case, suggest that this might be frequently found in cases of cystitis and pyelitis. The fact that one case in which the reaction was positive was one of an acute infection of but two weeks' duration, and the other positive case, a chronic case of many years' duration, would suggest that the reaction may begin shortly after the infection has been set up and may continue for a long period of time.

These cases, although few in number, suggest a possible means of differentiating the bacteria in those cases of cystitis and pyelitis where there is doubt about the bacteria causing the infection, and they also suggest that in this class of cases there is possibly developed a certain reactive tendency of the organism as a whole against the special infection.

The pleomorphism of many micro-organisms under varying conditions has been frequently dwelt upon by numerous bacteriologists. Thus the morphology of the tubercle bacillus may be made to differ quite markedly according to the media upon which it has grown; the motility of the typhoid bacillus varies markedly under varying conditions. The virulence of the streptococci and staphylococci lies within widely divergent limits, dependent upon many previous factors in the life history of those micro-organisms; and, of course, many other cases of like nature might be added. The factors in the development of these various forms of the same micro-organism are probably to be found by a careful study of the previous life history of the organism in question. In cystitis we have an especially favorable field for studying the pleomorphism of the organisms which give rise to this condition. Thus we may have varying grades of resistance of the patient due, in the first place, to the general condition of the patient's health, whether she is robust and healthy or anemic and poorly nourished, and in the second place, to the condition of the bladder itself, whether it has recently undergone trauma, whether it is in a condition of anemia or congestion, whether there is constant retention of a portion of the urine, etc.; and also there may be various factors definitely dependent upon the micro-organism itself. Thus the virulence may vary markedly, depending upon its previous history and habitat, whether its existence has been parasitic or saprophytic, also upon the number of micro-organisms which were initially introduced. The condition of the urine also plays an important rôle; thus upon the presence of considerable, a small amount of, or no albumin depends the fact whether or no the micro-organism will find a medium favorable for its growth.

The multiplicity of these factors has shown us marked pleomorphism in our cases of cystitis and pyelitis, over 80 of which have been carefully studied bacteriologically. The results of these experiments, as will appear in full elsewhere, go to show that the colon bacillus is the commonest cause of cystitis and pyelitis in women, while various staphylococci, the tubercle bacillus and the bacillus proteus vulgaris are also quite frequently found, and numerous other micro-organisms are found in exceptional instances. The pleomorphism of the colon bacillus in the various specimens found by us was very marked; thus its shape differed from that of a rather long, not very thick rod to a form difficult to distinguish from a coccus; its motility in some cases was very active, in the majority of cases sluggish, and in a few cases *nil*

as far as we could determine. Marked variations were also seen in its behavior upon the various media. In some cases the growth was very profuse, and the changes in the various media (production of indol in pepton, coagulation and acidification of milk, the production of gas on glucose agar) very marked and very rapid, while in other cases the growth was very scant and the changes slow and slight. Although no definite conclusion could be drawn regarding the significance of these various forms, generally speaking it seemed that the more virulent micro-organisms were those which approached more the slender rod-shaped bacillus in form, in which the motility was most marked and in which the changes produced in the various media were most marked and most rapid.

In the case of the staphylococci, morphological pleomorphism was not so marked as in the case of the colon bacillus, as one would naturally expect. The rapidity and profuseness of the growth upon the various media and the changes produced therein differed, however, quite markedly in the different cases. The staphylococci found in our cases were the staphylococcus pyogenes albus and aureus and a white staphylococcus especially characterized by its marked ability to decompose urea and the slowness with which liquefaction of gelatine was produced. We were especially interested, however, by certain peculiarities in the chromogenic properties of these bacteria. In 2 cases the growth from the urine upon agar consisted of a number of small colonies of light lemon color. Transplantations from these upon potato gave colonies of a darker yellow color, while two subsequent transplantations from this latter upon agar gave colonies with the typical orange color of the staphylococcus pyogenes aureus. In a third case the primary culture consisted of growths almost white in color, which after six successive transplantations gave colonies of the same typical color as those of the staphylococcus pyogenes aureus.

These results, while few in number, are very suggestive in regard to the relation between various members of the staphylococcus family and suggest that many of what we now consider separate species may have arisen originally from a common staphylococcus, and the variations in cultural peculiarities, in chromogenic tendencies, etc., may have been directly dependent upon the various factors, favorable or otherwise, which surrounded the special micro-organisms since that time.

THE MANAGEMENT OF ABDOMINAL TESTICULAR ECTOPIA ASSOCIATED WITH INGUINAL HERNIA.¹

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ON June 18, 1900, Dr. Barkwell, of Cheyenne, kindly referred to me H. C., a boy of fourteen years, who gave a history of having had a reducible bubonocoele on the right side for one year. The testis on this side had never been found in the scrotum. The hernia had been unusually painful and he was unable to wear any sort of a truss. Examination revealed a right oblique inguinal hernia of moderate size, not passing beyond the external ring. The testis on that side was not in the scrotum, and, as said before, it had never been found there. Just above the external ring there was a small, tender lump; this was movable and thought to be the testis.

Operation was advised and was performed under ether at St. Luke's Hospital, June 20th. The sac was found with considerable difficulty. It was small, extending to about the external ring, and contained a small cord of adherent omentum. The lower end of this piece of omentum was somewhat enlarged and this was the mass thought before operation to be the testis. The hernia was of the congenital variety, the sac being very thin and densely adherent to the cord, which it surrounded and which extended pretty well toward the external ring. With great difficulty and much patience the sac was dissected from the cord up to the internal ring. On drawing it down from the abdomen a small atrophied testis was found to lie within it, or rather within the cavity of the peritoneum proper, that is, it was lying within the peritoneum in the sense that the appendix or the intestine lies within it. The cord seemed to have turned on itself; it was atrophied and dissection of it was difficult.

The peritoneum was cut off at the upper margin of the testis, dissected well back from the cord high up and sewn off flush with the general abdominal cavity. The internal abdominal ring was enlarged upward, the peritoneum reflected backward and upward, and a prolonged attempt made to free the cord sufficiently high to permit the testis to be drawn down into the scrotum. It was not possible to do this. After dividing the cremaster muscle and other tissues, and freeing the cord to the farthest possible point, the testis could only be made to lie just above the external ring and even then there was some tension on it. Accordingly, with permission of the lad's father, the testis was removed, the cord being divided at a high point and the canal tightly closed with layer sutures of chromicized catgut. The wound was closed without drainage and healed under a single dressing. There has been no further trouble.

Testis retained in the inguinal canal is fairly common; failure of the organ to leave the abdomen is rare. In general, the causes of ectopia may be placed under two heads: (1) Inflammation when the fetus is *in utero*, this inflammation causing adhesion of the testis to adjoining parts, and (2) abnormal size of the testis or unusual narrowing of the inguinal rings and canal. The latter factors may exist singly or they may be combined.

When the testis is retained in the canal it is easily subjected to injury; this may be sudden or it may be the result of continued irritation. Not so, however, with the abdominal form of cryptorchidism, for here the organ is well protected and not more often the seat of disease than when in the scrotum. An inguinal testis is commonly inflamed or diseased. The processus vaginalis is often left open so that secretion readily finds its way into the general peritoneal cavity. The cord of an ectopic testis easily undergoes torsion. Hernia is common because of the open processus vaginalis. It is difficult for the patient to wear a truss and consequently the hernia becomes irreducible.

Finotti believes the inguinal retention of a testis to be due to congenital developmental disturbances and that such testis is therefore peculiarly subject to malignant change, especially sarcoma.

Finotti further believes that although the ectopic testis may be incapable of secreting semen, yet it is not useless, for it is the seat of another secretion which he vaguely terms "internal"—the inguinal testis is capable of secreting this "internal" fluid which is of

importance in developing and preserving the nature of man. On the other hand, Besançon and Finotti¹ think that patients with abdominal ectopia present more the feminine type or are analogous to eunuchs. This belief corresponds to that of Lucas Championnière and is confirmed by Strobe.²

The position of a given testis exerts far greater influence on the psychic than on the bodily condition of a given man. The great majority of those affected with ectopia are very nervous. Further, they may be subject to eclampsia, peripheral epilepsy, hystero-epilepsy or chorea.

One does not always know just what should be done in these cases. Bull, whose hernia experience has perhaps been greater than that of any other man in this country, believes that in general it is better not to operate on children with retained testis and inguinal hernia before the age of puberty, on the ground that the testis will probably descend, and this seems to be the general opinion of surgeons. Lucas Championnière³ reports an operation which he performed twelve years ago on a child then eleven years of age, who suffered with bilateral abdominal testicular ectopia, with bilateral inguinal hernia. The testes were sought, mobilized and transplanted in the region of the absent scrotum in a cavity dug out for each with the fingers. The vas deferens and the testicular artery were the only supports left for one of them. Each testis was transplanted separately. The general health was completely transformed within a year, and the child developed into an exceptionally strong and well-built young man. Both testes worked up from their first position, the smaller to a point about over the scar of the hernia and it had to be extirpated because of pain during physical effort. Championnière has operated on 37 cases of inguinal ectopia, 6 of which were bilateral. He always seeks to retain the testes, for they aid in the normal development of the general physique. If the vas deferens is too short to allow transplantation, castration is the only resort.

In inguinal ectopia, persisting until or beyond the age of puberty, mobilization to the scrotum should be made when possible; a thorough division of the cremaster and all surrounding fibrous tissue will often render this possible. The details of this operation have recently been set forth in an admirable way by Bevan, who lays stress on the necessity for thoroughly freeing all tissue about the cord to the highest possible point within the abdomen. Schüller's operation is practically that of Bevan. Unless the testis lies without tension and easily below the external abdominal ring, it will surely and speedily work up. The external ring should be snugly closed on the cord. In certain instances, especially when the ectopia is bilateral, failure to transplant the testis to the scrotum may warrant its being placed within the abdominal cavity.

MEDICAL INSPECTORS FOR SCHOOLS.—It is reported in the *Philadelphia Medical Journal* that Congress is to be asked to provide eleven medical inspectors for the public schools of the District of Columbia, in conformity with the report of Health Officer Woodward on the need of frequent examination of the pupils. A salary of \$500 is to be paid the physicians appointed.

¹ Monatsh. Harn- u. Sexual-Apparatus, Bd. iv, H. 9, 1899.

² Gustav Foch: Ueber Hodenectomie, Leipzig, 1899.

³ Bull. de l'Acad. de méd., Paris, June 12, 1900.