Take the list, supplied by a fashionable chemist, of the animal substances mainly available for the purpose of making an income for the manufacturer. Tabloids of cerebrine, spinal cord, pineal gland, pituitary gland, thyroid gland, uterine substance, ovarian substance, salivary gland, spleen substance, suprarenal substance, didymin, prostate gland substance, etc.

It is said that the use of the organs and parts of the body dates back to the earliest ages of medical practice; but we now seem to be pushing the doctrine of *similia similibus curantur* with a vengeance.

By an extension of the principle you might hope to tame a shrew by injecting her with the serum of a carefully-selected Mark Tapley, or cure a dipsomaniac by using that of an individual who demands that Parliament should prevent the manufacture of all forms of alcoholic drink. What we sadly want in Dublin is some strong stimulus for the development of scientific teaching and research work. Clinical medicine continues to hold the high position which it has always held, and the traditions inseparately bound up with the names of Graves, Stokes, Corrigan, and Robert Smith are fully maintained by the clinical teachers of the present day. Owing to many circumstances, the consideration of which it is unnecessary to enter upon here, we cannot claim that in scientific medicine we have reached the level of the German or French schools, and we have had to regard ourselves in physiology, pathology, and chemistry as largely their debtors, not alone in research work, but in the ordinary material for teaching. This is to some extent a humiliating admission, but it is one that is perfectly intelligible when one considers the apathy and indifference of the State to scientific progress here and in the sister country.

It seems to me that we are entering upon a new era, and that the establishment of a veterinary college in Dublin, supported by State funds, will supply the stimulus which is so desirable and so opportune. It will shortly, I believe, commence, under the direction of the Department of Agriculture and Technical Education in Ireland, research work in connection with rabies and the development of bovine tuberculosis.

If, as I hope and believe, we shall have established in connection with the Veterinary College a Jenner Institute for Dublin, may we not look forward to a great and flourishing centre of human and veterinary science which will redound to the credit of our country? In any movement which may be inaugurated to bring about this most desirable result, I sincerely trust the Royal Academy of Medicine will take an active, sympathetic, and a patriotic part.

ON THE OPERATIONS FOR CONGENITALLY MISPLACED AND UNDESCENDED TESTICLE,

WITH NOTES OF CASES OF CONGENITAL DEFICIENCY
OF THE TESTICLE.*

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MISPLACED TESTICLE.

THE condition of congenitally misplaced testicle, the result of some abnormal or faulty arrangement of one or more of the attachments of the gubernaculum, is not common. The situations in which such a misplaced testicle have been met with are; on one side of the perineum (most common), and in the region of the saphenous opening in the upper part of the thigh. A third and rare variety has also been described in which the testicle lay in front of the pubes at the root of the penis. When the testicle lies in one of these abnormal situations its presence may give rise to inconvenience, and should it be attacked with inflammation or other diseased conditions, or be complicated with a hernia, still more trouble may be caused.

In connection with operative interference one other fact is of great importance, that when a testicle remains out of its natural position in the scrotum it degenerates, and

its structure alters, so that its functions as a secretor of spermatic fluid are in time quite destroyed. This remark applies not only to the condition of misplaced testicle, but also to that in which a testicle is retained in the inguinal canal or abdomen. The very interesting experiments of Mr. Joseph Griffiths,¹ of Cambridge, on dogs, strongly confirm this fact, for he found that when he returned their testicles into the abdominal cavity they quickly degenerated, and soon no trace of the formation or presence of spermatozoa could be found when the animals had been killed.

I have met with two examples of misplaced testicle, both of which were perineal. The first case was one of a child, aged 3 years, which I recorded and figured in the *BRITISH MEDICAL JOURNAL* for January 4th, 1879, and was, I believe, the first case in which such a testicle had been successfully replaced and permanently retained in the scrotum. The late Mr. Curling, the author of the important work on *Diseases of the Testicle*, had previously operated on a similar case, but the organ slipped back into its abnormal position, and the operation therefore was not successful. As the successful result in my case depended upon certain details being carried out in the procedure, details which ever since I have successfully employed in operating also on undescended testicle, I desire to direct attention to them. They are as follows:

1. An incision is made so as to expose the spermatic cord and its junction with the testicle.

2. The cord and testicle are then drawn out and all attachments fixing the latter in its abnormal position are carefully divided.

3. The corresponding side of the scrotum is opened up with the finger and the testicle placed in it.

4. Two catgut or silk stitches are passed through those portions of the gubernaculum still attached to the testicle where they had been divided, and these same stitches are also passed through the base of the scrotum so as to fix the testicle in its proper position.

5. The opening through which the testicle had passed into the perineum is carefully stitched up by means of subcutaneous catgut sutures.

In this way the testicle is permanently fixed in the scrotum, and I had an opportunity of examining the patient several years after the operation, and found that the testicle had remained in its proper position. In this case the cord was long enough to permit the testicle to be placed in the scrotum, but if in operating in any case of this abnormality, or in the case of an undescended testicle, the cord be found too short, it may be considerably lengthened by a little traction and careful division of cremaster fibres and fascia surrounding the cord, care being taken not to injure the vas deferens or principal blood vessels.

The second case was similar to the first, but in a patient aged 18. He was not under my care.

The operation for replacing a misplaced testicle is therefore in my opinion to be urged and carried out in early childhood for a successful procedure such as has been described certainly gives the testicle a chance of developing properly.

UNDESCENDED TESTICLE.

When a testicle shows itself outside the abdominal cavity, not having passed properly down into the scrotum, it also is an inconvenience, and may give rise to much trouble should the organ be injured or become diseased. The complication of hernia in such cases is another cause of trouble, and may be attended with risks. When the condition is met with in childhood, an attempt to bring down the organ by operation should, I think, be made, as the testicle will not develop properly unless it is placed and retained in the scrotum. It is true that such undescended testicles are usually small, and more or less atrophied, but I say give them their only chance of developing by putting them in their proper place. Should one testicle be properly developed and situated in the scrotum, the operation upon an undescended neighbour need not be so strongly advocated; but when both testicles have not thoroughly descended, or when one is retained in the abdomen and the other has not reached the scrotum, by all means operate at an early period of life.

The complication of hernia with undescended testicle also usually calls for operation, as it is difficult to apply a truss, and such application may still further interfere with the

* Read before the Edinburgh Medico-Chirurgical Society.

natural descent of the testicle. In the case of an adult I always excise the undescended testicle when operating on the hernia, for the former is of no use as a testicle, and its removal allows the external ring and inguinal canal to be more thoroughly closed by a "radical" operation on the hernia. In young people I endeavour if possible to bring down the testicle and fix it in the scrotum, and at the same time perform a "radical" operation on the hernia, but if one good and properly-placed testicle were present, I should not be so anxious to preserve the undescended organ.

In operating on cases of undescended testicle I have for many years carried out the details already described, and in my last four cases I have added another detail, and this is to pass the stitches not only through the remains of the gubernaculum and scrotum, but also through the skin on the inner side of the thigh, so as to have a steady traction on the testicle and corresponding side of the scrotum. In one of these cases the patient was a fine lad of 15, whose right testicle was retained in the abdomen, and the left one lay in the inguinal canal close to the external ring. The operation carried out in this case, and in the other two, was most successful, and the first patient is now at a public school playing football and other games.

CASES OF CONGENITALLY DEFICIENT TESTICLE.

Congenital deficiency of the testicle is a comparatively rare condition, and I am glad, therefore, to be able to offer brief notes of two cases recently under my care, more particularly as I have by operation obtained the preparations from them, and so have verified their exact condition.

Fig. 1 illustrates the condition in Case 1, with a portion of the tunica vaginalis still attached to the convolutions of the vas deferens.

CASE 1.—M. J., aged 18, was brought to me by his father in order to have my opinion as to some abnormal condition of his left testicle. This condition had existed since birth, and was giving rise to some uneasiness. There was no history of any accident or other trouble, and the patient was a strong and well-developed young gentleman. On examination the left side of the scrotum was seen to be small; at its upper part there could be felt a body much smaller than a natural testicle, soft to the touch, and having an absence of the ordinary testicle sensation when pressed. The corresponding cord felt natural, and the right testicle was placed properly in the scrotum and was well developed. It was decided to explore the body in the scrotum, which felt somewhat like an atrophied testicle which had not passed sufficiently down. An incision exposing the cord and upper part of the scrotum having been made, the following condition was found. The cord was natural in structure, passed out through the external ring, and ended in the body already referred to, which on examination was not a testicle. The cord was then divided just outside the external ring, its vessels secured, and it, together with the body (the latter of which was firmly attached to the scrotum), was removed. The margins of the external ring were then brought together by two or three catgut sutures. The wound healed rapidly, and this month I had an opportunity of examining the patient, and found the parts operated upon quite sound.

CASE II.—J. M., aged 26, admitted into my wards on October 16th of this year, for a condition almost identical with the first case. He was a strong, well-developed young man, and had no history of any accident or

trouble, but stated that the left side of the scrotum, and its contents had been present from birth. The right testicle was sound, and in proper position. As in the former case the left side of the scrotum was contracted and small, and contained at its upper part a body somewhat more elongated, but much less in size than an ordinary testicle, and having no proper testicular sensibility. The cord felt natural, and passed out through the external ring, ending in the elongated body, which was fixed to the scrotum. As the condition was causing anxiety to the patient I explored the cord and body, and finding, no

Fig. 2 is taken from Case 2, the tunica vaginalis having been dissected off.

testicle I excised both, as in the first case. The wound healed quickly, and the patient was going about again on the 5th of this month quite well and with his mind relieved. As the parts removed by operation in both these cases were similar one description of their exact condition will suffice. For this description I am indebted to Dr. Dowden, who was good enough to dissect them for me. The vas deferens was well developed, and could be traced down to the lower part of the body situated in the scrotum. When approaching the body it assumed a series of tortuous curves which terminated in a closed end. There was no trace of any testicle or testicle substance. Around the body, and closely adherent to it, and to the different convolutions of the vas, was a dense firm membrane, the inner surface of which was vascular. The body in the scrotum then in both cases consisted of convolutions of the vas deferens bound together with the same fibrous bands, and surrounded by a dense membrane which in all probability represented the tunica vaginalis, which was quite shut off from the general peritoneal cavity.

Fig. 3 is taken from a photograph of Case 3 before operation.

Both these cases must, I think, be considered examples of the rare congenital condition of "absence of the testicle only," this condition being explained by the fact that the testicle and epididymis are independently developed.

Mr. Jacobson, in his valuable work on *Diseases of the Male Organs of Generation*, states that only four or five of such cases have been recorded. Godard, in his *Recherches sur la Substitution Graisseuse du Rein*, records and figures a case not unlike mine, but in his case an open process or sac of peritoneum passed down along the vas deferens. Mr. Jacobson, in his

work already referred to, mentions that the following different deficiencies have been met with :

1. Absence of the testicle only (left one most frequently absent), and this may be unilateral or bilateral.
2. Absence of the testicle, epididymis, and more or less of the vas deferens (most common).
3. Absence of the whole apparatus.
4. Absence of all or part of the excretory apparatus, the testicle being present.

When such deficiencies are unilateral, and the other testicle and its apparatus are natural, the sexual functions and the bodily and mental power are not necessarily interfered with, as exemplified in my two cases, but if bilateral the patients are sterile, and in addition the other genital organs are usually so feebly developed that they are also impotent.

ANOTHER CASE OF CONGENITALLY MISPLACED TESTICLE.

Since reading this paper before the Society I have operated upon another interesting case of congenitally misplaced testicle.

CASE III.—The patient was a well-developed boy, aged 16, who applied to me in connection with trouble in his right testicle. On examination the right side of the scrotum was small and much contracted; it contained no testicle or cord, and was quite empty and closed. A small testicle was present at the side of the upper part of the perineum and its cord could also be felt passing out through the external ring. At times the testicle and cord disappeared and passed up into the inguinal canal, just below the internal ring. The left testicle was normal and in its proper position. As the right testicle, meanwhile, was giving rise to inconvenience, the boy's father asked me to operate. An incision was therefore made from a point opposite the external ring down to the upper part of the scrotum. At this time the cord and testicle were drawn up into the inguinal canal and so were not exposed by the incision. After a little dissection a sac, much resembling the sac of a hernia, was disclosed, and was carefully separated from surrounding tissues. This sac was opened, and was found to be the tunica vaginalis, which was patent for some distance up the inguinal canal but did not communicate with the general peritoneal cavity. Below the tunica vaginalis ended at the upper part of the scrotum, where it was firmly attached but quite closed. Coming off from this portion of the sac was a diverticulum, which admitted the finger readily and passed down towards the perineum for an inch and a-half. It was into this diverticulum that the cord and testicle passed when they descended from the inguinal canal. Having introduced a finger into the inguinal canal and made some traction upon the upper part of the tunica vaginalis, the testicle was easily drawn down, and, its attachments being carefully divided, it was placed in the scrotum and secured there in the method already described. The greater part of the tunica vaginalis and its diverticulum were then excised, a ligature having first been applied above the point of their excision.

The testicle in this case was small but apparently fairly well developed, but the epididymis was not properly developed, the vas deferens ending in a few convolutions at the point of its junction with the testicle.

In this case I passed the stitch securing the testicle to the bottom of the scrotum, through the skin on the inside of the opposite thigh, as I found that this gave traction more directly in the natural line of the cord than when the traction was made from the same side.

In conclusion, operative interference cannot, of course, be of service in such cases of deficiency, but it may, I think, be justifiable in order to remove a condition giving rise to local or mental irritation. If complicated with hernia, an operation may be necessary in order to relieve the hernia.

REFERENCE.

¹ *Journal of Anatomy and Physiology*, vol. xxvii.

FUNDAMENTAL POINTS CONNECTED WITH THE PATHOLOGY OF DIABETES MELLITUS.*

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THE primary point to be dealt with in connection with diabetes mellitus is that carbohydrate, in the form of sugar, is eliminated with the urine in a manner that does not occur in health. From this it follows that in diabetes an inaptitude exists within the system for the proper application of carbohydrate matter to the purposes of life. Thus, briefly stated, diabetes consists fundamentally in a mal-application of carbohydrate through an error existing somewhere or other within the system.

The amount of carbohydrate reaching the system from the food is exceedingly variable, but under natural circumstances

no matter what amount, within ordinary limits, is ingested, it does not afterwards become visible to us. All that is observable is that it disappears from view, and that the system derives benefit from it. Exactly the reverse is met with in diabetes. Instead of disappearing from view, the carbohydrate reaching the system from the food is afterwards discoverable in the urine as sugar. Proportionately to the amount of carbohydrate ingested is sugar discoverable in the urine.

Penetrating further, the blood of the general circulation is found to stand in a similar position to the urine. Normally, there is in the urine a certain small proportion of sugar which is not to any sensible extent influenced by the character of the food. Normally, also, in the blood, there is a certain standard amount of sugar present irrespective of the nature of the food. There is no difficulty in definitely expressing its quantity, which may be said to stand at somewhere about 1 per 1,000. It seems to be a standard component of the blood just as we find sugar entering as a constituent into the various tissues of the body; and, moreover, it is susceptible of being shown¹ that, as in the tissues, the sugar is not solely dextrose, but dextrose associated with other cupric-oxide reducing carbohydrate so as to give rise to a product possessing a cupric-oxide reducing power considerably below that of dextrose. Such is a representation of the normal state, and the small amount of sugar present in the urine corresponds, it may be considered, with that existing in the blood.²

Concurrently with the outflow of sugar in diabetes there is an increased amount recognisable in the blood. The sugar eliminated has pre-existed in the blood, and the fault lies in its having been there. Carbohydrate food now leads to the undue presence of sugar in the contents of the circulation, and it is by virtue of this that it appears in the urine. The sugar escaping may be taken as an index of the sugar that has wrongly been present in the blood.

The point is thus reached that diabetes is fundamentally connected with the wrong presence of sugar in the blood, and the question that next presents itself is, To what cause is the wrong presence attributable? Can it be that the carbohydrate of our food naturally reaches the general circulation as sugar, and through failing to disappear accumulates and thence passes into the urine, or is it that the carbohydrate ought not in reality to reach the general circulation, and by wrongly doing so renders itself evident in the manner that is observed?

The amount of sugar that escapes in diabetes gives a measure of the amount of sugar that would reach the circulation from the food and have here to disappear if this constituted the natural course of events. Everything conspires to show that it is quite impossible that such an amount of sugar could enter the circulation and not be revealed in an unmistakable manner by the urine. Indeed, in proportion as sugar in any way reaches the circulation so is an effect produced upon the urine.

For sugar to reach the circulation and not influence the urine there ought to be the capacity in the blood of immediately effecting its disappearance, inasmuch as a part of the blood goes direct to the kidney where elimination would occur of a portion of the sugar. No such capacity, however, has been shown to exist, and this affords an insuperable objection to the destiny of carbohydrate matter being its transit as sugar through the general circulation. Reliance has been placed upon old experiments which represent a marked loss of sugar during the passage of the blood through the capillaries from the arteries to the veins. I confidently assert that the results given will not stand the test of examination. The figures are altogether discordant with those definitely known to belong to the normal state. As I have pointed out in my *Physiology of the Carbohydrates* published in 1894, the experimental procedure is exceedingly open to fallacy in various directions. In my own experiments, where the utmost precaution was taken to escape from fallacy, no practical difference was discoverable in the amount of sugar in arterial and venous blood and my results have been confirmed by many authors. Bing has recently published³ experiments dealing exhaustively with the whole question of the presence of sugar in blood and concludes from his observations that if any difference exists in the amount of sugar present in the various parts of the circulation it must be so small as to lie within the limits of error of observation as he is unable to find any.

* Read at the thirteenth International Medical Congress held in Paris.