can be administered, and the introduction only retards repair. I believe this operation, if dexterously performed, not to be a fatal one, and have, as faithfully as I can remember, described each step of my operations, hoping the description may be of use to others when called on to perform pharyngotomy.

The lithographs, executed by Messrs. Forster & Co., accurately represent John O'B. after the operation; also the needle which was extracted, and the tumour removed from the pharynx, described in the second case recorded.

ART. XVIII.—*On the Connexion of Acute Diabetes with Disease of the Pancreas.*^a By GEORGE F. DUFFEY, M.D.; Fellow and Censor K.Q.C.P.I.; Physician to the City of Dublin Hospital, &c., &c.

As the pathology of the case that furnishes the following remarks will be described by Mr. Abraham, and illustrated by microscopic sections of the pancreas and nervous centres made by him, I shall confine myself to a brief description of it, and to a discussion of the probable relationship between disease of the pancreas and diabetes.

Clinically the case was one of acute diabetes, or that type of the disease described by Lancereaux under the term of *Diabète maigre*, or emaciating diabetes. It was altogether of only two months' duration—dating from the recognition of symptoms by the patient—and its rapid course terminated, after a sudden onset of vomiting and diarrhoea, in death by coma.

CASE.—The patient was a country farm labourer, over six feet in height, and well made. His age was twenty-four, but he looked older. He was married, the father of one child, and he stated that he had always enjoyed "the best of health" until about five weeks before his admission to the City of Dublin Hospital, under my care, on the 18th October, 1883. His parents were dead; he had two brothers and two sisters alive and healthy. The first symptoms of his illness that he noticed were polyphagia, polydipsia, polyuria, and emaciation. After about a fortnight he began to feel languid and weak; he did not sleep well, and he found that he had lost a stone in weight. He could not assign any cause for his illness with the exception of his having had to work very hard during the harvest.

^a Read before the Pathological Section of the Academy of Medicine, Friday, February 29, 1884.

Upon admission he presented the usual symptoms of an advanced case of diabetes mellitus. He seemed remarkably apathetic, and rarely spoke unless in answer to a question. He preferred staying in bed to getting up, stating that he did so because he got so easily tired. During his stay in hospital the amount of highly saccharine urine he passed in the twenty-four hours varied from 215 to 170 ounces, and its specific gravity from 1045 to 1040. It had a sweetish odour, and gave the reddish-brown colour on the addition of a solution of ferric chloride, said to be due to the presence of ethyl-diacetic acid. For ten days he continued much in the same state as he was upon admission, when, without evident cause, his bowels, which had been constipated, became exceedingly loose, and vomiting also supervened. He complained of pain in the epigastrium, and the abdomen was tender on pressure. The diarrhœa persisted for a week. The stools were somewhat of a dysenteric character, being very frequent, but small in quantity, of a jelly-like consistence, and extremely fœtid. For the first two or three days they contained white masses resembling lumps of undigested caseine, but these disappeared on giving him his milk peptonised. He had now completely lost his voracious appetite, but was even more thirsty than upon admission. The debility and emaciation increased, and he became extremely low and despondent. On the evening of the 3rd of November his temperature, which had been previously normal, rose to 100°, but subsequently his extremities became very cold and his pulse quick and so weak as to be almost imperceptible. He sank then into a state of coma, or, as Dr. Wilks^a more correctly perhaps would term it, of collapse, and died on the morning of the 6th November. During this latter period his face was flushed. He lay upon his back with his mouth open, and exhaled a sweet smell from his breath, but I cannot say that it was a characteristic one of acetone. His respiration was rapid, but no physical signs of pulmonary disease were elicited on examination.

The *post mortem* examination was made the day after death. Nothing remarkable was observed by the naked eye in the appearance of the organs removed, with the exception of the pancreas. This gland was hypertrophied and felt extremely indurated, the hardness being due, as Mr. Abraham's examination shows, to carcinomatous infiltration.

That a diseased state of the pancreas is frequently found after death associated with cases that presented all the symptoms of diabetes during life, is as well known as it is remarkable. According to Senator,^b "diseases of the pancreas are present in about half of all the cases of diabetes." Even a larger proportion is shown in the tables compiled by Dr. Windle, of Birmingham, who, in his

^a Med. Times. Jan. 19, 1884. P. 78.

^b Ziemssen's Cyclopædia. Vol. XVI, p. 887.

valuable Report on "The Morbid Anatomy of Diabetes"^a has collected 74 cases in which the pancreas was found diseased in diabetes out of a total of 139 cases in which the condition of the gland was referred to. Seegen, too, has found atrophy of the pancreas in 15 out of 30 autopsies he has noted of diabetic patients; and Bouchardat also attaches great importance to the state of the pancreas in this disease.^b

M. Humbert Mollière, in his elaborate article on the Pancreas in the *Dict. de Méd. et de Chirurgie*, t. XXV., 1878, referring to the frequency with which alterations of that organ have been met with in diabetes, says that such observations evidently prove that in certain cases diabetes is accompanied by more or less serious, but always very extensive, lesions of the pancreas; and he further makes the interesting remark, which is borne out by my case, that in all such cases the evolution of the disease was rapid and the termination quickly fatal. The results following experimental obliteration of the pancreatic canal in animals—viz., ravenous appetite and rapid emaciation, to which they eventually succumb, would appear to throw some light upon the peculiar type of the disease.

Several recent writers, including Jaccoud, Roberts,^c Niemeyer,^d and Aitken,^e also mention the connexion between disease of the pancreas and diabetes. The two latter authorities, however, refer only to its being found hypertrophied, but it would seem from a rough analysis of the cases I have met with in the available literature of this subject that I have consulted that the gland has more frequently been found atrophied than hypertrophied in this connexion. In all of Seegen's 15 cases already mentioned the pancreas was atrophied.

This difference in the condition of the pancreas in different cases of the same disease may, perhaps, be explained by the supposition that the atrophy is a sequence of the hypertrophy; and that in those cases of diabetes which have been of some duration the pancreas may at first have been enlarged, and subsequently have become atrophied; but that in acute cases of the disease there had not been sufficient time before the patient's death for the

^a *Dubl. Jour. of Med. Sci.* August, 1883.

^b N. Th. Klein. *Rev. des Sci. Méd.* Tome VII., p. 797.

^c *Theory and Practice of Medicine.* Fifth Edition, p. 298.

^d *Text-Book of Practical Medicine.* Vol. II., p. 773.

^e *Science and Practice of Medicine.* Vol. I., p. 1051.

atrophic change to occur, which generally follows primary inflammatory enlargement of the gland.

Cyr^a in a recent brochure (analysed in the *Rev. de Sci. Méd.*, t. XIX., p. 535, from which I quote) asks if atrophy of the pancreas, instead of inducing the production of diabetes, may not, on the contrary, be determined by the diabetes itself. He reminds us that diabète maigre, an essentially wasting affection, sometimes induces atrophy of the liver, of the stomach, &c. Atrophy of the pancreas, according to him, would then be a result of the process of exaggerated non-assimilation which characterises diabète maigre. This argument, of course, would not apply to the cases in which the pancreas was hypertrophied.

On the other hand it must be admitted that although disease of the pancreas is comparatively rarely found, even when looked for, there are sufficiently numerous cases on record to prove that the pancreas may be the seat of disease apart from any glycosuria. For example, in Dr. C. Handfield Jones's "Observations Respecting Degeneration of the Pancreas,"^b in which thirty cases are recorded, diabetes, as a co-existing morbid condition, is not mentioned. And in Dr. Norman Moore's table of thirty-nine cases of cancer of the pancreas, met with in the records of *post mortems* at St. Bartholomew's Hospital, from the year 1867 to the year 1881^c, no note is made of its being associated with diabetes. In Vol. II. of the "Transactions of the Pathological Society of New York,"^d thirteen cases of diseased pancreas are reported, in none of which was disease met with. I have numerous references to other cases of morbid changes in the pancreas unassociated with diabetes.

It may be also remarked that several writers on diabetes, including Dr. Dickinson, whose monograph on the disease is so well known, make no reference to its connexion with lesions of the pancreas. That there is, however, some association between the two cannot, I think, be doubted. M. Lancereaux in a paper communicated to the *Académie de Médecine* for November, 1877,^e drew attention to a special and distinctive form of diabetes, distinguished by a sudden commencement, and an especially rapid evolution, found in conjunction with pancreatic lesions. M. Depierre, in

^a *Étude critique sur quelques travaux récents concernant l'anatomie pathologique du diabète.* Paris, 1880.

^b *Med.-Chir. Trans.* Vol. XXXVIII. 1855.

^c *St. Bartholomew's Hosp. Reports.* Vol. XVII., p. 205.

^d *New York, 1877.* P. 219.

^e *Lond. Med. Record.* 1877. P. 513.

1880,^a published further facts in the same connexion, showing that this so-called pancreatic diabetes was characterised by a sudden explosion of symptoms which reached an acme in a few weeks. The habitual presence of diarrhœa, as in my case, is also noted; and rapid emaciation and extreme prostration are also pathognomonic of this acute variety of the disease.

The nature of the connexion that exists in these cases is still theoretical. Klebs's view, as stated by Senator, is that the co-existence of diabetes mellitus and diseases of the pancreas depends upon lesions of the cœliac plexus. Either the disease (cancer, formation of calculus, and inflammation of the surrounding tissue) starts from the pancreas, encroaches upon the plexus, and gives rise to diabetes by destroying its ganglia, or else the cœliac plexus is first affected, and in consequence thereof circulatory disturbances arise in the territory supplied by the cœliac artery, which lead to degeneration and atrophy of the pancreas.^b Dr. Shingleton Smith,^c however, has made numerous observations as regards the condition of the sympathetic ganglia in diabetes without finding any uniform or definite change, and Dr. Dickinson has generally found them to be healthy.^d In Windle's tables they were normal in eight out of seventeen cases, and the changes noted in two other of the cases appear unimportant. Dr. Lauder Brunton^e after stating that reflex inhibition in the liver may, probably, follow irritation of the encephalon, and possibly, also, of sympathetic ganglia, as well as of the roots, trunk, and branches of cerebro-spinal nerves, says—"There is another possible cause of increased formation of sugar in the liver; and that is, a greater proportion of diastatic ferment in it or in the blood which flows through it. . . . We do not know whether this ferment is peculiar to the blood or whether it is ptyalin or pancreatic ferment absorbed from the intestines. . . . The increased secretion of a hypertrophied pancreas may thus not only act by quickening the conversion of starch into sugar in the intestines, but by increasing the transformation of glycogen after its absorption into the blood. But atrophy of the pancreas (as we have seen) is quite as common a lesion in diabetes as hypertrophy; and, if we suppose, as is usually done, that the only function of the pancreas is that of forming ferment, it is difficult to explain the

^a Ibid. 1880. P. 150.

^b Ziemssen. Loc. cit. P. 888.

^c Brit. Med. Jour. Vol. I., p. 657. 1883.

^d Ibid. P. 864.

^e Ibid. Vol. I., p. 864. 1874.

occurrence of diabetes under these conditions, except on the supposition that in both of them the nerves of the organ are irritated, and cause reflex dilatation of the vessels of the liver in the same way that irritation of the liver itself does. But if we suppose that the pancreas not only forms ferment, but also excretes ferment already circulating in the blood, in much the same way as the liver both forms and excretes bile, we at once see that the diastatic ferment which Hüfner supposes to be found in many parts of the body may accumulate in the blood, because the pancreas can no longer excrete it, and thus lead to diabetes." Dr. Lauder Brunton, however, confesses that this explanation will seem to many persons too hypothetical, and that of irritation of the pancreatic nerves and reflex dilatation of the hepatic vessels will appear more probable.

With regard to the special nature of the pancreatic lesion in my case, I shall only remark that I have met with reports of several cases in which cancer of the pancreas has been observed. M. Ancelet, in his *Études sur les Maladies du Pancreas*,^a has collected 195 observations of this kind. The disease is sometimes primary, sometimes secondary, and either the whole or a part of the gland may be engaged. Carcinoma, according to Orth,^b is the most common form of morbid new growth in the pancreas. "In its primary form it usually takes the form of hard, fibrous nodules scattered throughout the organ, or else of a uniform scirrhous enlargement; more rarely colloid cancer and cylindrical-celled epithelial cancer have been observed. Colloid cancer when it occurs involves nearly the whole of the organ."^c Under the name of adeno-sarcoma Dr. Norman Moore^d has described a form of a new growth in the pancreas, which appears not to have been previously met with.

A remarkable fact brought out by Dr. Stephen Mackenzie in the discussion on the pathology of diabetes, at the last annual meeting of the British Medical Association,^e was that all his cases with one exception dying at or below the age of twenty-five years died of coma; and that the rapid course of the disease, which as a rule is equivalent to its severity, favours the occurrence of coma. He also drew attention to a circumstance which he believes to be of important prognostic significance as influencing the occurrence

^a Quoted by Mollière. *Dict. de Méd. &c.* Loc. cit.

^b *Diagnosis in Pathological Anatomy.* P. 335.

^c *Trans. New York Path. Soc.* Vol. II., p. 219.

^d *St. Bartholomew's Reports.* Loc. cit.

^e *Brit. Med. Jour.* Vol. I., p. 655. 1883.

of coma, and that is, freedom from, or only slightly developed, affection of the lungs. My case bears out both these observations.*

From a consideration of the case I have brought forward and of other similar ones I have noted, it may, I think, be reasonably inferred that there is a peculiar form of diabetes of an acute type, most common in young subjects, in which the initial symptoms come on with marked brusqueness, and in which suddenly occurring intestinal symptoms usher in the fatal coma or collapse which is the usual mode of death characteristic of these cases, and that in this form of the disease especially are morbid lesions of the pancreas likely to be met with. The nature of the connexion, if any such exists, between pancreatic disease and diabetes remains, however, still as vague and undetermined as the pathology of glycosuria itself.

ART. XIX.—*On some Microscopical Sections from Two Cases of Diabetes Mellitus.*^b By P. S. ABRAHAM, M.A., B.Sc., F.R.C.S.; Member of Court of Examiners, and Curator of the Museum, Royal College of Surgeons of Ireland.

As the result of the interesting and important discussion on diabetes mellitus which took place last year at the Pathological Society of London, we may consider that at the present time we really know very little about the true pathology of that disease. Although nearly every organ of the body has been in various cases and at different times found in a diseased condition, no definite or fundamental lesion has been demonstrated to exist in all cases. Without alluding to the numerous other chemical and pathological theories which have been, from time to time, put forward, it may be remarked that since Claude Bernard's historic discovery of glycosuria following injury to the floor of the fourth ventricle, and in consequence of the frequent termination of diabetes mellitus by coma, observers have been naturally led in recent years to a minute examination of the nervous centres. Dr. Dickinson, indeed, and some others consider that they have found in connexion with the blood-vessels of the medulla and pons abnormal appearances enough to account for the functional perversion.

I have recently had the opportunity of examining certain of the

* *Vide* also Lindsay. *Dubl. Jour. Med. Sci.*, Oct., 1883.

^b Read before the Academy of Medicine in Ireland, Friday, February 29, 1884.