic field and settle down to the usual routine of life, they are at a disadvantage. They have more lungs and heart than they need. Nature attempts an adjustment. A retrograde process supervenes, the organs become more or less flabby and less resistant. That this is probable we may infer from our observations on muscles which have been over-developed and those subjected to disease.

When one becomes adjusted to a high altitude the heart and lungs increase in size just as those of the athlete, and when he returns to the low altitude his heart and lungs must undergo a readjustment, a retrograde process must take place. In the case of tuberculosis it is probable that during this time the tissues are not so resistant as usual and that the patient is prone to have renewed activity in the old process.

From these observations I am led to the conclusion that tuberculosis is a disease which is best treated at low elevations.

THE RELATIONS BETWEEN DIABETES AND PREGNANCY:

WITH THE REPORT OF A CASE OF DIABETES IN WHICH THE GLYCOSURIA DISAPPEARED WITH THE INCEPTION OF PREGNANCY AND REAPPEARED AFTER DELIVERY.¹

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DIABETES mellitus must be looked upon as the expression of a derangement of carbohydrate metabolism, resulting in the more or less constant presence of an excessive amount of sugar in the blood, and, secondarily, in the urine, together with profound nutritional disturbances. The transitory appearance of sugar in the urine is not rarely observed in conjunction with a number of other conditions, while occasionally in cases of diabetes the sugar disappears from the urine with the onset of acid intoxication and coma, and perhaps it may be absent also at other times.

Sugar has been observed so frequently in the urine of pregnant, parturient, and puerperal women that its presence has been designated physiological. H. Blot² found in the urine of all parturient and nursing women and in that of about half of all pregnant women

¹ Read at a meeting of the Association of American Physicians, Washington, D. C., May 7, 8, and 9, 1907.

² *Gaz. d. hôp. civiles et milit.*, 1856, p. 482.

a reducing substance that he considered sugar, and he thought the phenomenon related directly to the secretion of milk.

Leconte³ contested this view, contending that the reducing substance was not sugar, but rather uric acid. T. Kirsten,⁴ on the other hand, agreed with Blot, while E. Brücke⁵ maintained that normal urine almost constantly contains traces of sugar and that the urine of puerperal women may contain even larger amounts.⁶

A. Hempel⁷ concludes that sugar appears in the urine of puerperal women only as the secretion of milk becomes active, and that the amount is proportionate to the degree of development of the mammary glands and the duration of the stasis of the secretion in the breasts. V. Johannovsky⁸ made comparative observations on 25 healthy men and 25 nursing women and found that the urine of all of the former and of 21 of the latter (without milk stasis) reduced copper and was levorotary, while the urine of 4 nursing women with milk stasis likewise reduced copper, but was dextrorotary. He considers the latter phenomenon as evidence of a resorption lactosuria, and L. Hofmeister⁹ found the reducing substance actually to be lactose.

J. Ney¹⁰ examined the urine of 148 nursing and 24 pregnant women and found sugar present in four-fifths of the former and one-sixth of the latter. The condition was especially associated with an abundant secretion of good breast milk. G. Keim¹¹ found sugar in the urine of 20 among 25 nursing women and in that of but 4 among 19 pregnant women. He considered the condition physiological in the one instance and pathological in the other. Among 125 women between the seventh and ninth months of pregnancy M. Brocard¹² found sugar in the urine in 50 per cent. Glucose predominated, but milk sugar appeared as lactation was approached.

F. A. Lemaire¹³ found that when sugar was present in the urine prior to labor the amount became greater after labor in consequence of the excretion of milk sugar, as well as of a greater amount of glucose and isomaltose. Milk sugar appeared in the urine of nursing women when none had been present during pregnancy.

F. Lanz¹⁴ has found the power of assimilating carbohydrates greatly diminished in pregnant women, as shown by the presence in 19 of 30 cases from the fourth month of pregnancy onward of

³ *Compt.-rend. hebdom. des séances de l'Académie des Sciences*, 1857, xlv, 1331

⁴ *Monatsschr. f. Geburtsh. und Frauenheilk.*, 1857, ix, 437.

⁵ *Sitzungsbericht der kaiserlichen Academie der Wissenschaften*, Wien., 1858, xxxviii, xxix.

⁶ *Wien. med. Woch.*, May 8, 15, 1858, 321.

⁷ *Archiv f. Gynäk.*, 1875, viii, 312.

⁸ *Ibid.*, 1877, xii, 448.

⁹ *Zeitschr. f. physiolog. Chemie*, 1877-78, i, B, 101.

¹⁰ *Archiv f. Gynäk.*, 1889, xxxv, 235.

¹¹ *Progrès médical*, 1898, i, 424.

¹² *Compt.-rend. hebdom. des séances et mémoires de la Société de Biologie*, 1898, t. 5, 10 ser. 1077.

¹³ *Hoppe-Seyler's Zeitschr. f. physiolog. Chemie*, 1895-96, xxi, 442.

¹⁴ *Wien. med. Presse*, December 8, 1895, xxxvi, Jahrg., No. 49.

grape sugar in the urine within six hours after the administration of 100 grams of grape sugar. R. v. Jaksch¹³ thought this phenomenon might be diagnostic of the existence of pregnancy. J. Hofbauer¹⁴ found the assimilative power for carbohydrates progressively reduced in 39 of 45 cases from the end of the second month of pregnancy, and he considered the reaction as indicative of the existence of physiological conditions.

H. Ludwig¹⁷ contends that the organism of a healthy pregnant woman reacts upon polysaccharids in the same way as does that of a non-pregnant individual, so that a failure to demonstrate diminished assimilation of carbohydrates cannot be accepted as evidence of the non-existence of pregnancy, while the appearance in the urine of a pregnant woman with abundant glycosuria of more than 1 per cent. of the sugar ingested with a mixed diet is of affirmative diagnostic significance. He examined the urine of 82 women for mellituria during the last eleven weeks of pregnancy and found no trace of sugar in 26, fermentable sugar alone in traces or in amounts determinable quantitatively in 10, fermentable sugar in traces or in amounts determinable quantitatively, but not alone, in 38, and varying amounts of fermentable and non-fermentable sugar in 8. A. Payer¹⁸ determined that the assimilative power for grape sugar in pregnant women is in inverse relation to the maturity of the fœtus; that is, the farther advanced the pregnancy the more readily can alimentary glycosuria be induced. Other things being equal, alimentary glycosuria can be more readily induced in primiparæ than in multiparæ. The disparity is more marked with advancing years. On the other hand, Payer found glycosuria uncommon during pregnancy.

J. Veit¹⁹ suggests that the glycosuria of pregnancy may be due to absorption of the glycogen contained in the chorionic tissues. He observed dextrose in the urine of rabbits when living young placental tissue was introduced into the abdomen.

In the course of 1800 urinalyses Robert N. Willson²⁰ noted that when sugar appeared in the urine of a pregnant woman not previously glycosuric the phenomenon was observed between the beginning and the end of the last month of gravidity. Occasionally a trace of glucose was observed throughout pregnancy, often disappearing completely after parturition.

Although sugar is thus said to be a frequent constituent of the urine during pregnancy, diabetes, on the other hand, appears to be quite an uncommon complication of gravidity. This fact is attributable to the circumstance that the disease is less common in women

¹³ *Prag. med. Woch.*, July 4, 1895, xxvii, 231.

¹⁴ *Wien. klin. Rundschau*, xii, Jahrg., January 1, 1899, 1.

¹⁷ *Wien. klin. Woch.*, March 23, 1899, xii, 12, 305.

¹⁸ *Monat. f. Geburtsh. und Gynäk.*, 1899, x, 559, 784.

¹⁹ *Münch. med. Woch.*, July 17, 1906, 1437.

²⁰ *AMER. JOUR. MED. SCI.*, 1904, cxxvii, 261.

generally than in men, and that its incidence in women is greatest after the child-bearing period. There are, however, on record a small number of cases in which diabetes has recurred with successive pregnancies. Even rarer than diabetes complicating pregnancy is the occurrence of pregnancy in a diabetic woman. The reasons for this, in addition to those already given, are to be found in the state of impaired nutrition of the diabetic patient and the functional derangement and structural alteration of the internal generative organs that are often present.

J. M. Duncan²¹ quotes Frerichs as stating in a private communication that of 386 cases of diabetes mellitus 282 occurred in males and 104 in females, and that of the latter only 1 was observed during pregnancy. From personal experience and a study of the literature Duncan concludes that diabetes may develop during pregnancy and even be present only in association with that condition; or that it may disappear with the termination of pregnancy, either to appear some time later or not to recur in a subsequent pregnancy; or that it may develop soon after labor. He recognizes the fact also that pregnancy may occur in a diabetic woman and, with parturition, be unaffected by the associated disease, although liable to be interrupted in its course by death of the fetus. Gaudard²² expresses the view that diabetes in a mild form may set in at the beginning of pregnancy and disappear after labor, while a more severe form persists after delivery, and a still more serious variety rapidly terminates fatally. The condition, he finds, is aggravated by lactation. H. D. Fry²³ states that when a predisposition to diabetes exists pregnancy is likely to act as an exciting cause; when the disease is already present its type becomes aggravated. If a fatal termination does not take place before labor sets in, a change for the better may be expected at this time.

In a discussion of the principal complications of diabetes, Grellety²⁴ states that sexual indifference is habitual in consequence of the associated constitutional debility, and that impotence and sterility are a natural result. M. Loeb²⁵ relates that of 9 cases of diabetes mellitus in women under his observation 5 were complicated by disease of the uterus, namely, retroflexion, chronic metritis, fibroid, prolapse (2). M. Hofmeier²⁶ states that atrophy of the internal genitalia takes place in the sequence of diabetes mellitus in women.

In a discussion of diabetes in its relations with uterine activity, menstruation, and pregnancy Lecorché²⁷ calls attention to the fact

²¹ Trans. of the Obstet. Soc. of London, 1882, xxiv, 256.

²² Thèse de Paris, 1889; abstract in *Centralbl. f. Gynäk.*, 1890, xiv, 24, 434.

²³ Trans. Amer. Gynec. Soc., 1891, xvi, 350.

²⁴ *Lyon médical*, 1880, xii, ann., t. xxxiii, 521.

²⁵ *Berl. klin. Woch.*, October 10, 1881, 601.

²⁶ *Ibid.*, October 15, 1883, 42, 641.

²⁷ Du diabète sucré chez la femme, Paris, 1886, 162 et seq.; extract in *Annales de gynécologie*, 1885, xxi, 257.

that diabetes in women is observed especially before puberty and after the menopause, at the same time pointing out that the relative rarity of the disease appears counterbalanced by its gravity during this period. Both diabetes and the menopause are most common in women at about forty-four or forty-five years of age. On the other hand, diabetes is charged with causing more or less profound alterations in the function and structure of the uterus and its adnexa, so that frequently menstruation is irregular, painful, or absent, and conception is unlikely to take place. When pregnancy occurs the nutrition of the fetus is affected in such a manner that premature labor often takes place.

H. Senator²³ notes that menstruation becomes deranged in diabetic women only when nutrition is greatly impaired and that pregnancy has been observed to occur, although often interrupted by abortion. J. Seegen²² found amenorrhœa an uncommon symptom in diabetic women, and he has observed normal menstruation, even in severe cases, up to within a week before death.

According to C. von Noorden²⁰ there is no general rule as to the occurrence of menstruation in diabetic women, amenorrhœa being noted early in some, while in others menstruation recurs at regular or irregular intervals until an advanced stage of the disease. He states that conception occurs frequently, even at a late period in the disease, and that pregnancy and the puerperium have no unfavorable effect on the diabetes, as illustrated by 5 diabetic women under his care who became pregnant. He admits, however, that in severe cases sexual desire is diminished and sterility likely to be present, and he advises against the marriage of young women having diabetes, as the disease is serious under such circumstances.

W. Lesse²¹ believes that the prognosis is better in the case of a woman diabetic before pregnancy than in that of a woman who becomes diabetic during pregnancy. He considers the induction of premature labor advisable only in the presence of hydramnios or contracted pelvis. F. Schauta²² considers diabetes a serious complication of pregnancy and especially during parturition. Accordingly, he would sanction the induction of abortion in the early months, as the fetus is likely to die anyway; and also in the later months if the amount of sugar in the urine is large. G. E. Herman²³ favors the early termination of pregnancy as offering the greatest probability of benefit to the mother, especially if hydramnios be present. According to J. W. Williams²⁴ gestation in a diabetic woman sometimes exerts a deleterious influence on the course of

²⁰ Handbuch der speciellen Pathologie und Therapie, 1876, B. xiii, 2 H., 164.

²¹ Der Diabetes Mellitus, 3 Aufl., Berlin, 1893.

²² Die Zuckerkrankheit und ihre Behandlung, Berlin, 1898.

²³ Monat. f. Geburtsh. und Gynäk., 1902, xv, 680.

²⁴ Ibid., xvi, 470.

²⁵ Edinburgh Med. Jour., 1902, n. s. xi, 119.

²⁶ Obstetrics, 1903, 344.

the disease, and if the patient's condition should become alarming he advises the induction of premature labor.

P. Rudaux³⁵ states that diabetes retards the progress of pregnancy, equally whether it has been present before or has supervened upon conception. The diabetic woman seldom reaches full term; premature birth is more common than abortion before the child is viable. The amount of sugar increases about the sixth month and during the last days of the ninth month, and there is a definite relation between the amount of sugar and the death of the child. The fœtus may die in the uterus and be expelled subsequently; or, when it approaches term, it may die during labor or soon after birth. Death occurs during or after parturition in 41 per cent. of the cases. The most common complications are hydramnios and hydrocephalus; besides, the size of the child may be excessive. The effect of diabetes upon labor is unimportant, although uterine contractions are less energetic and, therefore, the period of parturition is prolonged. Diabetic patients are especially prone to septic infections, their tissues furnishing a favorable medium for the growth of pathogenic microorganisms. Lactation is well maintained and is accompanied with a diminution of the ordinary symptoms of thirst and polyuria. Part of the glucose is converted by the mammary glands into lactose, and a large proportion of the sugar found in the urine is lactose. On the other hand, pregnancy aggravates diabetes considerably, although the aggravation does not appear during the first four or five months. Toward the end of the fifth or during the sixth month the symptoms reassert themselves with increased intensity; the patient complains of thirst, and polyuria; glycosuria and emaciation become marked; or such complications as coma, loss of vision, paralysis, or syncope develop. The symptoms may have been so slight as to escape detection until aggravated by the pregnancy, or in cases that have been recognized prior to the occurrence of pregnancy the symptoms may have been dormant until the sixth month; but in either event the disease then makes rapid progress. In the latter days of pregnancy, should the patient go to term, the severity of the disease is greatly intensified; but after delivery some alleviation may be expected. Slight symptoms appearing toward the end of pregnancy and held in check by suitable treatment after delivery will be increased by a subsequent pregnancy. The average duration of diabetes is three or four years, but when complicated by pregnancy this is reduced to twenty months. The termination is usually due to coma, cachexia, pulmonary tuberculosis, or exhaustion, and it is often hastened by parturition. For an exhausted woman labor is a serious trauma, and sudden death or death within a few days after delivery will occur as a result of the shock. The effect of lactation can be looked

³⁵ *La Clinique*, October 19, 1906; *Brit. Med. Jour.*, January 5, 1907; *Epitome of Current Medical Literature*, p. 2, No. 7.

upon only as harmful, as it prolongs the puerperal period and lowers the resistance of the maternal organism. When pregnancy occurs in a diabetic woman the prognosis is always serious for both the mother and the child.

I have observed a case of diabetes in which the glycosuria disappeared with the inception of pregnancy and reappeared only after the delivery at about term of a macerated foetus. I have been unable to find in the literature the record of a parallel case.

M. G., a married colored woman, aged thirty-seven years, was referred to my dispensary service at the Polyclinic Hospital, on February 18, 1905, on account of vulvar pruritus and a suspicion of diabetes. Her mother had died at forty-nine years of age of some disease of the kidney and gangrene of the leg. Her father, two sisters, and one brother were living, in good health. She had borne one child, sixteen years previously, but it had lived only nine months. She had herself had measles in childhood. The woman related that she had been sick for three years, during which period she had been passing large amounts of urine at frequent intervals. Micturition was attended with burning pain and there was a purulent vaginal discharge, with marked swelling of the vulva.

For a year the lower extremities had been swollen; for six months she had had severe headache, and she had lost fifty pounds in weight in two months. The woman admitted that she had a fondness for sweets, on several occasions indulging herself to the extent of a pound and a half of candy in twenty-four hours.

The patient had at various times lost different finger-nails. She complained of want of appetite and nervousness. She drank water excessively. Menstruation was regular, attended with moderate pain for the first twenty-four hours, and lasted for three days. There was no history of mental or physical shock.

The woman weighed 206 pounds as compared with 220 rather more than a year previously. The action of the heart was rhythmic. The sounds were clear and the second was accentuated in the aortic area. The knee-jerks were preserved. The urine was found to be free from albumin, but sugar was present in a proportion of 4.67 per cent. From four to five pints of urine were passed in the twenty-four hours. Under treatment, in part dietetic, in part medicinal—salol, sodium phosphate—the patient began to feel better and to gain in weight. The pain on micturition diminished, the vaginal discharge and the itching grew less. Menstruation occurred on February 28, 1905, and a trace of blood from the uterus appeared about April 1. At the latter date morning nausea was noted and anorexia was marked. There was some soreness of the breasts, both of which contained secretion. The glands themselves had not increased in size, but the areolar tubercles were enlarged. Pregnancy was suspected, although this condition had not been present for sixteen years.

Urine examined on March 4 contained only 1.17 per cent. of sugar and another specimen examined on March 18 contained 1.6 per cent., while no sugar at all was found in specimens examined March 28, April 1, 8, and 29, and May 2. On November 15, 1905, the patient complained of tenderness and dull pain in the lower portion of the abdomen. The facial expression was dull and sleep was poor. Thirst was almost unquenchable. Urine was passed in large amounts. The specific gravity was 1005 and there was no response to tests for albumin and sugar. Labor set in definitely on the following morning, but it progressed so slowly that the membranes were ruptured and artificial dilatation of the uterine mouth was undertaken. The breech presented and expulsive efforts were feeble. By manipulation a foot was brought down and then the other foot, and finally the trunk was extracted. The head appeared to be impacted at the brim of the pelvis and the fœtus had to be turned several times before descent could be effected. The umbilical cord had broken at the fœtal extremity and the fœtus was dead and macerated. The placenta and membranes were delivered manually. Labor had occupied more than thirty-six hours and was followed by profuse uterine hemorrhage. The patient became comatose, with stertorous breathing, but she eventually reacted and recovered. On November 20 the urine contained a trace of albumin, but no sugar. On the 22d also no sugar was present, but a small amount of albumin was again found, together with red and colorless blood corpuscles, amorphous and triple phosphates, squamous epithelial cells, and free granules. On December 1 symptoms of thrombophlebitis in the left thigh appeared. The urine still contained a trace of albumin, but no sugar. On the 8th sugar was again not demonstrable in the urine, but a trace of albumin was present, with one hyaline cast and a few finely granular casts, as well as leukocytes, crystals of uric acid and of calcium oxalate, squamous epithelial cells, and free granules. The subsequent history of the patient may be summed up briefly in the statement that the albumin disappeared from the urine, while in April, 1906, sugar was again found and the symptoms of diabetes previously present once more made their appearance. The patient's weight, however, increased to 226½ pounds.

The patient was skillfully looked after during labor and the puerperium by Dr. Annie L. Conner, to whom I am indebted for notes covering that period of the case.

I append herewith abstracts of the cases that I have collected from the literature, giving separately those in which pregnancy was complicated by diabetes and those in which pregnancy took place in diabetic women. I have endeavored further to separate the cases in which diabetes recurred in successive pregnancies and those in which diabetes appeared during pregnancy after having been present temporarily at an earlier period.

I. CASES OF PREGNANCY COMPLICATED BY DIABETES.

J. M. Duncan³⁶ reports the case of a woman, aged thirty years, in the fifth month of her third pregnancy. She was married at twenty-six years, and her first child was born, decomposed, at term. Subsequently she presented a succession of boils, but her urine was not examined. Her second child was born, also decomposed and at term, fifteen months later, and again the urine was not examined. The woman became pregnant a third time six months later and now the urine was found "diabetic." Alarming symptoms developed in the seventh month and premature labor was induced. Improvement followed for a time, but later a fatal termination ensued.

It can be only a matter for speculation as to whether diabetes was present in the first pregnancy in this case, and whether it continued and was present also in the second pregnancy.

M. Loch³⁷ reports the case of a woman, aged twenty-two years, who presented symptoms of diabetes in the second month of pregnancy. Abortion took place in the sixth month and death followed soon afterward.

In a paper on "Puerperal Diabetes," J. M. Duncan³⁸ reports 2 additional cases of his own and also 11 others from various sources, besides those of Bennewitz and Lecorché. In one of Duncan's cases, in a woman aged thirty years, there was a suspicion of temporary diabetes at the end of a former pregnancy. In the fifth pregnancy diabetes was discovered in the eighth month and the foetus died before labor set in, at the beginning of the ninth month, with collapse. There was an excess of liquor amnii. Death took place on the third day after delivery.

Duncan's second case occurred in a woman, aged thirty-five years, in whom diabetes was discovered at the time of quickening in her eleventh pregnancy. A large child was born dead, and the symptoms of diabetes disappeared. Later, however, there was a relapse, and death took place in coma eight months after delivery.

The case of W. L. Reid (Duncan) occurred in a woman, aged thirty-two years, whose first pregnancy terminated in the delivery of a macerated foetus. Diabetes was discovered early in the second pregnancy. The foetus died in the eighth month and premature labor occurred a few days later. The liquor amnii was excessive. The diabetes persisted.

A case of Williams (cited by Duncan) occurred in a woman, aged thirty-six years, who developed diabetes early in her seventh preg-

³⁶ Edinburgh Med. Jour., 1873, xviii, ii, 696.

³⁷ Berl. klin. Woch., October 10, 1881, 601.

³⁸ Trans. of the Obstet. Soc. of London, 1882, xxiv, 256.

nancy. The fœtus died during pregnancy and was expelled in the eighth month. The mother died suddenly four months later.

Another case of Williams (cited by Duncan) occurred in a woman, aged thirty-three years, who first became pregnant at the age of twenty years, and exhibited thirst and emaciation, but became strong again after delivery. Her second pregnancy began when she was twenty-two years old, and was attended with the same symptoms. Her third pregnancy, which occurred when she was twenty-three years old, was attended with slight loss of flesh. There was a fourth pregnancy at twenty-five years, a fifth at twenty-eight years, and a sixth at thirty years. In the last there were again thirst and emaciation and incontinence of urine. The seventh pregnancy took place at thirty-three years, and its course was marked by wasting, thirst, and incontinence of urine. Glycosuria was discovered a short while after delivery, disappearing in the course of three months.

It is possible that in this case diabetes was present in the first second, third, and sixth pregnancies, but in the absence of any statement with reference to the urine the necessary certainty for the formation of an opinion is wanting. Although the discovery of sugar in the urine soon after the last labor renders it likely that glycosuria was present during the seventh pregnancy, the omission of a specific report on this point leaves room for reasonable doubt. In Husband's case (Duncan) occurred in a woman, aged twenty-seven years, in whom diabetes was discovered in the third pregnancy. The child was feeble at birth and died a few hours later. The liquor amnii contained sugar. The mother died eight months after delivery.

In Winekel's case (Duncan) diabetes was observed in the second pregnancy and the child was born alive.

In Davidson's case (Duncan) a woman, aged thirty-eight years, was found to be diabetic in the middle of her fourth pregnancy. Labor set in prematurely and the child lived for thirteen hours. The symptoms of diabetes disappeared, but returned, with a fatal termination, four months later.

Frerich's case (Duncan) occurred in a woman, aged thirty-six years, in whom diabetes was discovered in the eighth month of her tenth pregnancy. The lying-in was normal. Death took place fifteen months later from tuberculosis and gangrene of the lungs. On postmortem examination a tumor of the medulla oblongata was found.

L. Kleinwäbter²³ reports the case of a woman, aged twenty-two years, who aborted a few weeks after marriage and during her second pregnancy presented symptoms of severe diabetes. In the thirty-second or thirty-third week amniotic fluid in excessive amount escaped and the patient went into collapse. Forceps were applied

²³ Wien. med. Presse, 1904, xlv, 51, 2448.

and an immature fœtus was delivered.³ The child lived for but a short time and the mother died eighteen hours after labor. Kleinwächter believes the disease must have commenced in the twentieth year.

M. J. Durieux⁴⁰ reports the case of a woman, aged thirty-seven years, whose first pregnancy, attended with albuminuria and eclampsia, resulted at term in the birth of a dead infant. Six weeks after labor all trace of albumin had disappeared from the urine. The second pregnancy was interrupted in the second month by abortion without appreciable cause. Symptoms of diabetes made their appearance in the seventh month of the third pregnancy. A healthy child was born at term, and the urine was free from albumin and sugar after disappearance of the lochia.

B. Naunyn⁴¹ refers to the case of a woman, aged thirty-nine years, who presented symptoms of diabetes in her ninth pregnancy and four years later still had pruritus and glycosuria.

H. D. Fry⁴² reports the case of a woman, aged thirty-one years, who exhibited symptoms of diabetes in the fifth month of her second pregnancy. The fœtus died in the seventh month and premature labor followed. The mother died on the fifth day.

Born⁴³ reports the case of a woman, aged twenty-four years, who in the seventh month of pregnancy died in diabetic coma. The uterus contained a macerated fetus.

E. L. Partridge⁴⁴ reports the case of a woman, aged twenty years, who developed diabetes in the fourth month of her first pregnancy, the disease subsiding in the seventh month, and labor taking place at term, with the delivery of a healthy child. The urine was free from sugar one month afterward.

E. Rossa⁴⁵ reports the case of a primipara, aged twenty-eight years, with a rachitic contracted pelvis, whose urine in the sixth month of pregnancy yielded a distinct reaction for sugar, which was found to be due to dextrose. The fœtus was living and exhibited hydramnios. The patient declined Cesarean section, so that premature labor was induced. The membranes were ruptured and three liters of amniotic fluid was evacuated. Delivery ensued sixteen hours later, but the fœtus lived for only thirty-two hours. Grape sugar was found in the amniotic fluid, but not in the fœtus' urine. The sugar disappeared from the mother's urine six days after labor. The case is considered one of mild diabetes superinduced by pregnancy.

G. E. Herman⁴⁶ reports the case of a woman, aged thirty-two years, who had borne seven children. All of the labors were difficult and

³⁹ Bull. de la Société d'Obstét. de Paris, 1905, viii, 141.

⁴⁰ Der Diabetes Mellitus, Vienna, 1903, 234.

⁴¹ Trans. Amer. Gynec. Soc., 1891, xvi, 350.

⁴² Correspondenzblatt f. Schweizer Aerzte, 1892, xxii, 347.

⁴³ Med. Rec., July 27, 1895, 109.

⁴⁴ Centralbl. f. Gynäk., June 20, 1896, 25, 650.

⁴⁵ Edinburgh Med. Jour., 1902, n. s. xi, 119.

the last three children were stillborn. In the third month of her eighth pregnancy the woman was weak, with an irritating vaginal discharge, burning micturition, itching, and boils. For three months there had been thirst, as there had been also in previous pregnancies, and for one month loss of flesh. The woman had been told in the fourth month of pregnancy that she had diabetes. When seen in the seventh month she had bearing-down pains and vomiting, and in a few days she became moribund. The urine contained albumin and sugar. Fluctuation was present over the uterus. The fetal heart sounds could not be heard, nor fetal movements felt. The membranes were ruptured and a large amount of amniotic fluid escaped. Natural delivery of a decomposed fetus took place. The amniotic fluid was excessive and contained albumin and sugar. The woman died ten days later.

In the absence of a knowledge of the state of the urine no opinion is possible as to whether diabetes was present in any of the pregnancies but the last.

A. Stengel⁴⁷ reports the case of a woman, aged thirty-three years, in whom symptoms of diabetes were observed in the fourth or fifth month of her second pregnancy. A healthy child was born at term, and the glycosuria disappeared one month after labor.

II. CASES OF DIABETES IN SUCCESSIVE PREGNANCIES.

Bennewitz⁴⁸ reports the case of a woman who in her fourth pregnancy suffered from insatiable thirst and polyuria, which ceased after delivery. The urine was not examined. During her fifth pregnancy, at the age of twenty-two years, she presented the same symptoms and the urine examined at this time contained "two ounces of saccharine matter to the pound." Labor set in prematurely and the woman gave birth to a twelve-pound infant, which died in the process of delivery. The woman was well again in a short while and the urine free from sugar. Six months later she became pregnant for the sixth time, with the same symptoms as she had previously exhibited, but these all disappeared after delivery. It is possible that diabetes was present during the fourth pregnancy as well as during the fifth and the sixth.

A case of Williams (cited by Duncan) occurred in a woman, aged twenty-five years, in whom diabetes was discovered the day following the birth of her first child at term. The sugar gradually disappeared from the urine, but it reappeared in the succeeding pregnancy, which terminated in the birth of a healthy child, with an excess of liquor amnii, in which, however, no sugar was found.

⁴⁷ Univ. of Penna. Med. Bull., October, 1903.

⁴⁸ Osann's 12. Jahresbericht des poliklinischen Instituts zu Berlin, p. 23; Edinburgh Med. Jour., 1828, xxx, 217.

Sugar was present again in the third pregnancy, at the termination of which the mother was safely delivered of a small child. Death took place, however, one month later, in coma.

This case belongs also in the next category, being one in which the diabetes recurred during pregnancy after having previously been present temporarily.

F. A. Packard⁴⁹ reports the case of a woman, aged forty-one years, in whom symptoms of diabetes were present during each of four pregnancies, disappearing, however, in the intervals, but persisting after the last. The gravity of the symptoms increased progressively with each succeeding pregnancy and all terminated in miscarriage.

M. A. Tate⁵⁰ reports the case of a woman, aged thirty-five years, in whom symptoms of diabetes were observed in the third month of her second pregnancy and miscarriage took place in the fourth month. Sugar had disappeared from the urine one month afterward. Similar symptoms appeared in the third month of the third pregnancy, the course of which, however, was not interrupted. Labor terminated normally and the sugar disappeared from the urine.

III. CASES IN WHICH DIABETES RECURRED DURING PREGNANCY AFTER HAVING PREVIOUSLY BEEN PRESENT TEMPORARILY.

M. Graefe⁵¹ reports the case of a woman, aged thirty-seven years, who several years following the birth of her sixth child presented symptoms of diabetes, which, however, disappeared under treatment. Fifteen months later she became pregnant for the seventh time and the symptoms of diabetes returned. In the seventh month foetal movements ceased and a dead foetus was delivered. The mother improved for a time, but subsequently grew worse.

W. Liepmann⁵² reports the case of a sextipara, aged thirty years, with a previous history of diabetes mellitus, but whose labors had always taken place normally. Polyuria, glycosuria, and albuminuria, with hydramnios, were discovered about the fifth month of pregnancy. Two months later the membranes were ruptured and 11 or 12 liters of fluid evacuated. The foetus was extracted with some difficulty and copious postpartum hemorrhage ensued. The sugar disappeared from the urine for a short time, but soon reappeared, and death took place nine days after delivery. In addition to degeneration of the kidneys, arteriosclerosis, and gastric ulcer, dissecting metritis was present.

J. Fels⁵³ reports the case of a woman, aged thirty-four years, who

⁴⁹ Univ. Med. Mag., 1888-89, i, 229.

⁵⁰ Amer. Jour. of Obstet., January, 1906, liii, 65.

⁵¹ Sammlung swangloser Abhandlungen aus dem Gebiete der Frauenkrankheiten und Geburtshilfe, 1898.

⁵² Archiv f. Gynäk., 1903, lxx, 426.

⁵³ Wien. med. Presse, 1905, 13, 627.

some time after her third pregnancy presented symptoms of diabetes. These cleared up under treatment, but reappeared later, in a fourth pregnancy, again disappearing under treatment. The woman was delivered of a normal living child at term, but died three years later, in coma.

IV. CASES OF PREGNANCY IN DIABETIC WOMEN.

Lecorché⁶⁴ reports the case of a woman, aged twenty-eight years, who was found to be diabetic following the birth of a child six years previously. The infant also became diabetic. Two years subsequently the woman became pregnant again and gestation went on to favorable termination.

Two cases of Newman are cited (Duncan). Both occurred in women, aged thirty-six years. In one diabetes developed during or perhaps before the first pregnancy, which terminated in normal labor, and it persisted throughout two succeeding pregnancies. The second pregnancy and parturition also were normal. In the third pregnancy the child was born dead at six or seven months and the mother died three days later. In the second case diabetes was observed in two pregnancies. The children were born alive, but the mother died in coma two years after the birth of the last child.

Duncan cites a case of Seegen in which three pregnancies occurred during the course of diabetes. All ended in miscarriage in the fourth or fifth month, with death of the mother after the last.

F. Minot⁶⁵ reports the case of a woman, aged twenty years, who in the fifth month of pregnancy was seized with vomiting after a hearty meal, gradually became unconscious and died two days later. When first seen, six months previously, she presented the usual symptoms of diabetes, passing, in twenty-four hours, seven pints of urine containing large amounts of sugar.

H. Ludwig⁶⁶ reports the case of a woman, aged forty-two years, who in her ninth pregnancy presented symptoms of diabetes of two years' standing. In the eighth month the abdomen became greatly distended and acetone and diacetic acid appeared in the urine in addition to sugar. The membranes were ruptured and an excessive amount of amniotic fluid evacuated, followed by a macerated fetus. The mother's condition steadily improved. The amniotic fluid contained dextrose (0.30 per cent.).

In the course of a discussion before the Obstetrical Society of London, Griffith⁶⁷ referred to a case of diabetes of some years' standing, in a woman who became pregnant and passed through pregnancy and labor without any sign of danger.

⁶⁴ *Archives générales de médecine*, 1882, 1, 385.

⁶⁵ *Boston Med. and Surg. Jour.*, January 19, 1888, 69.

⁶⁶ *Centralbl. f. Gynäk.*, March 16, 1895, 11, 281.

⁶⁷ *Lancet*, June 23, 1906, 1761.

An analysis of the foregoing cases shows that in the vast majority, namely 27, diabetes occurred as a complication of pregnancy, while in only 8 did pregnancy occur in diabetic women. Among the former diabetes recurred in four successive pregnancies in 1 case, and in two successive pregnancies in 3 cases. In 3 cases diabetes recurred during pregnancy after having previously been present temporarily. Two diabetic women became pregnant thrice and 1 other pregnant twice.

The association of pregnancy and diabetes was noted at almost all ages between twenty and forty-two years, without especial prevalence at any one period. It occurred most commonly in the first, second, and third pregnancies, although it has been observed also in later pregnancies, up to the eleventh. The existence of the diabetes was recognized in the majority of cases in the first half of pregnancy, although in these, as in the others, it may naturally have existed prior to its detection.

Death of the fœtus resulted in the predominance of the cases, namely, in 28 as against 11, either during the continuance of pregnancy or as a result of miscarriage or premature labor, spontaneous or induced. In a considerable number—8—hydramnios existed, the amniotic fluid containing sugar in 4 instances. One infant became diabetic.

Of the mothers 19 died at varying periods following delivery, and 4 of these after temporary improvement. In 3 the diabetes persisted, in 1 it grew worse after temporary improvement. In 7 cases diabetes was present in successive pregnancies. Improvement or recovery took place in 10 cases. My own case is unique in the disappearance of the glycosuria with the advent of pregnancy and its reappearance a short time after delivery.

SUMMARY. There is evidence to show that the power of assimilating carbohydrates is diminished in conjunction with pregnancy, and this deficiency may be manifested by the appearance of sugar in the urine.

Transitory glycosuria toward the end of pregnancy or during the puerperium may be considered physiological and related to the activity of the mammary glands in the secretion of milk; therefore, a resorption phenomenon.

Diabetes is an uncommon complication of pregnancy, partly because the disease is, in general, less common in women than in men, but principally because diabetes occurs, as a rule, at a later period of life than pregnancy usually takes place. Occasionally diabetes has been noted in two or more successive pregnancies.

Pregnancy occurs even more rarely in diabetic women, partly because, in addition to the reasons already given, of the deprived nutrition of the diabetic patient and of the disordered function and structure of the internal generative organs.

The complication of the one condition with the other usually

increases the gravity of both. Often the foetus dies *in utero*, and miscarriage or premature labor takes place, or the child may die during birth or shortly afterward. The child also may be diabetic. The liquor amnii has been found increased, and in some instances also to contain sugar. The mother often dies of the disease, sometimes during pregnancy or in childbirth or shortly afterward.

Accordingly, a diabetic woman should not marry; or if married she should not become pregnant. In the event of a diabetic woman becoming pregnant or of a pregnant woman becoming diabetic, pregnancy need not be interrupted artificially unless some special indication arises. If the woman is safely delivered she should not nurse her child.

HYPERTHYROIDISM.

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A TYPICAL case of Graves' disease, with the cardinal and subsidiary symptoms all characteristically grouped, is diagnosed without difficulty. In the pure type of the disease, the five cardinal symptoms occupy the foreground of the clinical picture with the various secondary functional manifestations present, but less constant and intense. The diagnosis becomes somewhat difficult if the secondary symptoms are predominant, with but one or two cardinal indications present. Most recent writers on the subject refer, with more or less emphasis, to this class of cases, and there is an apparent disposition to distinguish a mild and temporary from the essential or chronic form of Graves' disease. The attempt to draw a sharp line of distinction has little vindication from practical experience, since we are constantly observing a gradual transition and eventual termination of the mild in the severe and fully-developed disease. In the clinical valuation of the different grades of thyroid toxemia, or Graves' disease, the matter stands much in the same light as the inter-relationship of the glycosuria and diabetes. It is only in perspective that we are able to estimate whether a functional perversion is the expression of some essential malady, or merely a mild and transient reaction to irritation. The necessity for the proper recognition of these atypical forms of Graves' disease is great, in consideration of the fact that the disease, so far as we can now tell, is one and the same, whether we call it complete or incomplete—difference being a matter of degree only. Various names have been applied to these mild types of the disease. They have been designated "aberrant types," "pseudo-Graves'," "formes frustes," "larval types." The term