In nearly every recorded case there has been an imperfect development and an imperfect descent of the testicle, the separation of the body of the organ from the epididymis by a long mesorchium being a constant feature. Now when a testicle so loosely fashioned has to travel from the region of the kidney to the groin, passing through the inguinal canal, it surely is not improbable that during this gubernacular slide some degree of rotation might occur.

The attachment of the gubernaculum to a long mesorchium would certainly add to the probability of torsion occurring during the journey. I have endeavoured to illustrate this in the accompanying diagram.

A, Plica vascularis. B, Gubernaculum. C, Mesorchium. D, Body of testis inverted. E, Epididymis.

When the body of the testicle alone is rotated, or the whole organ twisted upon the cord, the vessels of the mesorchium or of the cord would of necessity be involved; and the more complete the twisting the more precarious would be the vascular supply. If the twist were a slight one—say, merely half a turn—the blood vessels might still be able to deal satisfactorily with a sudden vascular change; but should the twist be one of three or four half turns, then a sudden turgescence of the organ, from whatever cause, would not improbably result in thrombosis.

In the *BRITISH MEDICAL JOURNAL*, vol. i, 1897, Dr. M. R. Taylor relates a case of torsion of the testis in a newborn child. Nothing abnormal was noticed at the time of birth, but four hours later the nurse noticed that the right testicle was slightly larger than the left, and the skin of the scrotum was discoloured. Two days later the child was given an anaesthetic, and the testicle was removed. It was sent for examination to Mr. C. B. Lockwood, who reported as follows: "The spermatic cord is very thin, and twisted apparently just above the tunica vaginalis. The whole cavity of the tunica vaginalis and the whole testicle and epididymis were full of congested blood. The clot runs $\frac{1}{2}$ in. up the cord as far as the twisted part."

Though the testicle was in the scrotum, this is clearly a case in which intense congestion was due to a congenital twist of the cord, for this is the only reasonable explanation of the clinical symptoms and of the pathological findings. In the case of torsion of an inguinal testis where there is a clear history of a blow or strain, and in which it is believed that the torsion occurred suddenly as the result of the blow or of a muscular effort, it would appear more probable that in such cases some degree of torsion had existed since birth, and that the injury produced a venous engorgement of the organ which, owing to the precarious vascular supply, resulted in thrombosis.

In about 70 per cent. of recorded cases the symptoms have occurred before 20 years of age, and nearly 50 per cent. of them were observed at puberty. It is surely not unreasonable to suppose that, granted some degree of torsion of the vessels supplying the testicle, the sudden vascular changes which are known to take place at this time of life might readily result in excessive congestion and thrombosis. The view I am advocating receives additional support from a fact that in a certain number of cases the trouble originated during sleep. Slight degrees of torsion may be present without producing symptoms, and must have been observed by surgeons when operating for hernia associated with an undescended testicle.

It is of course impossible to advance direct evidence in support of my view, but I would submit that all the circumstantial evidence available makes it appear probable that torsion of the testicle is primarily of congenital origin and not acquired.

ACUTE EPIDIDYMITIS PRODUCED BY MUSCULAR STRAIN.

By J. W. GEARY GRANT, F.R.C.S.ENG.,
CARDIFF.

I READ with much interest the article in the *JOURNAL* of April 13th, p. 832, by Dr. Arnold Edwards, describing in a very exhaustive manner two cases which he considers bear out the theory that epididymitis may be caused by strain. The conclusions drawn therefrom are of considerable importance in their medico-legal relations, and are worthy of a somewhat close scrutiny and analysis. For if it be established that a muscular effort or strain can cause epididymitis, then it could quite conceivably follow that so serious a condition as tuberculous testis might owe its origin to the same cause—the sequence being obviously strain, effusion into epididymis, and inflammation upon which tuberculous infection is grafted. I cannot put my hand on the record now, but unless my memory is at fault, I have heard such a case successfully argued in court. From the employer's point of view it is rather a serious position.

I have met with two cases which present considerable similarity to those given with such detail by Dr. Edwards, although I regret that circumstances did not permit of my investigating them so closely as he did, and that the urine was examined in neither.

CASE I.

A. B., aged 39, on Thursday, whilst standing on two joists of a flooring with the feet about 16 in. apart, swung round a plank from the scaffolding, and as he did so "felt a slight sting in the right groin." No squeeze or blow. Pain was felt in groin, not testis; it was so slight that it did not cause him to stop his work, even momentarily. He felt slight soreness in groin, but continued working up to Sunday, when he noticed a swelling in the groin and laid up. On Tuesday the testis commenced to swell. A fortnight ago he got up for two days, but had to return to bed on account of the left testicle swelling.

The globus minor of the right testis was swollen, not hard, and there was evidently an inflammatory condition in process of resolution. The rest of epididymis, body of testis, vas, and cord were perfectly normal.

He never mentioned the condition of the left testis until I observed it for myself. There was a similar swelling of the globus minor of the left epididymis, much firmer and more tender than its fellow. Neither body of testis, vas, or cord was in any way affected. And there can be little doubt that it presented the early stage of the same inflammatory process that was previously existent on the right side. There was no suspicion of any urethral discharge. The urine could not be examined. He was a leading light of his particular religious denomination, and was greatly offended at being asked certain questions, and in fact that he should be examined at all.

I certified the case as one of bilateral epididymitis, cause unknown. But I think that it affords a strong commentary on the inferences that are drawn from the two cases given by Dr. Edwards. Here is a man who meets with "a strain" on Thursday, and all symptoms are latent until Sunday, and only on Tuesday does the epididymitis begin to swell. But suppose we admit this doubtful strain as the definite determining cause of the epididymitis on the right side, how can we connect the ensuing attack of epididymitis on the left after a strain in the right groin? Is not the weight of probability that both were due to some general cause—either an unrecognized inflammatory condition in the deep urethra, or a haematogenous infection?

CASE II.

Man, between 20 and 30, dock hobbler, on Wednesday, a fortnight before he came under treatment, as he was finishing work threw down the shute and jumped sideways out of the way; in doing so he felt "a twist on the right side of belly passing round to the groin." The following morning the testicle began to swell, and although he went to work the pain became so severe that he had to give up. The swelling is now subsiding and he has no pain. The globus major of the right epididymis was slightly enlarged and firm in consistence, but was neither stony hard nor craggy in feel. The rest of the testis was normal, as were the vas and cord, and there was no tenderness of the latter either in the scrotum or in the inguinal canal. The orifice of the urethra was perfectly healthy without the suspicion of a discharge. He complained of some tenderness over the lower part of the right side of the abdomen; there was no muscular rigidity. He resumed work in about two weeks after I saw him. No examination of urine was made.

In this case I suggested that in the jump sideways that he made the testicle was squeezed between the thighs or

the thigh and trousers, and there was local trauma that he did not notice. If this be not the explanation, then it is a case which is more suggestive of the origin from strain than any I have seen or read of. It happened as he was finishing work, he went straight home, had pain all the time, and although he made an effort the next morning to go to work, the testis was then swollen and too painful to allow him to continue. This is the sequence I should expect in a true traumatic epididymitis—the immediate onset of pain of some severity, the continuance of pain becoming more acute until the inflammatory process is fully established, and not a latent period of several days without symptoms. In neither of my cases was there any ecchymosis to be made out. This case, I believe, was due to a definite traumatism. The former case I feel just as sure was not.

A few years ago I treated a boy, aged 16 or 17, whose right testis suddenly swelled up in the night. When I saw him the next day body and epididymis formed an indistinguishable mass which was acutely tender, and it resembled a very acute gonorrhoeal epididymitis. I was very doubtful at the time as to whether it was a case of torsion. In a day or two the pain and swelling subsided, but the testis remained permanently atrophied; there was no connexion with mumps to be made out. He had been at gymnasium on the night it came on, but there was no account of any strain whatever. He told me he had no recollection of injuring the testis in any way or of experiencing any pain whilst at the gymnasium. I regret that I took no notes of this case, and merely give it from memory.

The theory of the *coup de fouet* can, I think, be dismissed. The sluggish contraction of the cremaster muscle, when eliciting the cremasteric reflex, and a view of the scattered muscular bands which compose it, when dissecting or performing the radical cure of hernia, will hardly impress one with its powers of striking the testicle a violent blow against the pillars of the ring.

It might be conceivable that in violent straining efforts the blood pressure in the vena cava could be so raised that such veins as those of the pampiniform plexus lying outside the abdomen, and therefore not supported as those are inside, might be ruptured; at the same time, it appears very unlikely. Dr. Edwards's suggestion is that in a violent action of the abdominal muscles the cord is nipped and the veins are compressed by the muscle, whilst the arteries, being more resistant, remain patent, as happens in any form of torsion or strangulation of a viscus. He suggests that the fibres of the rectus do this, but as these are inserted into the pubic and not the iliac crest this is an anatomical impossibility. What Dr. Edwards doubtless means is the action of the arched fibres of the internal oblique and transversalis muscles. Such an action, however, would be so brief, that I find it difficult to believe sufficient congestion could be produced to rupture any of the veins. In one of his cases there was some slight ecchymosis in the groin, but how or why even an extensive haematoma of the cord should cause epididymitis I find it difficult to see. If the bleeding occurred into the epididymis itself then I should expect immediate swelling and pain, which would not pass off rapidly, only to again manifest itself some days later. If it were so slight as not to cause this I cannot see why it should set up inflammation later.

From the very rigorous examination made by Dr. Edwards in his two cases, a urethral origin seems definitely excluded. But can the same be said of a general cause? Dr. Edwards mentions gout, rheumatism, and malaria, but only to dismiss the first two; but orchitis or epididymitis are well known to occur in mumps, typhoid, and other infective diseases, and I have seen epididymitis in pyaemia. I was told the other day of two cases of epididymitis occurring one after the other in members of the same family that were attributed to influenza, and it seems not an improbable assumption that it may occur as the result of a mild infection in some other of these cases of obscure origin quite as probably as from a doubtful trauma.

The one really weak point in Dr. Edwards's two cases and in the first of my two is the delayed onset. The testis, vas, and cord are well supplied with nerves, and are acutely sensitive to any traumatism, and I cannot conceive that such can occur, whether directly or indirectly, without pain of some severity occurring at once and persisting. In my second case this is what happened. The man felt severe pain at once, he left his work, the

pain continued to increase, and in the course of twenty-four hours the pain and swelling had fully developed. This, in my opinion, is strongly confirmatory of a traumatic origin. I cannot, however, but think that this was of the nature of a squeeze, and not a strain, and a mistake by the individual as to what exactly happened is quite conceivable.

The idea of strain as a cause is so difficult to imagine as being effective that I should prefer to assume some other unrecognized general condition of the nature of a mild infective process in the other, and that the supposed injury did not stand in the relation of cause and effect.

I have seen two or three cases of undoubtedly gonorrhoeal epididymitis, verified by staining specimens of the pus, which were unblushingly attributed to strains whilst at work. If, therefore, in such cases a history of strain is so frequent, how much more may it be expected where no obvious cause is apparent!

NOTES ON SLEEPING SICKNESS:

SUGGESTIONS AS REGARDS GLAND PUNCTURE
AND THE TRAPPING OF TSETSE FLIES.

BY

ANDREW BALFOUR, C.M.G., M.D., B.Sc.,
MEMBER SUDAN SLEEPING SICKNESS COMMISSION.

HAVING just returned from a visit to the Lado district of Mongalla Province in the far southern Sudan, whither, as a member of the Sudan Sleeping Sickness Commission, I accompanied the President, Colonel H. B. Mathias, D.S.O., I would like to direct attention to two points, one of minor interest, the other having an important bearing on the question of prophylaxis.

1. A Gland Holder.

I have frequently found that the little operation of gland puncture is by no means so easily performed as might be imagined. This is specially true when one is working unaided and when the suspected glands, though enlarged, are small and comparatively hard. It is frequently difficult to fix the gland, none too easy to pierce its capsule, while sometimes one is apt, when exercising the necessary force, to run the needle right through it, possibly to the danger of one's own finger. Difficulty or failure is all the more exasperating when, as is usually the case, the patient's skin is greasy and slippery, the operator's fingers are in like condition, he himself is bathed in perspiration and worried by flies, and the needle is none too sharp.

It has occurred to me that a little instrument, which may be termed a gland holder or a gland fixer, would be useful. I hope when in London to have one made for me, but the accompanying sketches, for which I am indebted

Two types of proposed gland fixer.

to Mr. George Buchanan, will give an idea of the kind of thing which I think might serve the purpose. It will be seen that, in one form, that intended for a large gland or a mass of glands, it consists of two central curved blades the edges of which can be protected by rubber or leather, and which are intended to close in behind the gland and the skin covering it, thus isolating the gland and obviating any danger to the operator's fingers, or the risk of making two holes instead of one in the patient's skin. The blades