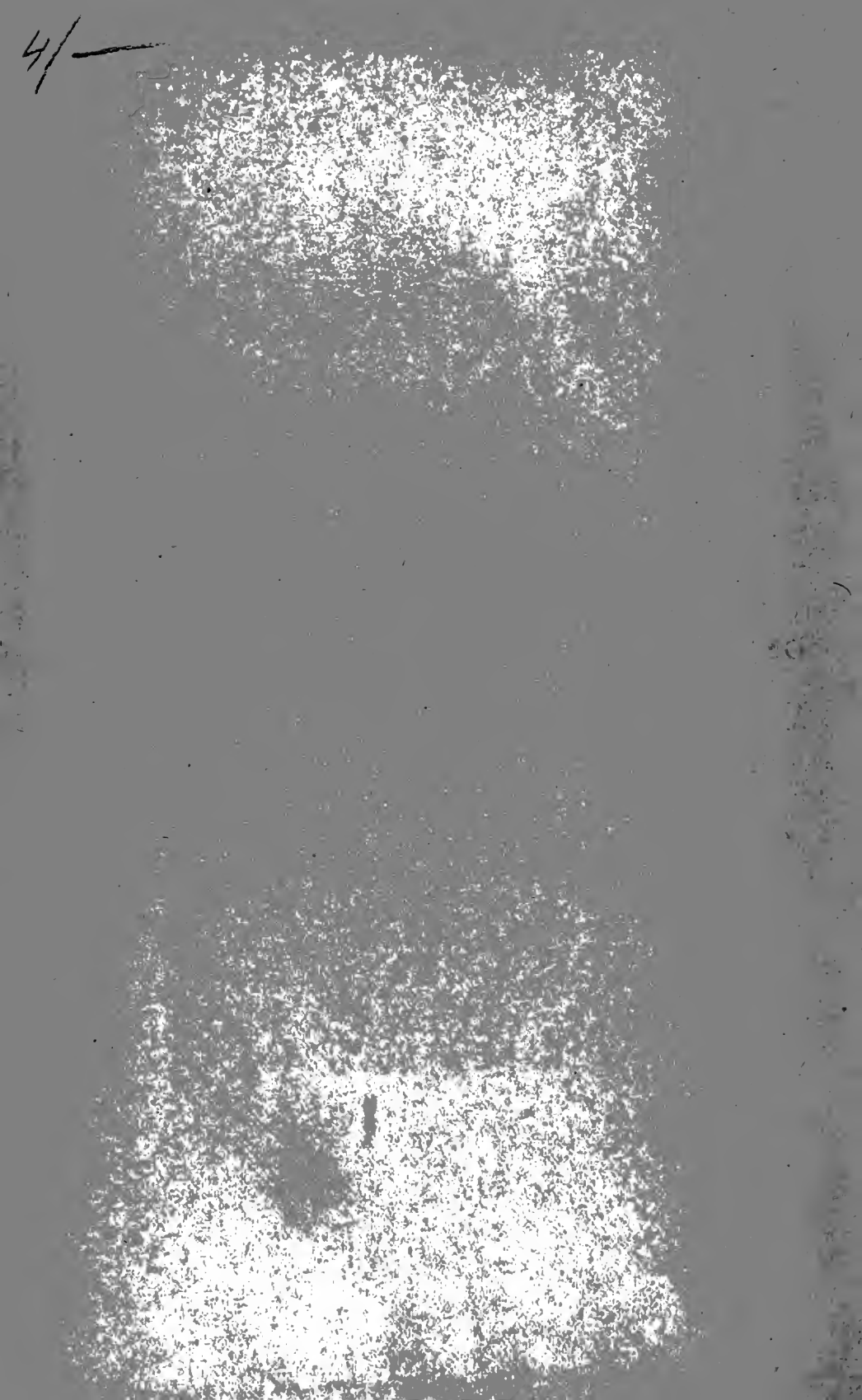

ON GONORRHŒAL INFECTION IN WOMEN.

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IN

WOMEN.

BY

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PREFACE.

THE following chapters are, to a large extent, a reprint of papers which appeared in the *Medical Chronicle* from May to October, 1887. A considerable portion has been re-written, and the substance of the most recent contributions to the subject, which seemed to contain anything of value, has been introduced. The author does not profess to be in any sense a specialist in the Venereal Diseases. His whole aim has been to put before the reader the present state of the question of gonorrhœal infection from the purely Gynæcological point of view. With that object, while on the one hand performing the function of translator and commentator, he has, at the same time, drawn upon his own experience in the belief that he could thus produce some additional contributions to our knowledge of clinical gynæcology. He has undertaken the work in the hope of doing his part in arousing the profession in England to some interest in a subject which he earnestly believes to be of vast social importance, and full of promise from the point of view both of the social reformer and the practical physician.

MANCHESTER,
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ON GONORRHŒAL INFECTION IN WOMEN.

Chapter I.

GONORRHŒAL INFECTION PRODUCES COMPLICATIONS WHICH ARE SERIOUS IN THEMSELVES AND OF FREQUENT OCCURRENCE.

Importance to the Gynæcologist.

GONORRHŒA as it occurs in the female sex is still in this country strangely neglected by general practitioner and specialist alike. Its symptoms, its differential diagnosis, and the ravages which are its immediate or remote results, are hardly recognised or understood, and the treatment of it, as ordinarily practised, is contemptible. Yet the virus of this disorder gives rise to a group of diseases, a series of pathological conditions, which, by reason of their clinical interest and their social and moral consequences, surpass in importance any other class of affections with which the gynæcologist is called upon to deal. To the reader, cognisant of the eager activity which, now as heretofore, pervades every department of medical research and practice, there must appear to be something extreme or paradoxical in this statement. But the explanation is not far to seek. If gonorrhœa stood alone among the diseases of women that had been neglected for generations by the surgeons, the explanation might be difficult; but it has only shared what was the common lot with abdominal and uterine surgery until the latter was removed from the limbo of neglected subjects by the work of the specialists,

so recently that many of the early reformers are still alive and engaged in the active practice of their profession. Even yet the importance of the part played by the gonorrhœal virus in the production of disease has received comparatively little attention from the gynæcologists in England and America, whereas in some other countries, especially in Germany, in recent years, a large amount of experimental work has been done, and much clinical evidence has been collected, which must soon work a revolution in the opinions and practice of the profession throughout the world in regard to certain phases of gonorrhœal disease. So little even of foreign work has been published in England, that it can be no exaggeration to say that if the whole subject could be put before the practitioners of this country in all its fulness of detail, both theoretical and practical, as it has developed in Germany during the last few years, the knowledge would come as a surprise and a revelation. Writing with this conviction, I need hardly apologise for endeavouring to give an outline of these recent researches and observations, especially as I shall be able to incorporate some observations and illustrative cases of my own, which can hardly fail to be recognised as corroborative evidence in support of conclusions already suggested in the opening sentences, and ultimately to be stated more explicitly and formally.

Erroneous and Inadequate Views Taught.

There are few medical practitioners in this country who, when medical students, were not entirely mistaught with regard to the pathology and treatment of gonorrhœa in women. Their teachers were the pure surgeons, and when these taught that the disease was to be considered only a form milder in its course, and more amenable to treatment, when affecting the female sex, there need to be no surprise if the practitioner has carried the ignorance of his teachers into his daily practice, with disastrous consequences to some of his patients. Whether the teaching of

an old pathology is still carried on, I do not know; but there is no evidence of a change in some of the most recent works on surgery. It would be interesting, if space permitted, to collate a series of quotations on gonorrhœa in women from the older and more recent manuals of surgery, as exhibiting the barrenness of surgical observation until the subject was taken in hand by the specialists. It must suffice, however, to quote from the article "Gonorrhœa" in Holmes's "System of Surgery." This work is selected as one which is looked upon by many practitioners as a complete library of surgical literature, and as I quote from the third edition, published in 1883, it may fairly be assumed that we have here a statement of the orthodox surgical doctrine of the present time, as understood by the average general practitioner; and, having it fresh before us, we shall be better able to see how we stand with regard to the orthodox creed when we have assimilated the newer knowledge. Under the sub-division, "Gonorrhœa in the Female," the author says[1]: "Gonorrhœa is a much less common affection in women than in men, and when it does occur, the disease is ordinarily much less severe, and hence more rarely comes under treatment. . . . Inflammation, in consequence of gonorrhœa, has been supposed to extend to the cavity of the uterus and to the Fallopian tubes. West mentions two successive attacks of vaginitis, at an interval of eighteen months, in same patient, which were followed by such severe peritonitis as to call on each occasion for the abstraction of blood. . . . Ovarian inflammation, corresponding to the epididymitis of the male, occasionally occurs. It has been described by Hunter, Dr. Tilt, and others." There is in this chapter not a single expression to convey to the reader any hint of the serious nature of the complications of gonorrhœa in women, as compared with the corresponding phases of the affection in men. The existence of a "latent" or creeping form of the disease is not so much as mentioned,

[1] "A System of Surgery, by various Authors." Edited by Holmes; p. 391, 3rd Edition, 1883.

and the author is equally silent with regard to dysmenorrhœa, pyo-salpinx, sterility, and other well-recognised results of the disease. It will be observed that the date of this essay is eleven years later than the appearance of Noeggerath's work; six years later than when Lawson Tait wrote,[1] "Acute ovaritis from gonorrhœa is a common result of the infection;" and four years after Neisser's first publication on the discovery of the gonococcus. It need not surprise us if the practical outcome of such teaching is a very lame method of dealing with the disease in the male, with unfortunate results for the female. The ordinary treatment of the male sex, with its consequences, is well illustrated by a case at present under my care, which, in its clinical aspect, as affecting the woman, will be given in more detail in the sequel. It is that of an hospital patient, suffering from acute pelvic inflammation, as I shall call it at present, the special internal development of the disease not having been as yet sufficiently differentiated. She has been married only about two months, and she has a turbid uterine discharge, which has been ascertained to contain gonococci in abundance. In order, if possible, to obtain corroborative evidence, without too closely questioning the wife, I sent for the husband. I told him my object in wishing to speak with him was to learn if he had had clap? "Yes, I had," said he, quite frankly. "When?" "I got it in August last year." "When were you cured?" "In November." "When did you get married?" "In the beginning of February." "When did your wife begin to complain?" "Last month"—that is, in March, just about a month after marriage. In answer to further questions, my interlocutor informed me that the doctor who treated him first, considered him quite cured in November. There was some uneasiness in the genitals about Christmas, and he consulted another practitioner, with special reference to the question of marriage at an early date. Although the patient was the subject of phimosis, and his glans could not be seen, he was

[1] "Diseases of Women," 1877.

assured that he was all right, and might get married without misgiving. Very soon after marriage he began to have a discharge, and his wife became ill, complaining of intense hypogastric pain, which necessitated her taking to bed. Still another medical practitioner was called in to attend the wife, and he was also consulted by the husband on account of some symptoms which had reappeared. This doctor recommended, and performed, the operation of circumcision on the husband, and is reported to have assured him that there was no sort of connection between his wife's ailment and his own. The final result in this case, so far, is a gleet in the husband, and an ailment which is probably destined to do irretrievable damage to the sexual organs, and perhaps to the general health, of the wife.

In further illustration of the practice which may result from an inadequate apprehension of the danger to women arising from gonorrhœal infection, I shall quote from a comparatively recent French writer on the venereal diseases. Speaking of the case of a young man about to be married, who has had the misfortune to contract a gonorrhœa which there is not time to cure before the wedding day, he says: "In these embarrassing circumstances one sovereign remedy remains, only one—injections of nitrate of silver. . . . Suppose one employs a medium dose of the solution, in an hour and a half or two hours after the injection there appears a discharge, the simple effect of traumatism, accompanied by a little smarting in micturition. This slight inflammation lasts five or six hours. But then, precious result, the canal becomes dry; all morbid secretion is arrested, and this condition persists for eighteen or twenty-four hours—quite sufficient time for the bridegroom to seek his nuptial couch in a healthy, or, at least, noncontagious state. In exact figures, if the newly-wedded pair ought to retire to their room on Friday morning at one o'clock, the preservative injection ought to be made about nine o'clock on Thursday forenoon."[1] This is surgery fit only for satyrs; and

[1] "Le péril vénérien dans les familles." Par P. Diday. Paris, 1881.

yet the practical outcome of much of the prevalent treatment is as inevitably the ruin of the health of innocent women, as must be the result of following the coarse advice of this French surgeon.

Some who have paid but little attention to the diseases of women may consider the terms here employed to indicate the effect of the venereal poison upon the health of the woman unnecessarily strong. But it will be shown later on that the gonorrhœal virus may, and does frequently, cause chronic discharges, metritis and endometritis, salpingitis and pyosalpinx, ovaritis, peritonitis, derangements of menstruation, sterility, and a variety of complications and combinations of these diseased conditions; and, if this can be proved, any language fails to do justice to the facts. It may be also objected that such severe cases must be rare, and therefore the subject becomes comparatively unimportant. The frequency with which the more serious cases occur appears to vary in different countries—that is, as might be expected, according to the habits of the people. The apparent frequency also depends upon the method in which the facts of the history of each gynæcological case are investigated, that is to say, the nature of the cases is overlooked or detected according as the practitioners are ill or well informed on this special theme. That the gonorrhœal virus and puerperal septicæmia are the great factors in producing the more serious pelvic diseases cannot now be disputed against the weight of evidence; and there can be no doubt that a large number of the apparently puerperal septic cases are of gonorrhœal origin.

Cases Illustrating Phases and Complications.

Without attempting, at present, to give any complete and precise description of a typical case of gonorrhœal disease in the female sex, including complications, as a guide to diagnosis and treatment, I shall mention in somewhat general terms a few fairly typical cases, with the view of bringing out in con-

crete form some of the various phases of the disease under consideration, keeping in mind only that, for the present, the disease has to be shown to be of common occurrence, and important apart from its frequency, and leaving definite conclusions as to diagnostic points and treatment to be developed in the sequel.

Case 1.—This patient when first seen was a married woman of 20. She had been married twelve months, and had not become pregnant. She complained of a pain chiefly felt in the left inguinal region, shooting across the hypogastrium, and making her feel sick. She has been worse for the last five or six weeks. Menstruation has so far been regular, but the last two periods have been scanty. Before marriage, menstruation was almost painless, and she was free from inter-menstrual discharge. Now the pain at the periods, coming on a day or two before and lasting until the flow ceases, is intense. It doubles her up, as she puts it; and she cannot sleep at night for the pain. Her ailment began three months after marriage. She had then some sort of acute abdominal disease, accompanied with severe hypogastric pain and scalding in micturition. This illness made her keep to bed for a fortnight. There is also mastalgia in the right side, intensified before the periods. Examination per vaginam shows that the uterus is in normal position and movable. Both ovaries are made out enlarged and adherent, and very sensitive to touch. These notes, taken twelve months ago, indicate the patient's condition then; she is now no better. She has been an in-patient of a hospital for women, and has been subjected to various measures of treatment, with only temporary benefit. She is now a dysmenorrhœal invalid, and in all probability permanently sterile. Here then is a young, robust girl, whose health is deteriorated, perhaps entirely ruined, by marriage. What is the essential element in the causation of this result? I have not been able to detect the gonococcus, but the husband confesses to having contracted gonorrhœa within a year before his marriage, although he considered himself well when the

marriage took place. Note the change in the type of menstruation in this case, often one of the most striking features in creeping gonorrhœa.

Case 2.—The next patient was, at the time of her marriage, three years ago, a robust healthy woman of 22, without any record of illness since childhood. A few months after marriage she began to suffer from vaginal discharge, with frequent and painful micturition. Menstruation, which used to be regular, normal in amount, and painless, became painful and profuse, ultimately developing into menorrhagia, for which medical treatment had to be sought. The first marked menorrhagic period was ushered in by an illness requiring rest in bed, the chief symptom of which was severe hypogastric pain. From this time the periods varied from one to three weeks, and were accompanied with severe pains, which continued during the whole time of the menstrual flow. An intermenstrual discharge is described as "running away" from her. The uterus, it appears, was dilated and curetted by the medical practitioner who first attended her, and the result was temporary relief from the hæmorrhage, but with no relief from pain at the menstrual periods. When she came under my care, a year and a half ago, I found that she had an enlarged uterus, evidently the result of metritis, and both her ovaries were enlarged and painful. She was submitted to treatment, varied in every way that promised to give relief, but with only temporary advantage. The third time she was admitted as an in-patient of the Manchester Southern Hospital was after great suffering at a menstrual period, and when she had made up her mind to undergo any operation that might be considered necessary. The state of the ovaries was worse than ever, and accordingly, with the consent of all concerned, the ovaries and tubes were removed. That is six months ago. The tubes were somewhat dilated, and the outer extremities were incorporated with the enlarged and cystic ovaries. The patient recovered without any bad symptom, and is now relieved of her sufferings, and she has regained to a large extent her healthy appearance.

There can be no doubt, I think, that the direct cause of all this injury to the woman's health was due to gonorrhœal infection: The husband had the disorder the year before he married, and though his statements have varied, he admits to having seen traces of the disease within six months of his marriage. He was and is addicted to drink, and, that being the case, it is easy to understand how the diseased process would be continued indefinitely in the latent form, and be ultimately stimulated by frequent sexual intercourse into such active development as to make it readily contagious.

Case 3.—In this case we shall see how the diseased process may continue indefinitely, while the woman is living under comparatively favourable circumstances, producing symptoms which, under other conditions, might call for operative treatment. The patient is 29 years of age, and has been married the second time five years. She came first under my care eight years ago, when her first husband was living. At present the form her ailment assumes is enlargement of the uterus, with retroversion and a tendency to prolapse. On exertion, the dragging of the uterus, when not supported, produces nausea and vomiting, which may come on quite suddenly during any kind of active exercise. The left ovary is enlarged and tender, and bands can be made out behind the broad ligament, which are the result of inflammatory adhesions. Near the vaginal orifice there are tender areas, which make it almost impossible for the patient to wear a Hodge's pessary, and yet a padded Hodge is the instrument which gives most relief to the other symptoms. This difficulty seems to be due to a chronic inflammation of the glands of Bartholini. The patient has been so far sterile since her second marriage; she menstruates regularly, but with severe pain, and scanty menstrual discharge. There is a considerable, though not profuse, leucorrhœa. Now, if a physician were being consulted by this patient for the first time, in her present condition, he would probably find it impossible to make out for certain the state of parts or the cause of the disease. It would be possible to elicit the history of a

very severe puerperal illness over seven years ago; that illness was of gonorrhœal origin. I attended the patient during her pregnancy, while she was suffering from an acute attack of gonorrhœa, conveyed to her by her husband, in whom it was clearly of post-nuptial origin. She was only apparently cured by the end of pregnancy. She was delivered of a healthy child, but she was seriously ill for months. The severer symptoms came on nearly a month after the birth of the child, and arose from inflammation, extending to the pelvic peritoneum and including the ovaries. There followed pelvic abscess, and all the usual train of hectic and emaciation, with adhesions and fixation of the uterus. She made a very slow recovery, and was unfit for any exertion for many months. I have a continuous history of her ailments since then, because I have seen her at intervals during these seven years, and there can be no doubt but that all her troubles began with, and are the direct result of, the gonorrhœal infection during her first and only pregnancy. Since her second marriage this patient's ailment has been "latent." Her husband has never suffered from any sort of irritation of the glans or urethra, hence it may be confidently asserted that the wife's leucorrhœa has been entirely non-specific in its effects, although specific in origin.

Case 4.—M. N., æt. 22, single, strong, healthy-looking woman, complains of a pain in the left inguinal region, and in the thigh. Menstruation is irregular and profuse, sometimes lasting three weeks, and producing extreme weakness. There is intense dysmenorrhœa, the pain continuing during the first two or three days of the period. Much inter-menstrual discharge. On examination per vaginam, the uterus is found to be enlarged and fixed, with patulous os; there is a large, hard, not sensitive mass behind the uterus, with the usual accompanying hardness of the tissues round the left side of the pelvis. This patient had an illegitimate child twelve months ago, and she has never been well since. In the latter half of her pregnancy she suffered from swelling of the nymphæ and scalding in micturition, and had an extremely

profuse mattery discharge. She is convinced it was a venereal disease that she had contracted, although she does not assign the reasons for this belief. The child began to have an inflammation in one eye, with mattery discharge, two days after its birth, and this continued for about a month, although the child was under treatment.

This is a common type of hospital case, occurring among women of the same class, both married and single. Repeated examinations of the discharge for the gonococcus gave no result, but the history permits of a confident diagnosis.

Case 5.—M. E. M., æt. 24, married six years, and has had four children. Last confinement six weeks ago. Has always had good recoveries until this time. Was confined to bed for three weeks, with pelvic pain after her confinement, and has continued to suffer from the pain to some extent since she began to go about. She has been troubled with a profuse yellow discharge since the lochia ceased. On examination, the uterus is found to be enlarged, with open os (subinvolution), and the left ovary is much enlarged and very tender to touch. Discharge from os, yellow, mattery, profuse. For the last two months of her pregnancy she had a slight discharge, which caused some irritation about the vulva, and a slight discomfort in passing water. She volunteered a statement which left no doubt that her husband was under treatment for a venereal disease contracted during the wife's last pregnancy. The child was under treatment as an out-patient of the Southern Hospital for *ophthalmia neonatorum*. Examination of the uterine discharge in this case, the matter being taken from the os uteri for the purpose, showed the presence of a micro-organism, having all the characteristic appearances of the gonococcus.

Case 6.—This patient was a rather scrofulous girl, of the domestic servant class, aged 19, who, when first seen, had been suffering for about six months from an ailment which was ascertained to be gonorrhœal in its origin. She had the usual hypertrophied uterus, with great enlargement and pain of the

ovaries; the condition of the Fallopian tubes could not be differentiated. Medical non-manipulative treatment and rest produced much improvement in the course of six weeks, but even then the patient could not walk erect. After other six weeks' treatment by medicated vaginal tampons, without further improvement, I resolved to make a careful exploration of the pelvis with the help of an anæsthetic, and then decide on the question of operation. The careful examination was made, a sound was used, which had been thoroughly disinfected—which was, in fact, lifted out of a warm antiseptic solution in order to be introduced—and the result of the examination was a decision to operate if a short trial of the then universally favourite hot douche failed to give relief. The hot douche was used for the first time the same day, in the hope of relieving the discomfort caused by the examination, and next day the temperature began to rise. This was one of my early cases of the kind, and I temporised in the hope of giving relief by sedatives; but the after course was continuously downward. There was pelvic peritonitis with fixation of the uterus, and intense pain on touch. She never menstruated again. Ultimately pelvic abscesses formed, one bursting into the bowel and another into the bladder, and continued for months to refill and discharge alternately. The patient slowly emaciated, and ultimately died of exhaustion.

My belief with regard to what happened in this case, in the light of later experience, is this: The examination by the sound produced a congestion by its stimulating effect, which, assisted by the hot douche, stirred up into more active development the quiescent gonococci, resulting in a further spread of the inflammatory process, probably producing pyo-salpinx, or abscess of the ovary, and other abscesses. It is just possible that the sound may have introduced some pathogenic organism, which brought on a "mixed infection," or the tube may have been stimulated into discharging some of its contents into the pelvic cavity. The one thing certain about the case, whatever it may have been towards the end, was that it

was gonorrhœal in its origin. If the ovaries and tubes had been removed when the temperature began to rise, the result might have been very different.

Case 7.—Another domestic servant, in whose case the only ascertainable cause for the lighting up of a fresh attack of ovaritis was passing the sound in examination. She confessed to having become affected with a venereal disease, with ordinary symptoms of a mild gonorrhœa, twelve months before. Since then her menstrual periods had become painful, and so profuse that her mistress suspected an abortion at the time I was first asked to see the patient. The girl was so reduced in strength by reason of her losses of blood, and pain from enlarged and tender ovaries, that she was unfit for work. She was admitted, at the request of her mistress, into the Southern Hospital. In the course of examination, a thoroughly disinfected sound was employed, and in 24 hours there was a distinct rise of temperature with unusual pain in the pelvis. The left ovary became more tender and larger, but in a few days it could not be defined because of a hard exudation in the left side of the pelvis. There was high temperature, with the usual red, dry tongue, but there was never any hectic. The temperature fell in ten days from the first onset of pyrexia, and the exudation could be pressed upon without giving rise to much complaint. All seemed to be going on well for about three days, when the temperature began to rise again, and the right side of the pelvis developed the same train of phenomena as the left. No abscess ever formed, and the patient ultimately recovered after an illness of two months' duration. When last seen her menorrhagia was cured, for menstruation had become scanty, but the dysmenorrhœa continued; she was still unfit for prolonged exertion of any kind.

Case 8.—Mrs. B., æt. 29, married seven years, had one miscarriage in the first year of married life, no pregnancy since. She came under my care two years ago, and was under treatment over twelve months without deriving any benefit. She had been always strong and healthy before she

was married, and her husband is a well-developed, healthy man. On his side there is the history of gonorrhœa contracted about two years before marriage, but there is no evidence of a gleet continuing after the first apparent cure, and there are no habits of dissipation to make such a continuance or recurrence probable. There is no clear evidence of the conveyance of the disorder to the wife, all her early symptoms being possibly attributable to pregnancy. She aborted at four months without apparent cause, and suffered for a long time from some form of puerperal illness, accompanied with pain in the abdomen. No abscess appears to have formed. From this time menstruation became painful and profuse, and at the time she first came under my care she was entirely laid aside during her periods, suffering what was described as an agony of pain. She appears either to have had at these times short faints or some sort of slight epileptic seizures. She was tolerably well in the intervals. The ovaries were enlarged and painful, and there were some obscure points in the palpation, suggesting adhesions. Dilatation of the uterus before a period gave no relief to speak of. The final resort was oöphorectomy. Both the tubes were closed and adherent at the outer ends, the right being greatly distended with turbid serum. The ovaries contained blood-cysts, and were adherent. The omentum had become attached to the extremity of the right Fallopian tube. Tubes and ovaries were completely removed. The operation took place nearly twelve months ago. The patient made a perfect recovery. She is now well, except for some nervous symptoms characteristic of the menopause.

This case, taken by itself, would prove nothing with regard to gonorrhœal infection. It requires the experience of many other cases more or less closely resembling it to bring out the fact that it is a very good typical case, and that we are justified in attaching what might otherwise seem undue importance to the points which make for proof of its gonorrhœal origin.

Case 9.—A lady, now 30 years of age, was married twelve years ago, and during the first year of wedlock contracted

gonorrhœa from her husband. She had a miscarriage at seven months, about a year after marriage, and since then she has been a wreck. At present she suffers from enlargement of the uterus, which becomes completely anteverted at times on exertion, making even a moderate amount of walking impossible. Her ovaries are enlarged, especially the right, and they become very painful at the menstrual periods. Menstruation is scanty, and very painful. There is now hardly any leucorrhœa. The anteversion of the uterus causes much bladder distress at times. She is anæmic and thin, the reverse of what appears to have been her condition before marriage. There is in this case the history of a long serious puerperal illness, necessitating constant medical treatment for over twelve months. The patient has been under treatment for relapses at short intervals almost continuously since recovery from the first serious attack. She has never become pregnant again. She appears to have worn all manner of pessaries, and to have tried internal and external applications of every kind. She has had the uterus dilated once, resulting in a severe illness of some kind; and she used to have several days of suffering every time the sound was passed by any one of the numerous specialists whom she has consulted in the course of years. Among other therapeutic measures that have been tried has been median incision of the cervix uteri, the only remaining objective evidence of which seems to be a small notch on the posterior lip of the os. What the anatomical condition is at present and how much of the deviation from the normal is to be ascribed to the original gonorrhœa, and how much to treatment, nobody could now profess to decide. Twelve months ago she consulted, at my suggestion, a celebrated London gynæcologist, who wrote to me: "She seems to me to have very little the matter," and went on to say that, in his opinion, she was suffering more from treatment than anything else, and he had advised her to give it all up, "to walk and dance and enjoy life." She was not satisfied with the advice given her by this physician, because she believed

herself too ill to attempt to follow it, but she took his prescription to a chemist to be dispensed. The dispenser entered into conversation with her, and at his suggestion she went the same day to another specialist in the neighbourhood whose name she had never heard of till then. This young gentleman wrote to me that he had diagnosed double pyo-salpinx, and had recommended operation. He went on to say: "If you do not care to undertake the operation, I would be *very pleased* to do it. I have been very fortunate with my cases of abdominal section, and *I look upon this as a very favourable case.*" I am responsible for the italics. Out of respect for the feelings of earnest and upright gynæcologists, I shall quote no more of this letter, but I must strenuously protest against any one professing gynæcology, whatever his excuse for ignorance, calling a case with a history of ten or twelve years of complications "a very favourable case" for operation. Favourable it could not possibly be, regarding either the immediate consequences of the operation or the remote results. Such cases are always difficult and dangerous because of the firmness and extent of organised adhesions; and they are disappointing in their later results, because the reorganisation of the innervation of the parts is either very slow in following a radical operation, or it remains incomplete. Palliation, not cure, is the best that can reasonably be expected. Enough has been said to call attention, in passing, to these extremes of treatment for some of the complications arising from gonorrhœal infection, and to call up in imagination the effects upon the patient of such advice. In the case under consideration the patient, wisely, I think, has adopted as much as she could of the advice "to give it all up," and is certainly no worse, probably a little better, than she was last year.

Case 10.—Two years ago I had occasion to open a mammary abscess in a hospital patient, and I took some of the matter to the Pathological Laboratory at Owens College with the object of trying some cultivation experiments, which I had the opportunity of making under Professor Dreschfeld's

friendly instruction and guidance. The pus was full of micro-organisms, some of which looked like gonococci. Tube cultivations produced a development like that obtained by Bumm from the gonococcus. No pure cultivation was carried out with this specimen. When the patient was next seen she was asked about her symptoms during pregnancy, and it then came out that she must have been infected with gonorrhœa while pregnant. The infant at the breast was suffering from *ophthalmia neonatorum*, and was also an out-patient of the hospital. The patient had so far no symptoms suggesting the existence of any pelvic complication. Her only ailment was the mammary abscess, which must have been produced by the extension of the inflammation along the milk ducts, and that inflammation must have originated in the implantation on the nipple of colonies of gonococci from the child's eyes. To go back a step further, the purulent discharge from the child's eyes originated in infection from the genital tract of the mother. The state of matters here described may have been a result of "mixed infection;" but without going into the discussion of that subject, I may claim, provisionally, this case as also an illustration of the consequences of gonorrhœa.

Cases might be multiplied indefinitely, but sufficient have perhaps been given for the present object, which is to convey a general impression of the importance and the frequency of occurrence of this class of disorders. It may seem strange to some to whom such observations are the mere commonplaces of practice, that so much is said about the importance of these disorders as a group of diseased conditions. But there can be no doubt that the subject is, as a rule, treated too lightly. It will be seen that a point common to all the cases cited is the absence of treatment in the early stages of the disease. The only apparent exception is the case which was under my care while in the acute stage; but even in this case the disease was thoroughly established before treatment was begun, and, besides, the treatment was of the ordinary inefficient routine sort which was in vogue eight years ago. How little success

attended it has been made manifest. As a rule, the disorder in women excites so little attention that the doctor is called in only to deal with complications when they arise. The reasons for this are probably the absence in most cases of severe urinary troubles; the want of an evil conscience, which is usually present with the man; the comparative difficulty with which women can minutely inspect their pudenda when slight discomfort begins, and their natural shyness about submitting to the inspection of other eyes; and the comparative frequency with which some plausible reason for a discharge or discomfort can be assigned; it is, for example, the effects of intercourse soon after marriage, a derangement of menstruation from some supposed "cold," or some one of the disorders of early pregnancy. No doubt one active influence in preventing the detection of gonorrhœa in the woman, while it is yet in the curable stage, is the conviction on the part of the husband that the thing is of no importance if the wife can be kept in ignorance of its nature. Matters will assume a very different aspect when all concerned awaken to the importance of prevention, and the difficulty of cure when the disease has reached the stage of complications. It is necessary to guard against exaggeration, for there is a danger that in rousing from long ignorance and neglect of the subject, the professional mind may sway to the other extreme, and, amidst the phenomena of disease obscure in their nature and as yet inexplicable, be tempted to accept gonorrhœal infection as an easy and sufficient explanation of morbid processes with which it has no kind of causal relation. Still, as yet, the actual facts with regard to opinion are all the other way, and the danger which exists is not too strongly stated by a recent writer on the subject, who says[1]:—"The danger of gonorrhœa in the woman lies especially in this fact, that the infection from the urethra or vulva, vagina or cervix, may extend over the mucous membrane of the uterus, and thence further on to the tubes, the ovaries, and

[1] Dr. Fritz Levy (Copenhagen): "Om den 'latente' Gonorre hos Kvinden." *Hospitals Tidende*, Nos. 1, 2, and 3, 1887.

peritoneum, where it may give rise to a series of the gravest abdominal ailments. These may end fatally in acute peritonitis, resulting from the escape of pus from the tubes into the peritoneal cavity, or from the bursting of an abscess of the ovary, or of a pyo-salpinx; or they may give rise to a condition of chronic peritonitis with adhesions of the uterus, tubes, and ovaries to the adjacent organs, or to recurrent attacks of pelvic peritonitis with the ultimate development of a 'gonorrhœal cachexia,' and general breakdown of the health."

Frequency of Occurrence of Gonorrhœal Affections.

I have not seen any statistics worth quoting which could guide us to a definite conclusion as to the frequency with which gonorrhœa is to be met with in men and women in this country. Every medical practitioner in the large centres of population knows that it is one of the commonest ailments among men, but with regard to women the case is different. The disease, as it occurs in the female sex, varies so much in its features, that from the signs and symptoms alone it is usually looked upon as impossible of diagnosis. As the cases are not definitely diagnosed, there appears to be a general belief that the disorder is not nearly so common among women outside the classes of professed or clandestine prostitution as it is among men. We must, therefore, for the present, rest satisfied with little more than looking at the views of some foreign authorities, keeping in mind that most of the facts are of foreign origin, when we come to draw conclusions from them.

Noeggerath,[1] whose small work on "Latent Gonorrhœa in the Female Sex" marks the beginning of a new era in our clinical knowledge of the disease, says: "I do not know what the state of matters is in other cities; I did not know how we stood in New York until I questioned the husband of every woman who came under treatment. And I believe we may

[1] "Die latente Gonorrhœ im weiblichen Geschlecht." Bonn, 1872.

apply here the dictum of Ricord that in every 1,000 men, 800 have had gonorrhœa." In another place he says: "I believe I do not go beyond the mark when I assert that gonorrhœa in 90 per cent. of the cases remains uncured. Of every hundred women who have married men formerly affected with gonorrhœa, scarcely ten remain healthy, the others suffer from some of the ailments which it is the object of my essay to describe." Coming more into detail with regard to these affections, he says that his experience in New York, which he supposes to be a type of all the cities of the first rank, leads him to conclude that "after catarrh, chronic perimetritis is the most common ailment of the female sex."

Alfred Fournier, who writes the article "Blennorrhagie," in the *Nouveau Dictionnaire de Médecine*, 1866, says: "Blennorrhagia is perhaps the most common of all diseases. In the great centres of population, in the cities, where the people are facile in their habits and fond of pleasure, there are few men who escape it, and there are many who have had it again and again." In another place he says: "La blennorrhée est vulgairement connue sous les noms de *goutte militaire*, de *goutte matinale*, de *suintement habituel* ou *chronique*. Elle est d'une excessive fréquence, et cela à tous les âges, dans toutes les classes de la société."

Some German gynæcologists have noted the frequency with which the diseases of gonorrhœal origin occur in their practice, and the results strongly support the once much derided statements of Noeggerath.

E. Schwarz,[1] of Halle, in a lecture published last year, says that in 617 cases, carefully observed since the end of 1885, there were 112 which excited the suspicion of previous gonorrhœal infection, and in which the patients' statements and the still existing symptoms made the diagnosis more or less probable. Of these 112 there were 33 = 5·3 per cent. who proved to be the subjects of acute gonorrhœa, and of that

[1] "Die gonorrhoische Infektion beim Weibe."—*Sammlung klinischer Vorträge*, Leipzig, 1886.

number 19 were either unmarried or widows. In the whole of these cases, diagnosed by appearances and symptoms alone, the diagnosis was further demonstrated by the presence of the gonococcus. Of the remaining 79 cases the gonococcus was found in its characteristic groups in 44 cases, although in some it had to be searched for several times. Thus gonorrhœa was proved to be present in 77 out of 617 cases, that is, in 12·4 per cent. Schwarz is of opinion that many of the remaining 35 cases had been infected at some time or other, and that the gonococcus would have been found if examination had been made at the most favourable times (Prädilektionszeiten), shortly before or after menstruation, during pregnancy, or in the puerperium. Several of them suffered from perimetritic affections with fixation and dislocation of the uterus, purulent endometritis, or showed other suspicious signs, and with several there was a history of purulent ophthalmia in their new-born infants.

Sänger,[1] of Leipsic, who is perhaps the principal champion in Germany of views approaching to those of Noeggerath, gave the latest results of his observations in a paper read before the German Gynæcological Society at Munich last year. He does not consider that the diagnosis of gonorrhœa is established except by the clear statements of the man or woman, by the occurrence of ophthalmia in the new-born children, or by the presence of affections of the urinary tract and the vulvar glands. The last especially he considers pathognomonic. Out of 1,930 gynæcological cases which came under his notice, in private and hospital practice, in the previous year, Sänger found 230 cases of gonorrhœal disease, equal to 12 per cent., or one-eighth of all the cases. More recently still, of 161 cases he had found 29, or 18 per cent., of gonorrhœal origin. In 389 cases of pregnant women, he found that 100 had a purulent discharge, 26 per cent., and 40 of the children ultimately born suffered from ophthalmia neonatorum.

[1] "Ueber die Beziehungen der gonorrhoischen Infektion zu Puerperalerkrankungen."—*Verhandlungen der deutschen Gesellschaft für Gynäkologie*, Leipzig, 1886.

O. Oppenheimer,[1] of Heidelberg, working upon the material of Professor Kehrer's Clinic, endeavoured to establish the relative frequency of gonorrhœal infection in women, partly by direct examination of the vaginal discharges, and partly by the occurrence of ophthalmia neonatorum. In 108 pregnant women, he found 30 in whose vaginal secretion the specific diplococcus was undoubtedly present; that is, in 27·7 per cent. Ophthalmia neonatorum occurred in from 12 to 13 per cent. of the cases.

Lomer,[2] of Berlin, examined some of the patients of Schröder's Clinic, just as they came, without any selection on the ground of previously existing catarrh of the uterus, and he found in nine out of 32 lying-in women the characteristic diplococcus enclosed in pus cells, that is, in 28 per cent. The cases in which diplococci in colonies were observed, leading to the suspicion of gonorrhœal infection, amounted to 56 per cent. of all examined.

The frequency of the occurrence of the disorder varies so much in different localities that it is, and perhaps always will be, impossible to formulate any statement which will be of general application even to cities. A curious example of this diversity is quoted by Noeggerath in a recent paper.[3] He refers to Winckel's statement that when he was at Dresden he was never able to demonstrate a single fatal case of acute gonorrhœal salpingitis in 400 female bodies examined, whereas soon after his transference to Munich he met with many cases of acute gonorrhœal salpingitis and peritonitis, and among them one fatal case. "In Dresden in eleven years not a single fatal case, in Munich in three years and three quarters three cases."

With regard to the material on which my experience in Manchester has been acquired, I am not prepared to hazard

[1] "Untersuchungen über den Gonococcus (Neisser)."—*Archiv für Gynäkologie*, Bd. XXV., Hft. 1.

[2] *Deutsche med. Wochenschrift*, No. 43, 1885.

[3] "Ueber latente und chronische Gonorrhoe beim weiblichen Geschlecht."—*Deutsche med. Wochenschrift*, Dec. 8, 1887.

any definite statistical statement at present. In private practice the occurrence of some of the gonorrhœal diseases of women, now that they are diagnosed as a rule, is common enough; but they are by no means the most ordinary ailments which one is called upon to treat. In the current list of patients the disease is never without two or three unequivocal witnesses to its existence. In hospital practice, among the class of women who are not very particular in their notions of personal cleanliness, it is a very common disease. Married men of the operative class, when out of work, appear to contract some form of venereal disease in amazingly large proportion, and to take little or no precaution to save their wives from the misery resulting from the contagion. It is a social question which it would be hard to settle, whether the poorer married women of the working class suffer most from the effects, including sterility, produced by the venereal diseases conveyed to them by dissolute husbands, or from the constantly recurring child-bearing and lactation, which fill up the burdensome prime of life for the healthy wives of the more virtuous or fortunate. Among the purely gynæcological cases, as they occur in my hospital practice, the proportion of cases of gonorrhœal origin is about 1 in 15. Of the cases of pelvic peritonitis, in any of its forms or phases, gonorrhœa is the cause in an overwhelming proportion, the fraction of the whole next in amount to the gonorrhœal being that made up by neglected cases of abortion.

From the contemplation of such facts as these it is a relief to turn to the other extreme. Milton,[1] speaking of a small town in Cumberland, says: "Having had the opportunity of tracing this disease for many years back, in what was then a very small town in the North of England, where gonorrhœa is now rather firmly established owing to the growth of the place, I was able, by means of the books of a successive line of surgeons, kept for a long time, to make out pretty certainly

[1] "On the Pathology and Treatment of Gonorrhœa." By J. L. Milton. 5th Edition. London, 1883.

that in their practice it had, till about forty years ago, only been very rarely seen and sometimes not heard of for years together. All the inquiry I could make tended to fortify this opinion: the general experience seemed to be that gonorrhœa always died out soon after it was acquired." In another place he says: "During a four years' apprenticeship to a surgeon, who, though living in a very small town, had one of the largest practices in Cumberland, I saw but very few cases of gonorrhœa, certainly not a dozen, though every instance of such a disease must have come to my knowledge. Of these I know that some were caught from sources foreign to the place."

With regard to the prevalence of these disorders, we can readily infer that between their frequency of occurrence in the cosmopolitan cities and dense centres of population, and their rarity in sparsely populated rural districts, there may be every grade of proportional frequency. Consequently, if the profession as a whole is to arrive at a just comprehension of the facts, the conclusions reached by each individual as the result of his experience must be modified and corrected by the experience of those practising under every degree of difference in circumstances. If this fact were kept in mind, we should find the history of the discussion of the subject under consideration less embellished with sneers and triumphant rejoinders than it is. For example, we find Milton discussing Noeggerath's conclusions without having acquired any clearer notion of them than could be obtained second-hand from a review, and with mildly sarcastic superiority brushing them aside. "It does not seem to have struck Dr. Noeggerath," he says, "that, had his facts been correct, *gonorrhœa would have long ago depopulated every country into which it had penetrated.*"[1] It will be seen, however, on reference to Noeggerath's words, which I have been careful to give literally, that he explicitly states that his allegations do not apply to the state of any community in respect of this matter except New York, with which alone he is familiar. If we had only our crowded

[1] *Op. cit.*, p. 53.

world-cities to trust to for the continuance of the race, the world would soon be depopulated, or worse, from more potent causes than gonorrhœa. If the statements on either side of the question of frequency of occurrence are a little strong, the conclusion of the whole matter only amounts to this: that for the physician in the large city, gonorrhœa is a disease of primary, practical importance; for his contemporary in the rural district it is more a matter of speculative scientific interest.

Chapter II.

HISTORICAL RETROSPECT OF VIEWS ON THE PATHOLOGY OF GONORRHŒA IN WOMEN.

In order to obtain a clear view of our present position with regard to the pathology of gonorrhœa and the effects of the disorder, it seems to me expedient to give a short historical retrospect of the path by which our present position has been reached. We shall then be better able, without the need for repetitions, definitely and concisely to consider the special phases of the disease with which we are at present concerned; to examine the phenomena of the affection as it occurs in the female sex, the consequences which infection may entail, and the prophylaxis and treatment, and any medico-legal, moral, and social questions which may naturally arise out of the whole case.

For our present purpose the past may most conveniently be divided into three periods—(1) Before Noeggerath's treatise appeared; (2) Noeggerath's work and immediate influence; (3) Neisser's discovery.

Before Noeggerath.

(1) The first period takes us back, according to the ordinary fashion in medical histories, to the time of Hippocrates. For practical purposes we may rest satisfied with looking to the

more modern epoch when Ricord flourished. Ricord's views as to the non-specific nature of gonorrhœa dominated the profession in his time, and do to a large extent still prevail. There was always a strong minority who held the opinion that the disease was specific, but they were in the position of mere agnostics, who could not accept the "frivolous anecdotes" on which their opponents seemed to ground their faith, rather than a school of scientific opinion founded on research and observation. The successive failures of the specificists to demonstrate the presence of an organic virus in the form of a micro-organism was claimed as still stronger support of the antagonistic views. Several investigators, each in turn, claimed to have discovered the specific organism. Donné's *trichomonas vaginalis*, for example, held the field for a considerable time as the organism whose presence produced the phenomena of vaginitis; but the anticipations of its discoverer and those who accepted his opinions were doomed to disappointment. But the existence of a micro-organism to carry the disorder was not a necessary part of the belief of those who held to the specific nature of gonorrhœa. The position taken up by Sigmund and Auspitz of Vienna, Durkee in America, and perhaps also by Milton and other authorities in this country, was that gonorrhœa can develop only from gonorrhœa, and some of these certainly held to the view that the specific virus resided in pus as compared with any other form of secretion. On this opinion depended some important practical conclusions, and we shall see that with regard to the precautions to be taken to prevent the spread of the contagion the believers in specificity were as faulty as the opposite camp.

Ricord, Fournier, and Diday were the chief authorities from whom orthodox writers, in this country and elsewhere, drew inspiration, and confidence in the correctness of their theoretic views. Mr. Henry Lee, in the article in Holmes's "System of Surgery" already referred to, under "Causes of Blennorrhagia," mentions, in addition to the usual direct contagion, the action of irritating substances and constitutional

causes. He then, in support of his position, quotes from Ricord a passage which I transcribe as well adapted to our present purpose:—"If we investigate with the greatest care the exciting causes of gonorrhœa—and I am now speaking of characteristic cases of the disease—we cannot help admitting that a gonorrhœal virus is absent in the majority of cases. Nothing is more common than to find women who have occasioned gonorrhœa unsurpassed in intensity and persistency, and attended by the most serious complications, and who are yet only affected with uterine catarrh, which is sometimes hardly purulent. In many cases, intercourse during the menstrual period appears to be the only cause of the disease; while in a large number we can discover nothing, unless, perhaps, errors in diet, fatigue, excessive sexual intercourse, the use of certain drinks, as beer, or of certain articles of food, as asparagus. Hence the frequent belief of patients, which is very often correct, that they have contracted their gonorrhœa from a perfectly sound woman. I am most assuredly familiar with all the sources of error in such investigations, and I will presume to say that no one is more guarded than I am against the various forms of deceit which are strewn in the path of the observer; yet I confidently maintain the following proposition: *Gonorrhœa often arises from intercourse with women who themselves have not the disease.* Anyone who studies gonorrhœa without preconceived notions, is forced to admit that it often originates from the same causes that give rise to inflammation of other mucous membranes."

When the masters in this peculiar field of science felt the need of strong language to bolster up such flabby opinions on causation as this passage implies, we need hardly feel surprise at any vagaries of the ordinary disciple. After reading a series of the stories by which the non-specific view is maintained, one hardly feels the absurdity of the suggestion made by a surgeon, mentioned by Milton, that a certain case of gonorrhœa might have originated from making water in the night air.

With regard to the phenomena of the disease in women, the predecessors of Noeggerath held the erroneous view that the vagina was the chief seat of pathological change. If the urethra and bladder were not involved, producing the characteristic symptoms, and if no coarse changes had occurred in the vagina, the surgeon was not in a position to decide with confidence whether or not he had to deal with a venereal disease. A discharge from the uterus was to him the product of a uterine catarrh, a condition quite separate and distinct from any venereal affection, and in only a very few severe cases had the observer confidence to allege any causal relation between the venereal virus and the uterine or pelvic disease. It followed from such loose notions as these with regard to the chief seat of the malady, its superficiality in an anatomical sense, and its non-specific nature, that the surgeon felt himself justified in pronouncing, from mere inspection, any suspected female clean or otherwise. It requires little imagination to grasp the vast social importance of this mistaken view of the pathology of so common a disorder; and that it was a mistaken view it is the chief object of this essay to emphasise, because all the rest depends upon it. If a concrete example of the social results of a pathological error be demanded, it should be remembered that the Contagious Diseases Acts, now repealed, were passed and administered in the United Kingdom, partly on the basis of this discredited pathology. Yet the medical profession is so indifferent to revising its opinions on this subject, and so confident in its old prepossessions, that it is probably not going beyond the mark to say that, if the re-enactment of these statutes depended upon a *plébiscite* of the qualified practitioners in this country, taken without further discussion, the laws would at once again come into force.

With regard to the disease, as affecting the male sex, the *crux* of the position was the belief that the pus cell was the pathological unit. The pus was the morbific agent, but inasmuch as any pus cell, whatever its origin, might be

sufficient, the disease was not specific. The practical result of this belief was that men, just recovering from gonorrhœa, were assured that if only the remaining discharge was clear and glassy they might indulge in sexual intercourse without fear of conveying the contagion. With some it was a difficult question to decide when the discharge became sufficiently clear to be innocuous, and, for safety, many surgeons stuck to the rule, that there must be an entire disappearance of the discharge before they could sanction sexual intercourse. "So long as *any discharge exists* sexual congress is unsafe,"[1] is a dictum containing the most advanced opinion of this school. This expresses by no means the general opinion and practice. "But not only does the medical world believe that a so-called cured gonorrhœa is actually cured, but they are even of opinion that a man who has a gleet (Nachtripper) may not infect his wife. It is usual at the present time with the best informed practitioners (non-specialists) to sanction marriage in the cases of men who still continue to observe adhesion of the urethral orifice and staining of the linen, as *beaux restes* of a gonorrhœa. Even the highest authorities, as Professor A. Geigel, permit the cohabitation with his newly-married wife of a man, the subject of gleet, so soon as the urethral discharge appears perfectly clear."[2] Such was the state of practice and of doctrine with regard to gonorrhœa, when a specialist in diseases of women began to comprehend and explain the meaning of certain pathological conditions of the female sexual organs which he had long observed. The establishment of the relation of cause and effect between the neglected, apparently trifling and innocuous, chronic gleet in the male, and inflammation of the pelvic peritoneum in the female sex, is one of the most important and interesting chapters in modern gynæcology.

[1] Mr. Henry Lee, in Holmes's "System of Surgery."

[2] Noeggerath, p. 2.

(2) Noeggerath's Work and its Immediate Influence.

The work which I am specially desirous of doing justice to, because of its originality and intrinsic merits, is that of Dr. Emil Noeggerath, a German physician, formerly practising in New York. His "grand idea" is expounded in a treatise, a mere "opuscule" in respect of physical proportions, published in German in 1872. The peculiar mode of publication has been a misfortune to English readers, and it has largely detracted from the influence which the book ought to have exercised. It has never been translated into English, and this fact seems to justify me in drawing largely upon the words of the original in support of the views which I am seeking to advocate. When it first began to dawn upon me in the course of gynæcological practice that many of the unexpected mishaps, and the whole course of many of the most intractable cases, were due to the gonorrhœal virus, I naturally turned to the literature in order to learn what was already known on the subject. Comparatively late in the search I had the opportunity of reading Noeggerath's monograph, which, until then, I had known only by hearsay. Like every other man I have hitherto met, I knew of Noeggerath as a German doctor who had actually published the outrageous doctrine that clap is an incurable disease, and as nothing more. It was, therefore, surprising to find, on perusal of the work, that only the undeniable exaggerations had been seized upon and noised abroad; the admirably clear exposition of the fruits of clinical work of the highest excellence, and the great idea which inspired the whole and formed an advance on all that had hitherto been written on the subject, appeared to have fallen, for the most part, as seed on stony ground.

Noeggerath's work was largely clinical, and in this respect it contrasts with much that is to follow, which is mainly the work of pathologists and bacteriologists, engaged in research and observation without such close relation to the actual phenomena of disease. He, however, clearly

enunciated the microbiotic nature of the disease, and indeed he almost believed, like some of his predecessors and contemporaries of the specific school, that he had discovered and succeeded in cultivating the special organism. "There is hitherto awanting," he says, "a so-called direct proof. If it were already proved in which form-elements the gonorrhœal contagion is exclusively bound up, if it were demonstrated that the pus corpuscles, and the pus corpuscles only, were the carriers of the contagion, then perhaps elements might be discovered in the secretions of the woman by careful microscopic examination which would throw light upon the origin of the affection." . . . "The whole meaning and importance of micrococci and of the fungi derived therefrom bear as yet so clearly the stamp of incompleteness, and are viewed with distrust by so many distinguished men of science, that I cannot expect any of my readers to attach very great importance to the presence of a fungus in forming their conclusions on the question. The subject must be further investigated by the mycologists in co-operation with one or other of the gynæcologists." Although it would be an exaggeration to call upon the reader to admire these sentences as a prophecy from the remote past, or as bearing the evidence of far-reaching scientific vision, still they show a very clear appreciation of the state of contemporary knowledge, and of the course that future research must take in order to be successful. It is evident that if Noeggerath had enjoyed the advantage of knowing Koch's methods of investigating the life-history of micro-organisms, that the missing link in the chain of evidence which he sought for would soon have been found, and the discovery of Neisser might have been anticipated by seven years at least.

Let us now examine Noeggerath's clinical work. He says that his object in publishing his observations is "to depict in their characteristic features a group of diseased conditions peculiar to the female sex, and to prove that certain phenomena observed in the sexual organs, which have hitherto been looked

upon and treated as distinct, possess a common basis from which, collectively and separately, they are derived." For this common basis he selected the name "latent gonorrhœa," because "it may be present for weeks, months, and even years, in the affected individual before it displays itself by any of its characteristic phenomena." In explaining further the nature of latent gonorrhœa, he says: "I have undertaken to show that the wife of every man, who at any time of his life before marriage has had gonorrhœa, with very few exceptions, becomes affected with latent gonorrhœa, which sooner or later shows its existence by some one of the forms of disease about to be described. The reason why this fact has not hitherto been brought under discussion in a radical fashion is grounded on several circumstances. In the first place, we physicians have hitherto believed that a gonorrhœa in a man, after it has once ceased to exhibit any signs of its existence, such as occasional moistening or adhesion of the urethral orifice, even itching, or discomfort in micturition, is actually cured. Such is, however, in the great majority of cases, not the fact, and I believe I am not going beyond the mark when I say that 90 per cent. of cases of gonorrhœa remain uncured. Of 100 women who have become the wives of men who have formerly been affected with gonorrhœa, scarcely 10 remain healthy; the rest suffer from one of the ailments which it is the task of this treatise to describe."

In order to prove his theses, Noeggerath gives the notes of fifty selected cases, which are so arranged as to illustrate the various heads under which he discusses his subject. These clinical groups, under which he classifies his observations, are: (1) Acute perimetritis; (2) recurrent perimetritis; (3) chronic perimetritis; and (4) ovaritis. All the four varieties of diseased processes are complicated with catarrh of distinct portions of the mucous membrane of the sexual organs, and this catarrh, in a few cases, is found to be the only sign of disease. Although this classification may now be considered obsolete, if even it could be considered originally established by the

author's own material, it did good service by calling attention to the extreme frequency of perimetritis as a consequence of the gonorrhœal infection. It may be a question whether it is possible clinically to distinguish between the three varieties of perimetritis, or whether every attack of perimetritis is not necessarily always more or less acute, ultimately becoming more or less gradually chronic, and liable at any time, under favouring conditions, to become recurrent. In any case we may accept that which is implied in the classification as something which clinical experience since Noeggerath's time tends more and more to establish, viz., that there is always catarrh, and in the great majority of cases perimetritis. "Inflammation of the female sexual organs, as it occurs in consequence of latent gonorrhœa, whether acute or chronic in its course, is in every case periuterine, that is to say, it affects the serous covering of the pelvis, and of the organs contained in it." In 100 cases of this disease, occurring in the author's practice, not one can be recalled to memory in which the morbid process began in the parametrium. After a criticism of the views of Matthews Duncan and the statistics of Bernutz, he concludes that, provisionally setting aside the cases which are said to have originated in the puerperal state and from menstruation, Bernutz also supports the opinion that gonorrhœa and syphilis are the most prominent causes of perimetritis. "But not only does the florid, acute gonorrhœa supply the principal contingent of this class of disease, but the so-called latent gonorrhœa is quite as important as the acute form. And I may add (1) that a woman who, at any time of her life, has had an acute gonorrhœa, has to expect some time, it may be after months or years, one or more attacks of acute, subacute, or chronic perimetritis; (2) that the wife of a man who, at any time of his life, before or during wedlock, has suffered from gonorrhœa is, with regard to an attack of perimetritis, in the same position as if she herself had had an acute gonorrhœa.

"Under these two groups of circumstances a woman must expect at some time or other in her life to become the subject

of a pelvic inflammation, sometimes ending only at death. If it comes to an acute manifestation of the affection, the case usually takes something like the following course.

"The man, either already a dweller in a large city, or in his capacity as traveller, student, etc., has become initiated into the mysteries of modern civilisation by contracting gonorrhœa. This disease, although it may have apparently disappeared without leaving a trace behind it, makes him for many a day capable of conveying the contagion. The young, hitherto healthy, wife begins to complain a few weeks after marriage; attention to her domestic duties becomes a burden to her, and pedestrian exercise which could formerly be taken without the least effort now gives rise to signs of fatigue; menstruation becomes more profuse than formerly, and there are pelvic pains during the first days of the periods; a little vaginal discharge follows each period, and this, gradually increasing, ultimately continues without intermission until the next menstrual period begins. After a few months, really severe pains come on either in the left or the right half of the pelvis, and the sufferer is ultimately compelled, on account of feverishness and unbearable burning in the abdomen, with increased discharge, to take to bed and send for medical help. According to the severity of the attack she remains confined to her bed for weeks or perhaps for many months, with exhausted strength, struggling for life, ultimately slowly recovering, but remaining sterile and invalid for the rest of her days.

"It not unfrequently happens that the woman who is married under such circumstances soon becomes pregnant, and during her pregnancy she suffers from pelvic pains which are supposed by herself and the doctor to be necessary drawbacks of her condition, and so she receives no particular attention. It sometimes happens that the symptoms become so urgent as to call for active treatment in order to prevent miscarriage. Labour ultimately comes on, and is followed by a severe endometritis with perimetritis, the former or the latter

being the more prominent feature of the case. The development of this inflammation may begin either immediately after the birth, or, as is more frequently the case, it may come on eight to fourteen days, or even six to eight weeks after."

It is a peculiar fact that some women directly after marriage with a man who has formerly had gonorrhœa begin to exhibit symptoms of serious inflammation, whilst others may be years before they emerge from the latent period, and others again show such trifling departures from the normal condition that it is difficult to say whether they are affected or not. It may be set down as a law of this disease that "the earlier the first cohabitation occurs after the time when the gonorrhœa was pronounced to be cured, the shorter is the period of latency in the woman, and the acuter are the symptoms."

Space will not permit me to transcribe all Noeggerath's interesting cases, and it must suffice to select one from the first series.

Case 11 (Noeggerath's Case 5[1]).—"Mrs. M., a native of Boston, had been, when I first saw her, married for five years to an advocate in New York, who about one year before his marriage had undergone two months' treatment for gonorrhœa. The wife, who before marriage was a type of robust health and beauty, began soon after marriage to have ailments; she remained sterile, and suffered from pain at the beginning of her menstrual periods, and, what had never before occurred to her, began to have a slight fluor albus shortly before the periods. After a year she consulted Dr. Marion Sims, who performed on her his operation of incision of the cervix, with the object of curing the sterility. This proceeding was followed by such severe hæmorrhage as to necessitate tamponade of the vagina. On the following days pain began, and gradually increased to an enormous severity. The doctors in attendance found that the cause was an acute perimetritis. The patient was confined to bed for two to three months, and since

[1] *Op. cit.*, p. 18.

that time she has never had a day's good health. She consulted one after the other the principal gynæcologists of New York and Boston; by one she was cauterised for ulcer of the cervix; another applied a large blister to the hypogastrium on account of chronic metritis; and a third made her wear an intra-uterine pessary for two months. A careful examination revealed the following facts: the uterus was anteverted and but slightly movable; the left ovary was small, hard, and firm, and fixed in the pelvis by adhesions; whilst the right ovary, lying deeper, seemed to be greatly swollen, rounded, and softened. Both ovaries were intensely painful to touch. The vagina was reddened, and bathed in a muco-purulent discharge, and there was catarrh of the glands of Bartholini. This lady had suffered inexpressibly during the last four years, not only at the menstrual periods, but during the intervals. The sleep was broken. . . . . I gave a very doubtful prognosis, and as soon as I saw that neither narcotics nor absorbent medicines produced the least effect upon her condition, I advised her to visit a German watering-place. My advice was concurred in by a gynæcologist in Paris, and the patient on my strenuous recommendation spent two seasons at Kreuznach. On her return she felt in many respects better, but by no means completely restored to health." This patient ultimately left New York on account of symptoms of commencing tuberculosis, and the author could learn nothing of her subsequent history.

The chapter on "Recurrent Perimetritis" contains some passages which cannot fail to arrest the attention even of those familiar with the literature of the subject. The author has never seen a case of recurrent perimetritis in which he failed to prove the former existence of gonorrhœa either in the woman or in the man. He cannot understand how the phenomena of the disease are to be explained, except by the occasional emptying of the irritating contents of one or other Fallopian tube into the pelvic cavity, but as to the reason why this accident should occur in only a few women he cannot offer any suggestion. He thinks that any stimulus capable of producing

sudden powerful contractions of the uterus and Fallopian tubes may produce in that way expulsion of the contents of the tubes into the pelvic cavity, and among these causes, which have been illustrated by cases of specific tubal catarrh in his own practice, he mentions: coitus after long absence of the husband, introduction of the uterine sound even in cautious and experienced hands, the application of bland intra-uterine medicaments, the wearing of intra-uterine pessaries, incision of the external or of the internal os, dilatation by sponge tents, and other manipulations. And such results he has observed only as the consequence of manipulations in women who were the subjects of latent gonorrhœa. "At least the presence of this affection explains, in by far the largest number of cases, the occurrence of the so-called 'accidents,' which, to the astonishment of the much-cutting uterine surgeon, sometimes come upon him like a thunderbolt from a cloudless sky. . . . I am far from saying that every fatal result of these minor operations is the result of perimetritis due to tubal catarrh, and I am persuaded that phlebitis and lymphangitis supply their contingent. This last, however, is the exception, the first the rule."

The notes of a case of recurrent perimetritis make, as a rule, a long story, and it would be tedious if I were to quote any of Noeggerath's cases in full. We are concerned at present only with the relations of supposed gonorrhœal infection to the after-history, and the author's evidence in proof of such relations can be exemplified by extracts from a few typical cases.

His eighth case is that of Mrs. F., a well-developed and beautiful Englishwoman, who was married to a young merchant in 1861. The gentleman had been under treatment for a rather obstinate gonorrhœa by a friend of Noeggerath's, but for three months before his marriage not a trace of the disease was to be seen. He was assured that it was quite safe for him to get married, and he acted on the advice. All went well for about six weeks, and then the lady began to complain

of a pain in the side, which at last increased to such a pitch that she had to take to bed. The husband's doctor was consulted, and diagnosed pelvic peritonitis, which he treated energetically. The patient was confined to bed for two months, and has been ailing ever since—1861 to 1872. All the symptoms are referable to the condition of the pelvic organs, which is given in detail. Then follows the history of ten years of bad health, varied with periods of more acute suffering.

The next case is that of a lady who was brought to New York in the beginning of 1872 to be under the author's care. When a bachelor the husband had suffered from gonorrhœa, which required many months for its cure; but it had disappeared for two years before marriage. In answer to the question whether every trace of it had disappeared, he admitted having noticed, after his marriage, an adhesion of the urethral orifice, and to have experienced occasional discomfort in micturition. Ten months after marriage the wife was confined of a healthy child, and since then (18 years) she has never become pregnant again. Soon after her confinement she began to complain of pain in the left side, and a sense of weakness in the pelvis. Then follows a history of wanderings in search of health from one European health-resort to another, and back to America. There were six distinct attacks of pelvic inflammation. Digital examination proved the existence of a mass of exudation in the pelvis, enlargement of the ovaries, and matting together of the pelvic organs generally. Noeggerath evidently despaired of doing any good, and recommended her to visit a Canadian watering-place.

These are fair examples of the half-dozen cases given as illustrations in this portion of the work. They have all these two points in common, that they are incurable ailments, entirely destroying the health and happiness of women who were healthy before marriage, and that they all show a history of gonorrhœa in the husband, which is brought out in a more or less convincing fashion as the cause of the wife's sufferings.

One more case may be quoted, chiefly for the sake of illustrating a point to which attention must be called later on, viz., the import of *neglected* gonorrhœa in men in relation to the gonorrhœal infection in women.

Case 12 (Noeggerath's Case 19).—"Mrs. V., an American lady, married six years before, as a healthy girl, to a man who suffered from a neglected gleet until shortly before marriage. The husband assured me that for two months before marriage he was quite well. Directly after the marriage the wife began to complain, had a leucorrhœal discharge, and suffered from pain in the right side, and sacralgia. Menstruation also became irregular and painful. She was treated by a series of doctors without any lasting benefit. On examination, I found a very sensitive 'succulent' uterus dislocated to the left, both ovaries very painful, especially the right, which was enlarged and fixed close to the uterus in an exudation mass. There were large ulcerated areas on the labia, and catarrh of the glands of Bartholini. After two months' treatment the patient had a slight attack of acute perimetritis." . . .

In the chapter on chronic ovaritis and catarrh, the author calls attention to the importance of inflammation of the glands of Bartholini as a sign of previously-existing gonorrhœa. It has been usual to rely on the presence of an inflammation of the urethral mucous membrane as a diagnostic mark, but this is comparatively evanescent; the reddening of the orifices of the vulvo-vaginal glands, on the contrary, remains for years. "In the natural condition the openings of the ducts of both glands are seldom visible to the naked eye. When, however, you examine a woman who in former years has suffered from gonorrhœa, it is the rule that if you pull the labium minus away from the remains of the hymen, you see, between the upper and lower caruncula myrtiformis, a deep red point, covered with the glassy mucus. From this point, as a centre, there extends upwards and outwards a streak, which gradually becomes paler, and ultimately fades into the colour of the surrounding mucous membrane." These appearances are said

to be characteristic of catarrh of the glands of Bartholini. That such an inflammation is caused by gonorrhœa, and that it is persistent, there can be no doubt, but whether it is characteristic of gonorrhœal inflammation alone, or may result from inflammatory conditions set up by other causes, yet remains to be settled by further clinical observation.

On the subject of sterility as a consequence of latent gonorrhœa, Noeggerath carries his conclusions further than the evidence produced seems to justify. He maintains that gonorrhœa is a common cause of sterility in the man, producing azoospermia, and he gives cases in proof. He is more convincing in dealing with the analogous effect on women, and he makes out a better case, though here also he leaves an impression of going beyond the record in the statement of opinions.

His treatment calls for little notice, not because of any deficiency in its merits, but because for our present purpose it is irrelevant. It is the treatment pursued by a judicious, scientific, and most patient physician, yet the most striking thing about it, perhaps, is its inefficacy. Noeggerath never hints at operative treatment, except to condemn it, but it is probable that few chapters have ever been written in more eloquent and telling support of surgical interference in this class of ailments than the portion of his short work which is devoted to treatment. Neither is this the place to deal with any conclusions which may suggest themselves from considering Noeggerath's work in the light of later experience, or to discuss wide-reaching questions which arise out of the subject and to which he himself explicitly calls attention. His more definite conclusions are perhaps best given in a nearly literal rendering of his own words :—

(1) "Gonorrhœa in the man, as well as in the woman, persists for the whole life-time, in spite of apparent cure.

(2) "There is a latent gonorrhœa in the man as well as in the woman.

(3) "Latent gonorrhœa in the man as well as in the

woman, may evoke in a hitherto healthy individual either a latent gonorrhœa or the symptoms of an acute attack.

(4) "Latent gonorrhœa in the woman manifests itself in course of time by perimetritis, acute, chronic, or recurring; or by ovaritis, or as a catarrh of some definite portions of the genital mucous membrane.

(5) "The wives of men who at any time of their lives have had gonorrhœa are, as a rule, sterile.

(6) "Such women, if they do become pregnant, either abort or bear only one child. Exceptionally three or four children are born.

(7) "From the discharge of a woman affected with latent gonorrhœa a fungus may be cultivated, which is exactly analogous to that obtained from the discharge of acute gonorrhœa in the man."

Much of this is now merely matter of historic interest; as the expression of opinion which first attracted serious attention to the subject, and led to the further observations which have brought about an entire revolution in the professional estimation of the importance of this class of disease.

Noeggerath has lived to greatly modify his first impressions. In the paper already referred to (p. 22) he states that he has given up his pessimistic standpoint, viz., that gonorrhœa is incurable, and that ninety per cent. of all married men who have had this disease infect their wives. He admits that if you ask ten men, eight or nine may say they have had gonorrhœa, yet it would be unjustifiable and arbitrary to assume that any disease of the organs of generation occurring at a later time in the wife is due to gonorrhœic infection.

When husbands deny that they have retained traces of gleet or a gonorrhœa until just before marriage, Noeggerath's rule is to thoroughly examine the urethra. Some of the worst cases of acute and recurring perimetritis which he has seen have occurred in the wives of husbands who had been dismissed as cured from gonorrhœa shortly before marriage. Of 24 patients suffering from acute and recurring perimetritis 12 were married

to men who were cured one to three months before marriage, one man had been cured 5½ months, another a year, six had been healthy two years before marriage, two married 2½ years after stoppage of the gonorrhœa, one had had no symptoms of disease for 10 years, and one for 11 years. These are the opinions formed by 15 years' further experience. His views with regard to puerperal infection will be mentioned in the proper place.

Noeggerath's first work was more an influence than an extensive addition to the sum of knowledge; a fruitful idea, under whose inspiration other men saw in a fresh light the facts of daily experience, and could recognise in them the material suitable for building up the required superstructure of new knowledge. We can only look at the work of the most important contributors, those who by observation and research have added the largest amounts to our knowledge, or who have modified in some important respect the general views by the contribution of influential ideas.

The first fruits of Noeggerath's work in Britain appeared early, if the crop has not been extensive since. In 1873 Dr. Angus Macdonald[1] read a paper before the Obstetrical Society of Edinburgh, which contained a report of some striking cases in support of Noeggerath's position, and an expression of opinions which might almost be called prophetic. In the course of his remarks he says that Noeggerath "really seems to prove his positions well, strong and strange though they appear to be. I must confess, however, that I cannot help feeling convinced that he proves too much. . . . That, however, Dr. Noeggarath has got hold of a grand idea, and one which possesses a large amount of evidence in its favour, no one, I think, can deny who reads the recorded cases fairly." The author then proceeds to give the details of seven cases, in which gonorrhœal infection had given rise to more or less severe puerperal illness. The gonorrhœal

[1] "Latent Gonorrhœa in the Female Sex, with Special Relation to the Puerperal State." By Dr. Angus Macdonald.—*Edinburgh Medical Journal*, June, 1873.

puerperal fever was in one sad case fatal. The whole of Dr. Macdonald's cases go to disprove a point that Sänger has recently insisted upon, viz., the constantly late onset of the gonorrhœal form of puerperal fever as compared with the early appearance of symptoms in cases originating otherwise. That some gonorrhœal puerperal cases are late in developing their severer symptoms, there is little room for doubt, but the cause of variation in this respect is still in obscurity. For the sake of calling attention to this point, which is obviously important, and interesting inasmuch as it is still unexplained, it may be worth while to insert here Dr. Macdonald's first case, and place by it for comparison one which came recently under my observation.

Case 13 (Dr. Angus Macdonald's Case 1).—"Mrs. S., aged 24, was delivered of a female child after an easy labour, on the 15th of April, 1869. Previous labours two, and had been quite normal. Both mother and child did well until about the fourth or fifth day, when the mother was seized with severe pain in the abdomen, accompanied with great tenderness on pressure, and a considerable amount of fever. This pain and tenderness, however, disappeared in about a week or ten days, under the influence of opiates internally, and the application of poultices externally. About the same time as the mother became ill, the baby's eyes were noticed to be affected with severe conjunctivitis of a suspiciously specific character. On inquiry, I ascertained that the husband of my patient had, during the time she was carrying this child, been affected with discharges of a gonorrhœal character, but that she herself had not suffered in consequence, except that she had some leucorrhœa before her confinement. She had had no pain on micturition, nor any swelling of the parts, as far as she could remember. The child's eyes were treated." . . . The mother made a slow recovery, but was able to be out of bed by the end of five weeks. "About this time, after being at church getting her child baptised, my patient was suddenly seized with excruciating pain in the left side of the pelvis,

about the situation of the left ovary, accompanied with quick pulse and fever. This, on physical examination, gave all the usual signs of a perimetritis originating near the opening of the left Fallopian tube, and spreading forwards and towards the right, so as to involve the anterior half of the pelvis, and fix the uterus in position. For this attack she was treated by poultices and opiates, as well as, latterly, with the bromide and iodide of potassium, and other remedial agents. She made an exceedingly slow recovery, and was more than six months almost entirely confined to bed. . . . Since then I have ascertained from her that she suffers more or less severely at each menstruation from pain in the left groin, and that when she menstruates she is usually ill for nearly three weeks at a time, though not very much blood comes away at any one time. Since I attended her, in 1869, she has given birth to two healthy children. . . . She is now in tolerably good health."

Case 14.—B. J., æt. 24, married two years and a half. Had one child a year after marriage. She came under my care owing to a chronic ailment, which was ascertained to be perimetritis, with double laceration of the cervix uteri. The anamnesis supplied the following facts:—The patient was well until her confinement; she had copious leucorrhœa during her pregnancy, but no urinary trouble. Two weeks after her confinement some severe inflammatory illness, affecting the abdomen, came on, and she was in bed several weeks. She has suffered from pain in the left iliac and inguinal regions more or less ever since. The child suffered from an inflammation of the eyes, with discharge of matter, for which it was successfully treated by the doctor in attendance on the mother. There have been several relapses since the patient's recovery from the first acute illness, the last dating from a fortnight before she came under my observation. In an interview with the husband, I learned that he had a gleet for over a year before his marriage, but considered himself quite cured for

two months at least before the marriage took place. He observed, however, for a long time, that after sexual intercourse there used to be a moistening and adhesion of the meatus. This patient is still under treatment, and other facts of the case may have to be referred to in illustration of points which would at present seem irrelevant.

There can be no doubt that the case is one of late gonorrhœal puerperal fever, and the course of the disease is that of a recurrent perimetritis. This is a fairly typical case, and the present purpose is served by placing it in juxtaposition to Dr. Angus Macdonald's typical case of early development of the inflammatory symptoms. But the relation of gonorrhœal infection to the puerperal diseases is too important to be treated only incidentally.

The late Dr. Thorburn, of Manchester, paid some attention to gonorrhœa in its relation to gynæcology, but soon concluded that it was unimportant. At the meeting of the British Medical Association held at Manchester in 1877, he read a paper on "Latent Gonorrhœa as an Impediment to Marriage," of which a too concise summary is given in the *British Medical Journal*, of August 25th, 1877. Dr. Thorburn denied the possibility of Noeggerath's conclusions being correct, and "appealed to the statistics of 81 private families, carefully collected by him. He showed that there had been 33 per cent. of male gonorrhœic infections previous to marriage, 26 in all; and taking all the cases of abortion, sterility, uterine, and pelvic inflammations, and living births that had occurred in these eighty-one families, he showed conclusively that there had been the merest fractional difference in their proportion between the previously and not previously infected classes. As regards inflammatory pelvic affections, the balance was fractional in favour of the free gonorrhœic cases; in other respects equally fractional in favour of the non-gonorrhœic." The conclusion was that the latent gonorrhœa of Noeggerath is mythical; and is not, as it otherwise would be, an imperative barrier to marriage. It is not for me to go behind the statements here quoted and try to

explain them away or minimise them. They do not seriously affect the question whether or not gonorrhœa may be an important factor in the causation of the diseases with which the gynæcologist has to deal. It must at once strike the reader, possessed of local knowledge, that Dr. Thorburn's statistics would be drawn from a class of people, exceptional to some extent in this respect that they would be specially careful and cleanly in their habits, and specially careful of their own health and that of their families, reducing to the minimum both the chances of contagion and the consequences of contagion, if perchance it did occur. However, I am concerned at present only in giving illustrations of the clinical work done under the influence of Noeggerath's "grand idea," and before the discovery of the gonococcus. We come now to the work of Neisser.

Neisser's Discovery and its Influence on Research and Observation.

So early as 1869, Hallier[1] had discovered and described the cocci which occur in gonorrhœal pus, but in the absence of sufficient means of magnifying, colouring, and illuminating the objects examined, his work attracted little attention.

In 1879, Dr. Albert Neisser,[2] at that time assistant in the University Clinic for Dermatology at Breslau, published an account of his observations. Whatever suggestions may have been thrown out by previous investigators, there can be no gainsaying the fact that it was Neisser's publication which gave the stimulus and guidance to workers in the same field, and has led to an ever increasing and widening process of research and experiment, by both clinicians and biologists.

Neisser found that when he prepared the pus of gonorrhœa in a certain way, he could see, in and about the corpuscles, micrococci, which he concluded must be characteristic of the

[1] *Zeitschrift für Parasitenkunde*, 1869. Bd. I., p. 179.

[2] "Uber eine der Gonorrhoe eigentümliche Micrococcusform."—*Centralblatt für die medicinischen Wissenschaften*, 1879, No. 28.

disease. He put the thinnest possible speck of pus upon the object glass, and allowed it to dry; he then stained the pus with a watery solution of methyl violet, and allowed it to dry once more. It was then ready for examination. In his investigations, Neisser used a Zeiss's microscope with Abbé's illuminating apparatus, $\frac{1}{12}$th oil immersion lens, with ocular No. 4 or 5. On bringing the object into focus, besides the nuclei of the pus cells, varying in form and deeply stained, while the protoplasm took on the dye but slightly, there could be seen more or less numerous groups of micrococci. Single individuals were seldom to be seen; almost always there were two micrococci so close to each other as to give to the observer the impression that they were one organism. He described each double individual as forming a figure-of-eight, or as a pair of dinner-rolls placed with the flattened surfaces close to each other. He believed that they developed by a process of division, each half of the double organism gradually dividing and forming a fresh double organism. This process is shown in diagrammatic form in the accompanying illustrations taken from Bumm's work (Fig. 2c). The micrococci for the most part formed colonies of 10, 20, or more individuals, and they were surrounded by a mucous envelope, which could be distinctly seen under a more subdued light. The micrococci were found chiefly on the surface of the pus corpuscles, rarely on the epithelial cells. In some pus corpuscles which were beset with micrococci, the nucleus was wanting or diminished in size.

Neisser, at the time of publishing his first essay, had found the micrococcus in 35 cases which he had examined. In every case examined this was the only sort of micro-organism found in the gonorrhœal pus, with the exception of a case which was suspected from the first of being complicated with soft chancre of the urethra. On the other hand, this particular micro-organism was not present in the pus from every other form of venereal disease or complication. Nor could it be discovered in any one of thirteen cases of simple fluor vaginalis submitted to examination without selection.

Exactly the same typical micrococci of gonorrhœa in the male were found in nine cases of purulent urethritis in women. In the seven cases of purulent ophthalmia of the new-born, which had so far come under examination, the same characteristic micrococcus was found in great abundance. In all cases of simple conjunctivitis, which were examined for the sake of comparison, the micro-organism was looked for in vain. It was present in the only two cases of gonorrhœal ophthalmia in the adult which had come under observation.

The presence of the micrococcus consequently appeared to Neisser to be a constant mark of a gonorrhœal affection of the urethra, and of the eye; and even at the time of publishing his observations, he had repeatedly made use of this fact in order to diagnose the specific gonorrhœal character of pus.

The publication of this discovery in Germany, at a time when Koch's countrymen were full of confident expectation as to the future of the new bacteriology, attracted to it universal attention, and brought a host of workers into the field. It was not to be expected that the results of all observers would agree, and the history of seven years' industrious observation and experiment shows a good deal of difference of view on even essential features of the subject. Neisser himself has been constrained to modify his original opinions, but, upon the whole, his work has been only supplemented and established by subsequent observers. The reader to whom the subject is comparatively new, when endeavouring to get at that which is acquired and added knowledge, amid a good deal of conflict of evidence, even in matters of fact, should not be discouraged into relinquishing the quest. He should remember that while most of us look upon Jenner's discovery as one of the greatest boons ever conferred upon mankind by medical science, there are still not a few who denounce it as a curse; and among these there are to be found men who have had the opportunity which a medical education offers of acquiring scientific modes of thinking, and so subordinating their emotions to their

intellect when discussing scientific questions. Similarly, it will be possible, I think, to trace in the work of some contributors to the elucidation of the questions arising from Neisser's discovery, the influence of fixed and rooted opinions, and perhaps also of bias of even less creditable origin, in judging of new facts.

As Neisser's discovery emanated from a clinic for dermatology, the dermatologists and syphilologists were among the first to publish observations. The presence of the micro-organism in the ophthalmia of the new-born interested the ophthalmologists and obstetricians, and other inquirers soon followed suit. It seems to be the custom for the specialists in Germany to publish their results, for the most part, in their special journals, and so the literature of a subject such as that under consideration, which claims the attention of several specialists, is almost inaccessible to the foreigner. Bumm, of Würzburg, whose work we must chiefly draw upon, mentions fifty-two contributions up to the beginning of 1886, and I find forty papers on ophthalmia neonatorum alone abstracted in the *Centralblatt für Gynäkologie*, in the six years 1881-86, some of them, like Credé's, being considerable treatises. It is only possible, therefore, in trying to get a clear view of the present state of opinion on all that relates to the gonococcus, to select merely the contributions which have added something to our knowledge and have stood the assay of criticism and later experience.

In 1880, A. Bokai[1] published the results of attempts to cultivate the micro-organism. He succeeded in obtaining pure cultivations, and in two cases he believed that he was successful in producing acute gonorrhœa in men by transferring a few drops of the fluid containing the crop of pure gonococci to the urethra. In the same year F. Weiss,[2] of Nancy, prepared a thesis, under the guidance of Prof. Spillmann, in which he

[1] "Ueber das Contagium der acuten Blennorrhoe."—*Allgemein. med. Central Zeitung*, 1880, No. 74.

[2] Weiss: Thèse; Nancy, 1880. Published in *Annales de Dermatologie*, 1881.

described afresh the organisms observed in gonorrhœal pus, and alleged that it was constantly found in a large series of cases.

Haab,[1] who has published at least two important papers on the ophthalmological aspects of the subject, found the cocci of blennorrhœa neonatorum absolutely identical with those of gonorrhœa. He met with the figure-of-eight coccus constantly in the virulent inflammation of the conjunctiva, and as constantly failed to find it in the pus produced by simple catarrh. In the second paper, which is devoted to the "Etiology and Prophylaxis of the Ophthalmo-blennorrhœa of the New-born," he says that he recognises the disease as of gonorrhœal origin only when he has made out by the microscope the presence of gonococci. Ordinary vaginal and lochial discharges do not produce blennorrhœa, but a simple purulent catarrh; without the microscope the differential diagnosis is impossible in the early stage.

After several of the ophthalmologists had published their observations, all of them adding to the proof of the justness of Neisser's original statements, Neisser[2] himself again came forward with the results of more mature investigation. He maintained that the gonococcus is a distinct organism, both functionally and morphologically. He again described its size and shape, and explained that its occurrence always in masses or colonies, never in chains, depends upon its mode of development, which is by a process of division at right angles to the long diameter of each element of the double individual. It is absolutely constant in every gonorrhœal inflammation of a mucous membrane, and it occurs in no other disease. He had succeeded in obtaining pure cultivations of the organism.

About the same time an important contribution to the subject was made by Leistikow,[3] assistant in the Clinic for

[1] Haab. *Korrespondenzblatt für schweizer Aerzte*, 1881, Nos. 3, 4; and same journal, 1885, Nos. 1, 2.

[2] "Die Micrococcen der Gonorrhoe."—*Deutsche med. Wochenschrift*, 1882, p. 279.

[3] "Ueber Bakterien bei den venerischen Krankheiten."—*Charité-Annalen*, VII., p. 750. Abstract in *Centralblatt für die med. Wissenschaften*, 1883, No. 22.

Syphilis in the Berlin Charité Hospital. He failed to find any bacterium characteristic of hard or soft chancre, but he was able to demonstrate the occurrence of Neisser's gonococcus in the gonorrhœal inflammation of all the mucous membranes. He found that the gonococci were not on but inside the pus corpuscle, and that the development of a large number of them caused bursting of the cell-wall. His attempts at inoculating various animals with pure cultivations of the gonococci gave no result.

In the following year Bockhart,[1] of Würzburg, published a curious experiment, whose results introduce us for the first time to some acquaintance with the tissue changes produced by the development of the gonococcus. He obtained pure cultivations of the gonococcus, and he injected some of the fourth generation into the hitherto perfectly healthy urethra of a man in the last stage of dementia paralytica. Two days later the external orifice of the urethra was found to be slightly reddened, and a drop or two of a mucous secretion could be expressed. In the course of the two following days the scanty discharge had become purulent. On the fifth day a copious thin mattery discharge could be pressed out from the canal. From the third day onwards microscopic examination revealed the presence in the pus of innumerable gonococci. The patient died at the end of ten days, and thus Bockhart was enabled to make a microscopic examination of the diseased mucous membrane. He concluded that the gonococci are the pathogenic bacteria of the gonorrhœal diseases. When brought into contact with urethral mucous membrane they penetrate, probably between the epithelial cells, into the lymph spaces of the mucosa and submucosa of the fossa navicularis; here they multiply and give rise to active inflammation and migration of white blood corpuscles. They enter the white blood corpuscles, and penetrate with them into the blood

[1] "Beitrag zur Ätiologie und Pathologie des Harnröhrentrippers."—*Sitzungsbericht d. phys. med. Gesellschaft zu Würzburg*, 1883, Nos. 1 and 2. Abstract in *Centralblatt für Gynäkologie*, 1884, No. 36.

vessels and push on in the connective tissue of the mucosa and pars cavernosa upwards towards the bladder. They destroy the white corpuscles into which they have migrated, and are themselves ultimately destroyed in the tissues or in the blood stream. Thus far, observers are unanimous in their agreement with Neisser, but now Sattler and Eklund, working at different subjects, announced their opinion that the micrococcus cannot be specific. The former concluded that he had obtained the characteristic, so-called specific gonococci, in the discharge from the eyes of a new-born child purposely inoculated with the vaginal secretion of an apparently healthy woman. The latter believed that he had found exactly similar and apparently identical micro-organisms in other purulent discharges than those of gonorrhœa. Schirmer,[1] assistant in Sattler's clinic at Erlangen, has also mentioned one case in which typical blennorrhœa of both eyes came on in a new-born child from accidental contact of some vaginal discharge of the mother with one of its eyes. He says the mother was quite clean, but he does not refer to any microscopic examination of her discharges or to any attempt at cultivation of the organism in proof of the truth of his assertion. His evidence, therefore, becomes reduced to the "frivolous anecdote" rank, such as the reported cases in which men are alleged to have contracted specific urethritis from perfectly healthy women.

Of quite a different sort is the evidence of Zweifel,[2] then also of Erlangen, it may be noted. Lochial discharge, varying in time post partum from the 3rd to the 13th day, was taken from lying-in women who certainly had never suffered from gonorrhœa, and applied with certain precautions to the conjunctiva of healthy new-born children. The lochial secretion was first carefully examined microscopically for cocci,

[1] "Die Augenentzündung der Neugeborenen."—*Centralblatt für Gynäkologie*, No. 14, 1882.

[2] "Zur Ätiologie der Ophthalmoblennorrhœa neonatorum."—*Archiv für Gynäkologie*, Bd. XXII., Heft 2.

and a few cocci, but no gonococci were discovered. The experiment was tried in six cases, and not only did no simple ophthalmia or specific blennorrhœa arise, but their eyes remained perfectly sound.

E. Arning,[1] working in Neisser's clinic, discovered the gonococcus in the discharge from the inflamed glands of Bartholini in eight cases of gonorrhœa. He coloured the cocci with methyl blue and the cell protoplasm with eosin. He was of opinion that the gonococci were *in* the cells, but he dissented from Bockhart's statement that they penetrated the nuclei.

Amidst a series of papers emanating from various sources, but adding little or nothing to our knowledge, we come upon E. Bumm's[2] first contribution. His subject is gonorrhœa in women, and he announces the discovery, in the vaginal secretions, of more than one diplococcus exactly similar in form to Neisser's gonococcus. The real pathogenic organism he could separate from the non-pathogenic only by means of pure cultivation. The substance of this paper is contained in the author's large work, which we have yet to examine, and we may therefore omit any further reference to this early production.

Kammerer[3] announces the discovery of the gonococcus in the fluid contained in the knee-joint in gonorrhœal rheumatism. But the evidence does not seem very conclusive. He mentions two cases, in both of which there was a history of injury to the joint, and the proof of the existence of either rheumatism or gonorrhœa is not satisfactory.

Kroner,[4] of Breslau, read a paper in the gynæcological section

[1] "Ueber das Vorkommen von Gonokokken bei Bartolinitis."—*Vierteljahrsschrift für Dermatologie und Syphilis*, X.

[2] "Beitrag zur Kenntniss der Gonorrhoe der weiblichen Genitalien."—*Archiv für Gynäkologie*, Bd. XXIII., Hft. 3.

[3] "Ueber gonorrhoische Gelenkentzündung."—*Centralblatt für Chirurgie*, No. 4, 1884.

[4] "Zur Aetiologie der Ophthalmoblennorrhœa neonatorum."—*Archiv für Gynäkologie*, Bd. XXV.

at the meeting of the German Natural Science and Medical Association at Magdeburg in 1884, in which he gave the results of observations on 92 cases of the ophthalmia of the new-born. He found gonococci in 63 cases, and in 29 cases he failed to find them, in spite of the most careful search. He therefore concluded that there are two forms of blennorrhœa of the new-born, but apart from the presence or absence of gonococci he cannot make out any clinical difference between the forms. Kroner leaves the theme of his observations without any very definite statement of opinion. The subject has yet to be worked out, and that can only be done where the material of a lying-in hospital and an eye hospital can be brought into comparison and carefully and patiently dealt with.

At the same meeting Sänger,[1] of Leipzig, brought forward the subject of "Gonorrhœal Disease of the Uterine Appendages and its Operative Treatment." He stated that the hope aroused by the discovery of Neisser, that in the gonococcus we should find a means of diagnosing chronic gonorrhœa, had proved to be vain. He held it as an established fact that gonorrhœa could exist without the demonstrable presence of gonococci. The absence of the gonococcus proved nothing against the gonorrhœal nature of the disease, whilst the presence of diplococci, in view of the occurrence of non-pathogenic forms, did not prove the gonorrhœal nature of the disease. If the cocci cannot be found, they may have been somewhere broken up, whilst a ferment produced by them may still be active; or they are absent from the secretion while present in the tissues; or there exists—and this would render the high degree of infectiousness of the comparatively trifling amount of secretion in latent gonorrhœa the most intelligible—a permanent form (Dauerform) of the gonococcus not yet discovered. He suggests, by way of analogy, Koch's discovery of the spores of the bacillus of splenic fever, unknown till then.

This contribution of Sänger's, to which, as well as to the more mature essay already quoted from, reference will have

[1] *Archiv für Gynäkologie*, XXV. 1.

to be made again, seems to me a most important one. From my own experience, I should say that there can be little doubt as to the difficulty of finding the gonococcus in chronic gonorrhœa in women. In cases of only a few months' standing, most certainly gonorrhœal in their nature, which have been under treatment, it has been almost invariably impossible to discover the gonococcus, however numerous other bacterial forms might be. If this be established as a fact by general experience, the sooner it is recognised as a fact the better. Fuller knowledge of the life history of the organism must furnish the explanation, and may lead to notable practical conclusions. The absence of the gonococcus in old standing cases is in striking contrast to its uniform presence in acute or sub-acute cases in the invasion stage. But of this more has to be said in its proper place. It should be remembered, however, that Neisser[1] has found the gonococcus in a remarkably large proportion of old chronic cases in men, and further experience may produce similar results from the gonorrhœal catarrh of the cervix uteri. Westermark's discovery of gonococci in the exudation of salpingitis is not a case in point.

In 1885 we have, besides several papers of practical value, such as Oppenheimer's already referred to, a series of observations by E. Fränkel,[2] which as yet stand almost alone and unexplained. He found in the discharge from the non-gonorrhœal colpitis in children, diplococci which were in every respect absolutely identical with the gonococcus. Fränkel's communication elicited a further contribution on this obscure subject from J. Cséri,[3] of Budapest, which, unfortunately, contains no results of the cultivation experiments referred to as having been instituted. The danger of infection from some

[1] "On the Contagiousness of Chronic Gonorrhœa."—*Transactions of the Congress of German Naturalists and Physicians at Strassburg, 1885.* Abstract in *Centralblatt für die med. Wissenschaften*, 1886, No. 32.

[2] "On the Results obtained from the Examination of the Secretion in Colpitis occurring endemically."—*Deutsche med. Wochenschrift*, 1885, No. 2.

[3] "On the Etiology of Infectious Vulvo-Vaginitis in Children."—*Wiener med. Wochenschrift*, 1885, Nos. 22 and 23.

cases of colpitis in children has been long well-known to the staff of the Stephanie Children's Hospital, in Pesth. Since October, 1883, the discharges in 26 female children, varying in age from two to ten years, had undergone microscopic examination, and in every one a large diplococcus bearing a striking resemblance to Neisser's gonococcus had been found. Biologically both cocci appear to be identical. The contagiousness of the discharge is very great, and contact of it with the conjunctiva may lead to serious results. Cséri mentions the case of a short-sighted nurse, who, in syringing a child with colpitis, got her eye infected by accident, and lost it in consequence of conjunctival blennorrhœa.

Further observations on this subject were published by J. Widmark[1] in the same year. He merely states that he has found the gonococcus in eight cases examined, but he does not seem to have proved the identity of the micrococcus present with Neisser's gonococcus.

The most recent French literature on the subject of the gonococcus is summed up in Martineau's[2] work. The author has worked at the subject alone, and in company with Goguel, and is perfectly satisfied as to the existence and pathogenic nature of the gonococcus. He claims for Bouchard precedence of Neisser, by one year, in the discovery and description of the micro-organism. The observations and experiments made by the French physicians have been the same in kind, though not so extensive, as those carried out in Germany, but no one is referred to as having failed to satisfy himself of the importance of Neisser's discovery.

This fact is in marked contrast to the import of the contributions from Italy. In that country several workers have submitted the results of their German contemporaries to a destructive criticism, and have sought to prove that the gonorrhœa diplococcus of Neisser, considered as the patho-

[1] "Gonococci in eight cases of vulvo-vaginitis of children."—*Archiv für Kinderheilkunde*, VII.

[2] "Léçons cliniques sur la blennorrhagie chez la femme." Paris, 1885.

genic element in blennorrhagia, does not exist.[1] The last of these, Giovannini, merely gives categorically a summary statement of conclusions derived from work in the Pathological Institute of Bologna. Until he has described the method by which his results have been obtained, we may suspend our judgment.

Chapter III.

CONTEMPORARY PATHOLOGY AND THE "GONOCOCCUS-NEISSER."

We have now passed in review the history of Neisser's discovery, and the chief episodes in the course of the evolution of our knowledge of the subject which have modified the original conclusions with regard to the morphology and functions of the gonococcus. Setting aside in the meantime the objections which have been raised on the basis of more or less complete and mature investigations, and accepting provisionally the broad conclusion that the gonococcus is the active agent, the pathogenic element, in the production of the gonorrhœal diseases, whether they affect the sexual organs of the adult or the conjunctival mucous membrane of the newborn, we may now proceed to look at the organism more closely, and consider how we are to detect its presence, and how we may bring our knowledge to bear upon the diagnosis and the treatment of disease. Some refinements with regard to morphologically similar micro-organisms, and the mode of differentiating them from the true pathogenic gonococcus, can be considered when we have become more familiar with the ordinary methods of looking for the bacterium.

In order to save frequent repetitions and references, I ought to state explicitly here that in writing this chapter I have constantly drawn upon the work of Dr. Ernst Bumm, of

[1] De Amicis: *Revista clinica terapeutica*, March, 1884; and Giovannini: *Central blatt für die med. Wissenschaften*, No. 28, Nov. 27, 1886.

Würzburg, whose treatise[1] is by far the most important and original that has so far appeared upon the pathology of the gonorrhœal infections.

Examination of a Suspected Secretion.

In a case of alleged simple urethritis in a man, of suspicious purulent discharge from the pudenda of a woman, or of conjunctival inflammation in a new-born child, how can the practitioner decide whether he has to deal with a simple catarrh or an inflammation of specific origin? He must look for diplococci in colonies or groups within the leucocytes or pus cells of which the discharge is composed. How is he to look? In order to be available as a practical clinical procedure, any method of investigation must be simple and rapid, like the process of testing urine for the presence of albumen or sugar. A difficulty in the way of popularising any process, is the cost of the apparatus, and the care required to keep it in good working order. A good microscope, with a $\frac{1}{12}$th homogeneous immersion lens, is an essential provision. My observations have been carried on or verified with a Zeiss's microscope, provided with Abbé's illuminating apparatus; the objective is a Powell and Lealand's $\frac{1}{12}$th oil immersion, and the eye-piece almost always Zeiss's No. 2 or No. 4. The ordinary apparatus and re-agents for microscopic work are supposed to be at hand in carrying out the following rapid clinical method of *looking for a diplococcus* in a suspected discharge.

A thin cover-glass, carefully cleaned, is held ready in a pair of suitable forceps, and a minute drop of the suspected pus is spread over a small area of its surface. This is quickly dried by holding it in the current of hot air high above the flame of a spirit lamp. Over the dry matter on the glass a drop of a concentrated alcoholic solution of methyl violet is let fall and allowed to spread. After a momentary pause, the superfluous solution is got rid of by turning the cover glass on edge and

[1] "Der Mikro-Organismus der Gonorrhoischen Schleimhaut-Erkrankungen 'Gonococcus-Neisser.'" 2nd Edition. Wiesbaden: J. F. Bergmann, 1887.

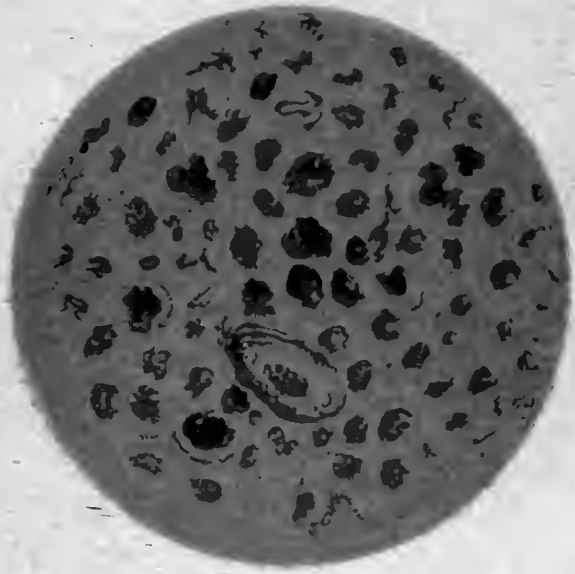
bringing it in contact with some clean blotting paper. The glass, now covered with a thin film of the dye-solution, is again raised for a few seconds above the spirit lamp, not long enough for it to dry. The dye is next washed away, as well as it can be, by bringing the cover-glass under a stream of distilled water from a wash-bottle. The cover-glass with the adherent stained film of discharge has now to be dried. The drop of water which adheres to it can be got rid of by bringing the object edgewise on to a piece of blotting paper as before, but still the glass remains wet, and even in the heat of the spirit-lamp it will take perhaps a minute to dry. This time may be saved, without drawback to the preparation as far as rapid clinical inspection is concerned, by immersing the wet cover-glass momentarily in absolute alcohol, which should be kept in readiness in a suitable vessel, such as a small wide-mouthed stoppered bottle. When the water is replaced by the alcohol, the drying above the flame of the spirit-lamp takes only a few seconds. A small drop of Canada balsam, dissolved in benzol, is now let fall upon the centre of the cover-glass, which is at once applied to the slide, previously cleaned and warmed. The preparation is now complete and ready for examination. With a little experience of this method, and when the appliances are all held in readiness, the practitioner will find that this method of looking for diplococci takes little more time than the ordinary testing of urine. There are obvious objections to the process if it be looked upon as a method of scientific research, but that is not its object. A quantitative analysis of the sugar in urine by even the shortest process requires time, but a qualitative analysis can be, and has often to be, made in the course of a consultation. So it may be desirable to know, in the course of a consultation, whether a discharge contains diplococci, and if it does, the overwhelming probability will be that the case is gonorrhœal, the anamnesis and the clinical features being available to perfect the diagnosis. For the purpose in view the method of examination which I have described is sufficient.

Bumm, in the monograph already referred to, says that at the Würzburg Clinic for Obstetrics and Gynæcology, they take only two or three minutes to make the preparations. For staining a watery solution of magenta (fuchsin) is used: the secretion is spread *upon the slide* and prepared in nearly the same way as that just described. When it is finally dried, the examination is made without a covering glass direct in the oil for the immersion lens.

Neisser's original method of examination could not be finished in one day because of the slow process of drying and staining, and Eschbaum's rapid method takes twenty minutes or half-an-hour. No process requiring such a length of time for its completion is suitable for the consulting-room, however admirable results it may afford in the pathological laboratory.

If it be desired to retain specimens for repeated examination and reference, all that is further required in the preparation of them is to employ a saturated solution in aniline water of the dye-material selected, and to take plenty of time in drying.

Now the next question is: What do we see in the examination of an object prepared as described? If there are gonococci in the field they will be distinctly seen. When absolute alcohol is used to promote rapid drying, the staining material may be found to have spread a little into the intercellular spaces, but not so as to interfere appreciably with the efficiency of the process. In Fig. 1 we have an attempt to represent the field of view, in a slide prepared from a real case, that of a young man who had been declared cured of a gonorrhœa a month before he came under examination. He was exactly in the condition in which men used to receive, and perhaps do still receive, medical sanction to marry. In consequence of "taking a glass of beer," he had the slightest possible return of discharge, and a speck of sero-purulent fluid supplied the object which the figure is intended to represent. It will be seen that the leucocytes are for the most part merely stained, and free from diplococci, the neuclei taking on a deeper coloration than the protoplasm. One epithelial cell occurs in



the field. The diplococci appear only as black dots, for the most part double, but not uniformly so. Some observers see a good deal more of detail in the individual organisms, but no refinements are to be expected from the rapid mode of preparation of the object. The appearance is, however, characteristic and unmistakable. In addition to the groups in or about the cells, it will be seen that two larger diplococci are visible with the epithelial cell as a background. These have probably fallen away from some disintegrating group; but, whatever be their origin, they are a common enough feature in the field of view in the ordinary course of searching a preparation for the gonococcus.

The illustrations in Fig. 2 are intended to show the relation of the micro-organisms to the other elements that come into view in the field during examination, and also to show some

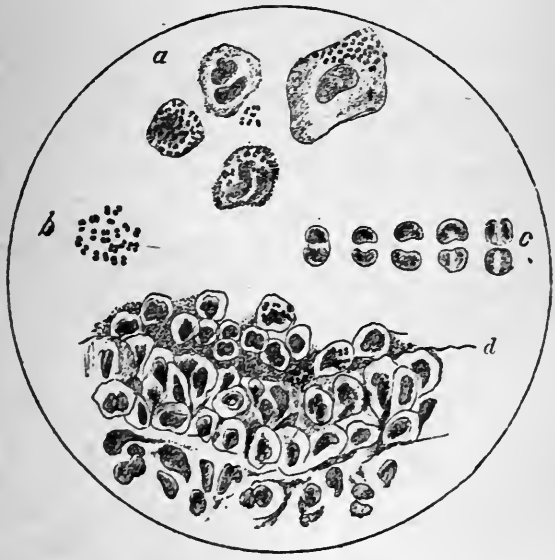


FIG. 2.

a.—This group contains: 1, a normal pus corpuscle; 2, a pus corpuscle partly surrounded with cocci; 3, a pus corpuscle with cocci in the protoplasm; 4, a pus corpuscle completely filled with cocci, and 5, a free colony or group of cocci. *b.*—Gonococci from a pure cultivation. *c.*—A diagrammatic representation of the development of gonococci. *d.*—Section from the conjunctiva, showing the presence of gonococci in the discharge before penetrating the epithelial covering.

of the details which should be made out by the observer after employing more careful modes of preparation than that just described. They are taken from Bumm's work, and are, as he explains, mostly diagrammatic. The explanatory notes sufficiently indicate the various relations of the micro-organism to the tissue elements, which may be seen in preparations of gonorrhœal pus.

It may now be asked: If in examining a discharge by the method described, the observer finds diplococci in groups or colonies, such as those figured above, is he justified in giving a decided diagnosis of gonorrhœa? Unfortunately the subject is not so simple as this, and a definite unassailable conclusion is not to be reached by such a summary process. In a suspected case, the discovery of diplococci arranged in the manner which has been described, makes it almost, but not altogether, certain that the disease is gonorrhœal. How then can we be certain? This brings us to the consideration of the diagnostic value of the presence of the gonococcus, and of a method by which it can be infallibly differentiated from any other micro-organism.

There can be no doubt that Bumm has proved the existence of micro-organisms which cannot be distinguished by the individual form alone from Neisser's gonococcus. He describes five different varieties of diplococci obtained by pure cultivation, only one of which, producing a yellowish-white film in the cultivation medium, is pathogenic. It is obvious that cultivation experiments cannot become a clinical method of differentiating micro-organisms which are identical or very similar in form, and we must therefore look for some more practical method. Such a method appears to have been discovered by Dr. Gabriel Roux,[1] of Paris. It depends upon the effect of Gram's staining fluid upon micro-organisms in general, including the diplococci resembling the gonococcus, as compared with its effect upon the gonococcus itself. Roux's application of Gram's method of staining consists in first colouring the

[1] *Le Concours Médical*, Nov. 13, 1886.

dried film of secretion which is to undergo examination with methyl-blue or gentian violet, fixing the colour, if it is fixable, with Gram's iodo-iodide solution, and then washing with absolute alcohol, so as to decolorise the pus or leucocytes in the secretion. Gram's liquid fixes the colour in all micro-organisms, as far as is known at present, excepting the gonococcus. Hence it follows that if the cocci, which have been observed in a specimen of discharge prepared in the ordinary way, completely disappear after the application of Gram's solution and washing with alcohol, they are Neisser's gonococcus. If on undergoing the same treatment they remain visible, that is, retain their colour, then they are some other form of diplococcus; and the case from which they are derived cannot be pronounced gonorrhœal on the strength of the microscopic examination alone.

Roux's method has been submitted to a severe trial by Dr. Charles W. Allen[1] and Dr. Edmund C. Wendt,[2] of New York, and they both express confidence in it as an exact test. These observers have worked together, and though writing in different journals they practically give identical reports. Dr. Allen says: "We have examined pus containing a great variety of forms of bacteria, and find that, while the double coloration method brings out all other micro-organisms more beautifully than any other process we have employed, decolorisation removes the staining from the gonococci and causes them to disappear, while other micro-organisms are not decolorised. Here, then, we have a method which, when carefully carried out, appears never to fail, and has the great advantage of simplicity." The process of examination, as practised by himself and Dr. Wendt, is thus described: "A drop of pus is spread into a thin layer by pressing between two glass slides, and allowed to dry in the air. A drop of a solution of methyl-

[1] "Practical Observations on the Gonococcus, and Roux's Method of Confirming its Identity."—*Journal of Cutaneous and Genito-Urinary Diseases*, March, 1887.

[2] "A New Colour Test (Roux's) for the Detection of the Gonococcus."—*Medical News*, April 23, 1887.

blue in aniline water is now placed upon it for a moment, and washed off with a stream from a wash-bottle; a few drops of Gram's iodo-iodide liquid is then poured on, and allowed to remain for several minutes. This fixes the colour on micro-organisms in general. Gram's liquid is now washed off, and while the specimen is still wet, a cover glass is placed upon it, and it is examined with an oil immersion lens. If micro-organisms resembling the gonococcus are found, we proceed to test them by decolorisation. The cover-glass is removed, and the specimen treated with absolute alcohol, until the colour is as completely removed as possible. The cover-glass is replaced, and the specimen again examined, when all gonococci will have been found to have disappeared. All other organisms, however, which may have been present will be distinctly visible. If desirable, the pus cells may be brought out again by applying a solution of eosin. By this method we have been able to exclude all cases which would have been of necessity left doubtful, without some confirming test."

It has yet to be seen whether the experience of other observers will confirm Drs. Allen and Wendt in their confidence in Roux's test. Bumm is satisfied, from his experience of the behaviour of the various organisms under staining processes, that the pathogenic diplococcus which he found in puerperal cystitis and in mammary abscess has its colour fixed by Gram's staining fluid, while the gonococcus has not. But if Bumm's contention is well founded, there is still room for further evidence with regard to the behaviour of the four other non-pathogenic varieties of diplococcus. Practically, in dealing with the discharges from the female genitals every source of error in identifying the gonococcus may be considered eliminated. If in a suspected case the particle of matter to be examined be carelessly taken from the lower portion of the vagina, there is a whole "fauna" of that region usually brought into the field of the microscope. But in every actual case for investigation, during the most characteristic and prolonged

stages, the discharge for examination may be best taken direct from the orifice of the urethra or from the os uteri, and the fluid taken from either site is comparatively free from bacteria other than the gonococcus. I have constantly applied Roux's test for the last few months, and though as a test it seems satisfactory, I doubt whether, clinically, its application is not a mere counsel of perfection, only valuable in hushing quibbling and pedantic objections to the sufficiency of the clinical and ordinary microscopic methods of differentiation. Instead of examining the same film of mucus or pus first with the ordinary stain and again after the application of Gram's fluid, I have usually made six complete and permanent preparations from each specimen of discharge to be examined, and have labelled them so that they could be repeatedly compared, if necessary. Three of these preparations are made with the ordinary stain, one rapidly done, the other two more carefully; two others are prepared with Gram's fluid, washing in absolute alcohol, and mounting in Canada balsam as described; and the sixth is re-stained with eosin in order to make the pus and other cells again visible, as recommended by Roux. Without exception, in the cases ascertained to be gonorrhœal by independent evidence, when diplococci have been seen at all, they have disappeared under Roux's process, and this has been so whether the pus has been taken from the cervix uteri and been free from other bacteria, or from the vagina when the diplococci were associated with myriads of other bacilli and cocci which persisted in the preparation after the washing with absolute alcohol.

In old standing cases of gonorrhœal origin, and in doubtful cases, diplococci have hardly ever been seen in the uterine discharge, and when they have occurred in non-gonorrhœal cases they could never be mistaken for the gonococcus, if the grouping of the gonococcus be characteristic.

With regard to the identification of the gonococcus in the actual clinical work of gynæcology, we are now in a position to collect the points of the complete process. They are :—

(1) The presence of some clinical sign or symptom to suggest the existence of comparatively recent infection.

(2) The collection of the secretion to be examined from the cervix uteri, from the orifice of the urethra, or exceptionally from the orifices of Bartholini's glands. As there is, strictly speaking, no vaginal blennorrhagia, the collection of the discharge from the vagina is merely inviting the risk of error.

(3) The presence of a diplococcus *in* the protoplasm of the pus corpuscles, or other elements of the fluid, and its arrangement in the groups or colonies which have been proved to be characteristic. A single group in the field of the microscope is sufficient to settle the question. In the absence of such a group, however numerous separate diplococci or groups of diplococci apart from the cells may be, we cannot pronounce the case to be gonorrhœal, even though we know that separate individuals and groups are very numerous in the acuter stages.

(4) Roux's test may be applied to complete the proof: (*a*) When all the other conditions of the proof are already fulfilled, in order to observe the disappearance of the gonococci, and (*b*) when some diplococci are present, but not in the characteristic groups, in order to see whether the persistence of the micro-organisms will prove the negative.

Presence of the Gonococcus—Its Clinical Significance.

The whole subject is in too inchoate a state to make it safe to allege that these conditions are sufficient to satisfy the requirements of medico-legal investigation. Clinically, so far as my experience goes, the fulfilment of the first three conditions has justified me in stating that a disease was gonorrhœal when such a possibility was denied by the patient or by one of the parties to its production, and, *without exception*, the confident statement of the opinion has elicited information that was previously withheld. But this is anticipating what we have next to consider, viz., the diagnostic value of the

presence of the gonococcus in a discharge. All experience goes to show that the presence of the gonococcus settles the question; it is the pathognomonic sign of the disease. Even the apparent exceptions support this conclusion. *If gonococci are present in the discharge from an inflamed mucous membrane, the discharge is of gonorrhœal origin.* Apparent exceptions to this rule have already been referred to. On the one hand, there are the reported cases of vulvo-vaginitis of young children, in which diplococci were observed, which could not by any means be differentiated from the true gonococcus. The later observations of Cséri, during an epidemic in Budapest, point, however, strongly to the conclusion that the virus of that disease and of the gonorrhœa of adults is identical. On the other hand, we have Kroner's observations on cases of ophthalmia neonatorum, in which the gonococcus could not be found in the discharge. Bumm's experiments, however, prove that the discharge from such cases is not infectious, and the inflammatory process is not followed by the same results as are seen in the genuine infectious ophthalmia of the new-born. Further inoculation experiments by Bumm with the discharge from the cervix uteri left as an effect of a former gonorrhœa, and with other discharges of gonorrhœal origin, but free from gonococci, the experiments of Zweifel with the vaginal discharges of puerperal women upon the eyes of the new-born, and a host of other experiments with every variety of discharge, lead us inevitably to the further conclusion that *a secretion containing gonococci, when brought into contact with a mucous membrane capable of infection, gives rise with certainty to a gonorrhœal inflammation;* and conversely, *a secretion, whatever its origin may be, which does not contain gonococci, is incapable of giving rise to a gonorrhœal inflammation.* The portion of the proof of these propositions, which consists of inoculation experiments with gonococci, derived from pure cultivations, is worthy of more detailed statement. The successful inoculations on the human subject have been, from the nature of the case, very few; attempts to inoculate the

lower animals have been uniformly unsuccessful. Gonorrhœa seems to be a purely human development. We have seen under what circumstances Bockhart's inoculation experiment was carried out; let us examine one of Bumm's more satisfactory experiments.

The original virus was obtained from a case of blennorrhœa neonatorum, and the inoculation was effected with gonococci of the second generation of pure cultivation in blood-serum. A speck from the cultivation area, along with a little clot of the serum, was conveyed by means of the platinum wire into the urethra of a woman, measures having been taken to prevent the spread of the disease, should it arise, to the internal sexual organs. The greatest care had been taken to ascertain that the genitals of the subject were entirely free from gonococci. Two days passed after the inoculation without any symptoms. On the third day the patient complained of a burning pain in micturition, and a small amount of yellowish watery secretion could be pressed from the urethra. This discharge contained separate gonococci as well as groups upon the epithelium. The other numerous pus corpuscles present were quite free from cocci. Next day the urethral mucous membrane, which had become red and swollen, bulged out from the orifice. The secretion was now thin, purulent, and small in quantity, and it contained numerous free cocci, epithelium cells beset with cocci, and also some pus cells filled with them. The further course of the disease was that of a rather severe attack of urethral gonorrhœa. The acute stage lasted three weeks, and the discharge required other three weeks of treatment to bring it to a complete cessation. No complications occurred. The discharge was regularly examined during the whole course of the attack, and the presence of the gonococcus in the characteristic manner was as regularly demonstrated. An almost exactly similar experiment was made with the twentieth generation of a pure cultivation of the gonococcus with a similar result.

These inoculation experiments of Bumm's fulfil all the

requirements of a complete proof that the micro-organism is the cause of the disease. We have in them (1), a distinct type of disease in gonorrhœa; (2) the isolation of the organism developed in that disease, and its cultivation in artificial media apart from the tissues in which it originally developed; (3) the inoculation of the organism into tissues capable of taking on the diseased action, and the production thereby of a disease characterised by all the phenomena of the original disease; and (4) the identification of the micro-organism in its characteristic relation to the tissues undergoing the diseased process set up as the result of inoculation.

If the proof, as stated so far, has done justice to the available material for proof which exists, we should now be in a position to accept the dictum—*without the gonococcus there is no gonorrhœa;* and, conversely—*without gonorrhœa there is no gonococcus.* The truth of these propositions is far-reaching in its influence. Gonorrhœa is the only disease which produces an infectious catarrh of the female genitals. All the various other diseased conditions and irritations producing catarrh of the genital tract in the female, which have been alleged to give rise to urethritis in the male, must be admitted to be innocent; they cannot produce a specific blennorrhœa. What then, it will be asked, becomes of the cases with which we are all familiar? We have all seen men who have had the alleged misfortune to contract a urethral inflammation from their wives; they have indulged too imprudently in sexal intercourse; the wife has a chronic discharge from general bad health, or from the mechanical irritation of a pessary; she had not quite ceased menstruating, and so forth. It is an ancient and convenient superstition, which has been almost universally accepted as fact. For such facts so much the worse if they do not square with the well-established modern doctrine. That a simple urethritis, *simulating gonorrhœa*, is not possible, it would be illogical and absurd to allege; but that few of us ever see such a urethritis, whose origin is above suspicion, the universal experience must admit to be the fact. When we

consider, on the one hand, how rare alleged simple urethritis is, and how common the specific form; and, on the other hand, how frequently, one might almost say universally, some amount of uterine or vaginal catarrh is found among parous women, who have never run the risk of specific catarrh, we must admit that there exists a discrepancy which is inexplicable on any hitherto accepted theory. If simple urethritis in the male could be produced by any form of non-specific catarrh in the female, then urethritis would be one of the commonest of ailments among continent married men, just the class among whom it is seldom or never seen. No case of alleged simple urethritis need, however, cause more than a momentary difficulty. Such cases are always seen in the acute stage; if the discharge contains gonococci, it is specific; if it is free from gonococci, the inflammation is not gonorrhœal. This facility for learning the truth may be sometimes embarrassing to some patients, and, occasionally to the practitioner; but the existence of an exact criterion in the early stage cannot fail, in the long run, to conduce to the morality and to the physical well-being of the community.

A case which well illustrates these points has recently been under my care. It was that of a lad of sixteen, a member of a highly-respectable family, who was brought to me by his mother. He had recently come home from school, and he had not been able to conceal the fact that he was suffering from a discharge from the penis. On examination I found that he was the subject of marked phimosis, and the orifice of the urethra could not be brought into view. The purulent discharge from the opening of the prepuce was copious enough. Not so long ago I might have been satisfied and silenced by the explanation which was given me as to the cause of the disorder. But I made a microscopic examination of the pus, and found typical gonococci. The possibility of my view, as stated to the patient alone, being correct was at first strenuously denied, but while he was under treatment I ascertained the origin of the malady. There was nothing unusual about it.

The occurrence of ophthalmia in a new-born child should also lead to an examination of the discharge. If the matter contains gonococci, the disease is gonorrhœal, and in the absence of proof of post-partum infection, it is to be presumed to have originated in gonorrhœal infection of the mother. This is now a universally accepted opinion, and the fact calls for no further notice.

Development of the Gonococcus in the Tissues—Its Effects.

The immediate dependence of the phenomena of the gonorrhœal inflammation upon the presence of the gonococcus brings us to this conclusion, that the pathology and pathological anatomy of this disease are described in any satisfactory account of the life-history of the gonococcus and the changes which its development produces in the tissues which harbour it. We have seen incidentally the result of Bockhart's experiment on the urethra of a dying paralytic, and the pathological investigation of the condition of the mucous membrane. Bockhart's conclusions have been warmly contested, especially with regard to the extraordinary penetrative power of the gonococcus, and its capacity for migration. But from the nature of the case there are few in a position to speak with confidence on the subject. Very few opportunities occur of submitting to sufficiently searching examination the urethral mucous membrane when it is in the condition to throw light on the pathology of gonorrhœa, and no opportunity at all of observing the progress of the disease in the urethra from day to day. The principal work of pathological investigation has been carried out upon the conjunctiva of the new-born; and here Bumm's[1] contribution stands out pre-eminent. Bumm had the opportunity of snipping out a small portion of the conjunctiva in a large number of cases of ophthalmia neonatorum at different stages of the disease. These portions

[1] *Loc. cit.*

of tissue were prepared and submitted to careful microscopic examination; and the observations thus made cannot fail to throw much light upon the minute anatomy of the disease-process in the genital tract. His observations extend from the first to the thirty-second day of the disease, when the gonococci could no longer be found either in epithelium or in connective tissue. The knowledge derived from a short summary of Bumm's conclusions may be advantageously applied analogically to the phenomena of the disease as observed in the female sexual organs. It will be found to explain some clinical features otherwise obscure or inexplicable, and to suggest a reasonable explanation of some symptoms of whose causation we have at present no direct knowledge.

Along with the infecting secretion at the outset of the purulent ophthalmia infection, there comes in contact with the conjunctival sac a small number of the micro-organisms. These find in the superficial moist layer of the conjunctiva an excellent soil, and proceed at once to proliferate, so that in twenty-four hours from the first contact they may be found in great abundance. While other micro-organisms which may have been brought incidentally into the conjunctival sac, amidst the infecting secretion, are rapidly eliminated by the movements of the eyelids and the flow of tears, the gonococcus holds its ground. "Endowed with an eminent invasive force," it penetrates between the superficial epithelial cells, and also into the soft protoplasmic substance of the same elements, continues to proliferate between the layers of the epithelium, and ultimately reaches the papillary layer of the mucous membrane. There is no evidence that the micro-organisms possess any power of locomotion to carry them against the outward stream of fluid. They develop superficially and inwards, probably owing to something in the nature of the soil. The time taken by the process varies to some extent, but usually in two days the micro-organism has penetrated and taken complete possession of the whole epithelial sheath. The way in which it marches forwards is always the same—by

breaking down the cementing substance between the epithelium elements. Sometimes the gonococci are seen pressing forward in thin streaks, sometimes spreading out into rounded colonies or thinly scattered groups of fungi, according to the resistance of the tissues to be penetrated. In every case the reaction on the part of the tissues is at this time very energetic and complete. Great swarms of white blood-corpuscles migrate from the capillary network which comes close down to the epithelial sheath, penetrate into the superficial layers of the connective tissue, and thence find their way through the epithelial layers to the surface. Owing to the disintegration of the strata of epithelium by the development of the fungi, it gets carried away in the stream of fluid and of cellular elements, either as individual epithelium cells or in flakes, a breaking up to which capillary hæmorrhages between epithelium and connective tissue and the movements of the eyelids contribute.

At the verge of the transition-epithelium of the limbus corneæ and of the edges of the eyelids, the invasion by the fungi breaks off suddenly. This epithelium, as well as the pavement epithelium of the cornea, retains its regular stratification and normal appearance. It resists the invasive force of the gonococcus.

When the epithelial sheath is broken through, the papillary portion of the mucous membrane lies exposed to the ravages of the micro-organisms. But their invasive force appears to be broken; they penetrate only the most superficial sheath of the sub-epithelial connective tissue. Usually the gonococci lie in small groups in the interspaces between the strains of fibres which run parallel to the surface. More rarely they may be seen in streaks penetrating perpendicularly, and these possibly reach the capillary lymph-spaces.

While the micro-organisms are thus invading the superficial layers of the conjunctival connective tissue, the inflammatory process appears to have increased in intensity; the infiltration of round cells reaches finally as much as 2 mm. under the free surface of the mucous membrane, and the individual cells are

crowded upon one another. This process gives direct origin to the purulent stage of the blennorrhœa.

The process of repair begins usually within four days, but it varies according to the severity of the attack. It starts from the remnants of the original epithelial covering, proceeds rapidly, and soon brings to an end the further development of the cocci in the tissues. The new epithelial sheath consists of a layer of cubical or slightly elongated elements, which becomes rapidly covered with two or three layers of flatter cells. The most superficial of these layers becomes further modified, and the whole sheath forms an impenetrable protection to the underlying tissues against the micro-organism. By the time the process of repair is well advanced, viz., the tenth or twelfth day, the gonococci are no longer present in the connective tissue, only in the superficial portion of the epithelial sheath, where whole ranks and groups of the micro-organisms still hold their ground. Occasionally there is a re-invasion of the deeper strata, when the new protective layers are broken through at points by the outward stream of *débris* from the surface of the connective tissue, and then there is a fresh invasion by the cocci, a repetition of the process, and, to some extent, of the appearances resulting therefrom. Such relapses hinder the process of repair, but do not prevent the complete development of the new kind of epithelium. The process of epithelium formation is usually complete in the third week of an attack of ophthalmia of the new-born, and the epithelial sheath remains intact during the subsidence of swelling and proliferation of elements in the papillary layer behind it.

The force of the invasion by the fungi and the duration of its different phases vary greatly in different cases. When the processes in the ophthalmia of the new-born were compared with the stages of the gonorrhœal ophthalmia in the adult, it was found that the process of repair was longer in beginning in the latter, and the invasion of the connective tissue of the mucous membrane was deeper, more extensive, and of longer duration. As late as the fourteenth day of the disease in an

adult no trace of an epithelial sheath could be seen; the papillary portion lay completely exposed, and contained, to a considerable amount, colonies of gonococci, partly free and partly in the cell protoplasm of the pus corpuscles.

When we see the invasion by gonococci giving rise to such different phenonema according to the age of the individual attacked, we cannot reject, without further consideration, the view that when implanted upon such a suitable soil as the urethral mucous membrane of the adult, the gonococcus may develop more vigorously and penetrate more deeply than it has been shown to do in the conjunctiva of the new-born. It is not improbable, though there exists no direct proof except in the single case of Bockhart, that the invasion may extend to the lymph-vessels and even into the capillary blood-vessels, but such an occurrence must be the exception, not the rule. Bumm maintains that he has proved that the gonococcus can only invade and destroy cylindrical epithelium, it cannot enter the pavement epithelium, and it can penetrate only the most superficial layers of the connective tissue of a mucous membrane. Whether there is any essential difference in the mode and extent of invasion when the gonococcus develops in the mucous membrane of the urethra, of the cervix uteri, or of the Fallopian tube, remains to be proved by direct observation. As far as our knowledge of the process in the conjunctiva is concerned, we see that the reaction of the tissues in the acute stage corresponds exactly to the violence of the onset and the rapidity with which the micro-organism is developed; and in the later stages, when the tissues have become protected by the development of epithelium due to the reaction of the tissues, and the gonococcus disappears, the remaining phenomena of the disease are just those which may be produced by any chronic irritation. The final process of healing depends, not so much upon the elimination of the micro-organisms, as upon the closing of the tissues against their further invasion, by the development of thick layers of pavement epithelium.

The application of these conclusions to the phenomena of

the gonorrhœal process in the genital tract is so obvious that any attempt at an explicit statement would be superfluous. The reaction of the tissues leading to the development of a special modification of epithelium, which will ultimately become in some sense cicatricial, explains at once the modified symptoms of second and subsequent attacks of gonorrhœa; and there are other equally striking points in the fitness of the results of Bumm's observations to explain clinical features of the disease, as we must trace them in the sexual organs.

Theory of "Mixed Infection."

No account of the pathology of gonorrhœal infection would be complete up to the present time without mentioning in some detail Bumm's theory of mixed infection, which has been already hinted at. His most recent contribution is a paper[1] published in December last, which, we may take for granted, contains the most mature experience on the subject.

Mixed infection is defined as the invasion of the organism by two or more kinds of bacteria. When these mixed infections are accidental they deserve no further notice. But that kind of mixed infection in which there exists a causal connection between the invasion of the two germs is most important. In such a case the bacterium possessing the greater power of invasion precedes and, as it were, prepares the soil for the second germ. These forms of mixed infection are distinguished by a certain constancy of occurrence, and the possibility, and even probability, exists that if one germ has settled another will follow. Ordinary croupous pneumonia with its after diseases is a typical example. The bacteria of pneumonia deprive the alveoli of the lungs of their epithelium, and fill them with an exudation, which is a soil in which secondarily tubercle bacilli or pyogenous germs settle, and which may lead to the termination of the illness in phthisis or

[1] "Ueber gonorrhoische Mischinfectionen beim Weibe."—*Deutsche medicinische Wochenschrift*, No. 49, 1887.

formation of abscesses. The gonococcus, too, by its growth on the mucous membrane of the female genital tract, is capable of so altering its substratum that other fungi which are usually present there without doing harm, or which, favoured by suppuration, find their way from the air, obtain an entrance into the tissues, and then on their own behalf exert their specific effects, which are totally different from those of the gonococcus.

This fact is well illustrated in the gonorrhœal infection of the vulvo-vaginal glands. These and their ducts are tolerably frequently the seat of gonorrhœa in women. The ordinary course is this: an acute purulent stage is followed by a chronic mucous discharge, which may continue for months. The secretion gradually ceases, part of the gland becomes destroyed, and finally cure supervenes. The course, however, is totally different if, during the course of the acute blennorrhœa, pyogenous micro-organisms find their way into the inside of the gland. The previously only tolerably tender gland becomes painful and swells, the skin covering it becomes red, and soon the appearance of purulent Bartholinitis is produced.

Such a gland, excised and examined, shows no traces of gonococci. The pus inside the gland only contains pyogenous staphylococci; these have overpowered the gonorrhœa microbes, have penetrated into the gland-sac, and from there into the periadenitic connective tissue. This is covered thickly with heaps of cocci, and shows the first commencements of purulent liquefaction.

The great majority of all abscesses of the vulvo-vaginal glands are due to this kind of gonorrhœic mixed infection. Other fungi possessing no pyogenous properties may invade the gland without giving rise to any characteristic tissue reaction. Similar processes occur in the mucous follicles of the female urethra.

Catarrh of the bladder is another form of gonorrhœic mixed infection. Gonorrhœic cystitis does not exist in the sense that the specific cocci of gonorrhœa attack the epi-

thelium of the bladder, as they do that of the urethra, and then cause it to suppurate. Bumm has isolated the active agent in cystitis—a special kind of coccus which is very similar to the ordinary gonococcus.

Returning to the genital tract, the inflammatory processes which, after cervical and uterine gonorrhœa, usually develop in the pelvic connective tissue and pelvic peritoneum are extremely frequent. Bumm says: "It is astonishing with what frequency here (Würzburg), in gonorrhœa patients, in whom indeed excesses of all kinds, continuous mechanical insults, &c., but often also a too heroic (eingreifende) treatment tend to help, para- and perimetritic processes are found." The microbes of gonorrhœa do not directly invade the lymph tracts and the connective tissue about the uterus, and cause inflammation and exudation. The territory of the gonococcus is fortunately limited to the superficial layers of the mucous membrane. Gonorrhœic para- and perimetritis cannot be explained by the action of gonococci; there must therefore be another agent, which, under the influence of the infection of the mucous membrane, passes into the parametric tissues and there causes disturbance. It is not very common for that exudation to break down into pus; if it does so, the occurrence is due to mixed infection. Bumm has had two such cases: in one he demonstrated the staphylococcus pyogenes aureus; in the other, the noxious agent was a chain micrococcus. In both cases the formation of pus was doubtlessly due to the pyogenous micro-organisms, which found admission through the infected and eroded cervical mucous membrane, and settled and multiplied in the lymph spaces of the broad ligaments till they were eliminated by the purulent inflammation. Bumm thinks himself, therefore, justified in saying, "Purulent parametritis with gonorrhœa of the cervix is due to a mixed infection with pyogenous bacteria; it is the analogue of the acute gonorrhœic bubo in the male, which likewise owes its origin to pyogenous germs."

The further the gonorrhœal infection advances upwards

from the cervix, the fewer admixtures occur in the gonorrhœic pus. In gonorrhœic uterine secretion besides the gonococcus but very few other bacteria are found, and they are scarcely ever found in the Fallopian tube. The gonococci advancing along the mucous membrane ultimately reach the tube, while other germs remain behind.

The proper character and the results of the pathogenous activity of the gonorrhœic microbes is therefore seen—pure and unadulterated—in the tube. They cause purulent inflammation of the mucous membrane, but the surrounding connective tissue remains free from them. The gonorrhœic tubal pus is evacuated into the peritoneum, and whereas in other conditions the bursting of an abscess into the abdominal cavity is followed by the gravest consequences, in this case the whole process terminates with a circumscribed inflammation, encapsuling the exuded pus. The cause of this difference is the varying pathogenic value of the organisms which are contained in the pus. A puerperal pelvic cellulitic abscess bursting into the peritoneum causes general peritonitis, because it contains pyogenous streptococci, which rapidly multiply in serous cavities, and are capable of exerting the most deleterious effects. Gonorrhœal tubal pus cannot do this; its microbes do not find in the peritoneum conditions for their increase; the pus, therefore, acts as an aseptic foreign body, becomes encapsuled, and is finally absorbed.

It may, under special circumstances, be possible for pyogenous cocci to get mixed with gonorrhœal pus, the result being a dangerous peritonitis. But such cases are as yet unknown or unreported.

Bumm then mentions another form of gonorrhœal mixed infection, viz., that with tubercle bacilli. Statistics, which are, however, few and therefore not to be quite relied upon, seem to show that in the etiology of localised genital tuberculosis, gonorrhœic processes, especially epididymitis, play a rôle. The question arises whether the cases of isolated tubal tuberculosis are not due to an old tubal gonorrhœa. The

thickened tubal pus, in which the gonococci gradually become disintegrated, might be a good soil for the tubercle bacilli, and so, by means of mixed infection, a tubal gonorrhœa might be changed into a tubal tuberculosis. He mentions the facts of a case which seem to support this opinion.

In the paper of which the above is a summary, Bumm frequently refers to parametritis as a result of gonorrhœal infection. It may be as well to take this opportunity of stating that hitherto my experience has not brought me a single case of parametritis in which there was the slightest evidence that gonorrhœal infection, pure or mixed, had anything to do with its production. While perimetritis is one of the commonest of complications, if indeed it is not part of the normal course of the disorder, parametritis must be among the rarest.

Chapter IV.

CLINICAL PHENOMENA OF GONORRHŒAL INFECTION IN WOMEN.

Coming now to the clinical phenomena of the disease, we shall see how far our modern doctrine of the pathology furnishes a feasible and sufficient explanation of the clinical signs and symptoms, and also to what extent our knowledge requires to be supplemented. It is not intended to reproduce here a description of an attack of gonorrhœa in the female such as might be suitable for a systematic treatise on the subject, but rather to describe and call attention to some features which are of value in relation to the diagnosis and treatment of the disease, but which, as a rule, do not attract sufficient attention. At this stage the description of subjective symptoms is purposely omitted to prevent repetition when we reach the illustrative cases which will be introduced.

There are two distinct types of the gonorrhœal disease in women: (1) the acute, and (2) the chronic or "creeping."

In the Acute Form.

The acute form, as affecting the urethra, does not differ materially from the gonorrhœal urethritis of the male. There is the same reddening, swelling of the mucous membrane, itching and burning, and finally the same discharge and scalding in micturition. The troubles in the female are less, as a rule, than in the male, and the complications of the urethral form less serious. Hence the comparatively little notice the disease received while the urethral affection was believed to be the most important part of the series of phenomena which ordinarily result from infection. In most of the cases to which I shall have to draw attention, the urethral troubles passed away spontaneously, and at an early period in the course of the disease. In the female the urethral form never occurs without other portions of the genital tract becoming involved, but the converse proposition is not true; the uterus may be affected, and the most serious complications may develop in the pelvis, without the patient ever having noticed any discomfort in micturition, and without the medical practitioner who may be called in to treat the complications being able to satisfy himself that any change in the mucous membrane of the urethral meatus has occurred. As a rule the vulva becomes next affected. The nymphæ become thickened and stiff, the mucous covering becomes eroded, and the exposure of the underlying tissues thus produced gives rise to much of the suffering in micturition. At the same time the orifices of the glands of Bartholini become inflamed, and similar tissue changes take place in those about the urethral orifice. In the ordinary Bartholinitis the disease spreads inwards and the glands become painful and swollen, but if the ducts do not become obstructed the swelling subsides, and a discharge from the mouths continues for some time in much the same way as from the urethra. Although the ostium vaginæ becomes red and inflamed in an acute attack it is never so deep red as the orifices of the ducts of Bartholini's glands. In every stage

of the disease the peculiar reddening, sometimes with erosion, at and near these orifices, is always distinctly visible. The reason of this appears to be that the mucous membrane about the ostium vaginæ, especially that within the remnant of the hymen, does not readily take on a diseased action; it is not a suitable soil for the development of the gonococcus. In women who are fastidious as to personal cleanliness you can hardly ever see any marked signs of vulvitis. In the careless, on the contrary, you not only find vulvitis, which may be due to the development of the gonococcus, but you find an erythema of the external surfaces of the labia and of the perineum which cannot possibly depend in any way upon the specific micro-organism of gonorrhœa, except inasmuch as the increased discharge due to the presence of the micro-organism becomes acrid and irritating, even to the external integument when left in contact with it. It stands to reason, therefore, that much of the tissue change which occurs in many cases of vulvitis depends more upon filth than upon anything specific.

It is not unusual to hear the acute form of gonorrhœa referred to as vaginitis, by a sort of euphemism, and yet it is still a question whether there is any such thing as gonorrhœal vaginitis. The vagina seems to be the last portion of the genital tract, from the uterus downwards, to become affected, and the first to get well under any suitable cleansing process. Why should this be? Anyone who has seen the uterus when a state of prolapse has been for long its usual position, cannot have failed to be impressed with the similarity of the vagina to the external integument. It has no genuine mucous membrane, merely a comparatively slight modification of the outer skin, and its surface is covered, like the outer skin, with a more or less horny epithelium. Such a surface is not easily invaded by the disease-process, and, indeed, in even well marked cases of urethral and uterine gonorrhœa, it is sometimes hardly possible to detect any changes in the vagina. Schwarz[1]

[1] "Die gonorrhoische Infektion beim Weibe."—*Sammlung klinischer Vorträge*, No. 279.

maintains that a vaginal gonorrhœa is not rare in the acute form, and he says he has seen it in cases where the uterus remained intact, and the vaginal changes could not therefore be attributed to contact of irritating discharges. But the discharge which produces the erythema may come from outside, from beneath. If a woman is suffering from an extensive urethral and vulvar inflammation, with œdema and erosions of the nymphæ, the discharge will be copious, and flow into the vagina when she is lying in certain positions, unless the ostium vaginæ be very firm and contracted, which is not its usual state in the class of case under consideration; and in this way the infection may be set up and the symptoms increased by the production of an erythema from irritation, such as has just been alluded to as affecting the skin near the genitals under certain favouring circumstances. The younger the female affected the softer is the vaginal lining, and the more readily does a true gonorrhœal invasion result; we may therefore consistently maintain that a true gonorrhœal vulvo-vaginitis of the adult is rarely or never seen, and yet accept the evidence with regard to the specific nature of the vulvo-vaginitis of young children. Schwarz says that gonococci are to be found in and under the deeper epithelial layers of the vaginal lining, but he does not express himself so as to imply that he has found them. If, however, this turns out to be a true observation, corroborated by capable observers, it follows that a genuine gonorrhœal vaginitis does exist.

On the other hand, and the fact may be referred to only as showing the difference of opinion which perhaps still exists, Martineau[1] does not look upon vaginitis as a directly specific disease. He describes the appearance of the vagina as seen through the speculum—the intense redness, the prominence of the plicæ, the layer of greenish pus covering the mucous surface, the small erosions, "superficial, red, and readily bleeding, which result from the desquamation of the epithelium produced by

[1] "Leçons cliniques sur la blennorrhagie chez la femme," p. 72.

maceration in the vaginal fluid," and then he goes on to say: "I consider the vaginal granulations as an anatomical expression, as a clinical modality of the inflammation of the mucous membrane of the vagina, and not as the expression of a lesion proper to a virulent affection, blennorrhagia, or to a physiological condition, pregnancy." The vaginal granulations, according to him, merely tell us that the patient is affected with a constitutional malady or diathesis, such as the scrofulous, arthritic, or herpetic. This statement does not seem to add much to our knowledge, but clearly implies that the author, who speaks of having made observations on over 2,000 cases of blennorrhagia in women, is not satisfied with the ordinary explanation of the phenomena of the disease as it appears to affect the vagina.

Continuing the consideration of the parts affected by the acute form of the disease, we now come to examine the question of uterine gonorrhœa. The existence of a gonorrhœa of the cervix was formerly denied. Then its existence began to be recognised as possible; now, all the most recent observation goes to prove that *it is the rule, not the exception.* For my own part, I have seldom failed to demonstrate its presence by the examination of the muco-purulent discharge taken direct from the os uteri in recent cases, which were proved to be gonorrhœal by independent evidence. In uterine gonorrhœa, the mucous surface of the vaginal portion undergoes changes very similar to those referred to as affecting the inner surfaces of the nymphæ. These are reddening, swelling, and punctiform erosions. But however red this surface of the uterus may become, we can always see that the lining of the cervix is still a deeper colour, and that it is swollen, perhaps bulging out from the os. The inflammation spreads upwards in the cervix, giving rise to a copious purulent or muco-purulent discharge; and that it spreads to the cavity of the uterus we may infer, in the absence of direct observation, from the enlargement which takes place, and from the change in the type of menstruation, which is a uniform, or almost uniform, consequence of uterine

gonorrhœa. It is this copious discharge which so frequently produces those changes in the vaginal mucous membrane over which it flows, and even in parts more external, which have been referred to as questionable evidence of a true gonorrhœal affection of those portions of the genital tract.

In describing the topography of the area of infection in a typical case of acute gonorrhœa, we might think it necessary to stop with the invasion of the cavity of the uterus. But, whether typical or not, there can be no doubt that in a very large proportion of cases the processes of the disease extend still further.

The process extends to the Fallopian tubes, ovaries, and peritoneum. Why this extension should occur in some cases and not in all, I cannot suggest any explanation further than by calling to mind what is implied in the varying vitality of the infecting organisms, and in some idiosyncrasies in the individual attacked, the consequently variable effect that might be anticipated from the varying initial force of the onset, and the nature of the soil, favouring or otherwise the development of the gonococci. In any complete investigation of this point, it would also be necessary to eliminate, as far as possible, all cases in which the gonorrhœal infection had already occurred even in an almost imperceptible "creeping" form. Between the virgin adult and the harridan subject of *colica scortorum*, there must be every shade of susceptibility. It cannot be a question of the narrowed condition of the uterine canal preventing the free flow of the discharge away from the orifice of the Fallopian tubes, for we see some of the worst results of extension of the process in women who have been recently confined, or in whom there is some subinvolution of the uterus with wide canal. Whatever be the causes of variation in the extent of invasion, we find frequently that acute gonorrhœa spreads along one or both Fallopian tubes. Here the process must destroy the ciliated epithelium, and give rise to a collection of fluid, if the canal does not remain patulous. We do not know by direct observation what goes on in the tubes,

but we know that the processes of tissue reaction against the invasion of the fungus give rise to hydro- and pyo- salpinx, and to the permanent closure of one or both ends of the tubes; and we may suppose that occasionally the changes are so slight as to permit of resolution, and the return to a comparatively normal condition. We see something similar in the glands of Bartholini, where the disease, in an almost closed cavity, gives rise to pain and swelling, ending usually in resolution with a mild chronic disease of the part, but sometimes in complete closure of the duct, and the formation of abscess.

Whether the process of gonorrhœal disease, having once reached the tubes, ever stops short there, it is hard to say. The probability is, that it always extends more or less to the peritoneum. We know that the salpingitis causes enlargement and lengthening of the tubes. It may, therefore, produce adhesions by peritonitis originating in the extension of the disease perpendicularly through the walls of the tubes, just as peri-urethral phlegmon may result from urethritis; but it is much more likely that the peritonitis results from the continuation of the process in the same way as it has thus far extended, or by the discharge of fluid from the end of the tube. If there be a special acute gonorrhœal form of peritonitis, it spreads, as a rule, very rapidly over the pelvic peritoneum. The pain produced by the extension to the peritoneum is sometimes the first thing that attracts attention to the nature of the disease. The process has extended so far painlessly, but almost suddenly an aching begins in the pelvis, rapidly increasing to severe pain, and on an examination being made, perhaps within twenty-four hours after the first apparent symptom, the whole pelvic floor is found to be hard and immovable. In cases in which the peritonitis is set up by a sudden discharge of a coccus-containing pus or mucus from the free end of the Fallopian tube, it is conceivable that death may rapidly ensue from the shock. Noeggerath describes a case of almost sudden death from shock, which he attributes to the extension of the gonorrhœal process, but it is highly probable, nevertheless, that his

patient died from perforating ulcer of the stomach. How violent the onset of the stage of peritonitis may be without any symptoms of shock is illustrated in a hospital case under my care in August, 1887. The temperature chart is before me, and at the time the patient had to take to bed, after complaining for two days, the temperature in the axilla was 103·4°, and in the vagina 105·2°, the constitutional symptoms being in proportion to the pyrexia.

When the disease extends to the peritoneum it immediately attacks the serous covering of the ovary, and extends some way within the capsule. It gives rise by the tissue reaction to very considerable enlargement of the ovary, and, as the process of inflammation dies out, to thickening of its covering, and to more or less extensive adhesions to the neighbouring viscera. How ovarian abscess may occur at a very early stage it does not seem by no means difficult to explain. We know that the ovaries of adult women often present considerable cysts or cavities without producing any symptoms, and while continuing to perform their functions in a perfectly physiological manner. These are the changes in the ovaries which are so often pointed to as a justification *post factum* for their removal, when no better justification is, or can be, forthcoming. Now supposing one of these cysts, with limpid contents, is situated near the surface of the ovary when the gonorrhœal process begins, its walls or a portion of them must become involved, the fluid contents increase and become turbid, and the cyst must either burst or become an abscess, just like the closed Fallopian tube, or the closed gland of Bartholini. Some such severe complications or accidents are required to explain the extreme amount of pelvic disease, and the persistency of the inflammatory processes, in a considerable proportion of cases. While the process can be observed beginning, and, as far as touch is a criterion, ending, in a few weeks in the milder cases; in the severer sort very grave symptoms are set up, and the disturbance of function, along with indications of anatomical changes, continues for months and even for years.

As bearing upon this portion of the subject, and indicating to what extent these opinions have taken hold among some clinical observers who have given the subject close and prolonged attention, I cannot do better than quote the following passages from Martineau's work: "The tubes are ordinarily affected in blennorrhagia, say the authors. They also frequently give origin to pelvi-peritonitis. Thus think Mercier, and Bernutz and Goupil. A. Tardieu reports the case of a young girl, affected with vaginitis, who died of peritonitis. At the autopsy he found a metritis of the mucous membrane of the uterus, with suppuration; the tubes were filled with pus.

"With regard to pelvi-peritonitis, its existence is admitted by authors since the publication of the work of Bernutz and Goupil. In the sixteen months which they have devoted in this hospital to the study of this affection, there have entered ninety-three patients affected with blennorrhagia, and twenty-eight of those, that is to say, nearly a third part, presented this complication. In the tabular statement of the cases, one sees that the pelvi-peritonitis only develops when the discharge is already of long standing. These authors have never seen it produced by sympathetic action; it has appeared to them, in every case, to have been the result of the propagation by continuity of the inflammation from the vagina to the mucous membrane of the cervix, from thence to the body of the uterus, and then onward to the tubes. The morbid condition of these has become the point of departure of the pelvi-peritonitis."

It is only right to add that Martineau holds the directly opposite view from that reached by Bernutz and Goupil. He proceeds to intimate to his readers how large is the amount of material on which he bases his conclusions, and adds: "You will find by a close examination of the material that primary uterine blennorrhagia is extremely rare. In about two thousand cases I have seen it only ten times at most. You will find, further, that ovaritis and salpingitis are so rare,

that I have not been able to pick out a single case. As to pelvi-peritonitis, I have found it only twice."

When opinions are so divergent as these, one, at least, of the sides to the controversy must be in the wrong. All the results of recent observation go to discredit Martineau's conclusions.

A general gonorrhœal peritonitis must be a very rare occurrence. The bowels and omentum evidently become matted together, and form a barrier beyond which the process cannot extend. It is thus confined to the pelvic peritoneum. This well-established clinical fact would seem to point to the conclusion that the extension of the inflammation is, as a rule, carried on, not by a gush of dammed-up gonorrhœal fluid from the Fallopian tube, but by some slower process, which brings the tissue reaction deliberately into play, giving time for the raising of a barrier against the further advance of the process.

The position we have now reached, then, with regard to the acute form of gonorrhœa in women is that the ordinary typical attack extends to the cavity of the uterus. This is a position which I confidently maintain, and to the further proof of which I hope to make some contribution. Whether in the ordinary typical case the process also involves to some extent the tubes, ovaries, and pelvic peritoneum, there is still room for doubt; but I firmly believe that such an extension of the disease is by no means unusual, though it ordinarily disappears without recognition, or is attributed, without any serious effort at diagnosis, to inflammation of the bowels, or to some other cause. This class of case has been described so far as acute, but it is by no means a type of disease that runs a rapid course like the acute gonorrhœa of the male. We sometimes find that the peritoneum has been reached in a remarkably short period from the time of the patient's first contact with the infecting discharge, but as a rule the process takes from two to three months while it still may be considered in the acute stage. The external symptoms, those of the urethral or

vulvar affection, have perhaps long disappeared, while the disease is still spreading on in the acute form in the uterus, tubes, or peritoneum. It may be best now, in order to support this statement with regard to the time required, to illustrate the course of the disease by mentioning the facts of two cases, which might almost be said to be taken at random, but for the selection of a case in which menstruation was suspended owing to lactation, for the sake of comparison.

Case 15.—A hospital patient seen for the first time on the 10th of June, 1887. Her only complaint was a sense of weakness, which she attributed to a very copious vaginal discharge. She was confined four months previously, she is suckling the child, and she has not menstruated since she became pregnant. Two months after her confinement she began to suffer from scalding and frequency of micturition, but not to an extent to cause much distress. Though she had passed through her confinement without any unfavourable incident, the urinary troubles were supposed to be due to after-effects of labour. On examination it was seen that there was a profuse yellow discharge staining the clothing and adhering to the pudendal hair. There was no redness or swelling about the urethra or vulva, except an intense reddening of the orifices of the vulvo-vaginal glands. The vagina was somewhat reddened in parts, but it was not tender, for the most careful examination could be made at the first interview, and a Fergusson's speculum introduced without evoking any complaint. The discharge was found to come entirely from the os uteri. The uterus seemed somewhat tender to the touch, the mucous lining was reddened, and there was considerable erosion round the os. There was no marked enlargement of the uterus; a slight subinvolution would have accounted for the whole amount. No complication affecting the ovaries or peritoneum could be made out by examination, and the anamnesis suggested nothing of the sort. This case might have been passed over as one of slow involution, with, perhaps, some amount of endometritis from some

unknown cause if the discharge had been slightly less, but for the striking appearance of the orifices of the vulvo-vaginal glands. This led to examination of the discharge, and the gonococcus was found again and again in the most characteristic form. The husband failed to respond to my request for an interview. On the 18th and 19th of June the patient complained of pain in the hypogastrium, and it continued to a slight extent until the 24th, when she was again examined. No changes could be made out in the pelvic floor or in the organs, but the pressure required for the bi-manual examination caused more pain than usual. When last seen on July 12th, after a month's treatment, the patient was considerably relieved of her discharge, but there was still a sense of discomfort in the pelvis, without any coarse change sufficient to enable me to make out thickening or enlargement. Lactation and the consequent absence of menstruation appears to have saved this patient from the usual perimetritis. In any case, such process of disease as was going on and produced the symptoms of the 18th of June, nearly three months from the onset, bore still the mark of an acute disease.

Case 16.—The husband of a lady, whom I had attended years ago in a confinement, came to me in the spring of this year (1887), and explained, with much circumlocution, why he feared that his wife had become affected with gonorrhœa. He himself was now almost well, as he had been under treatment, and the contagion must have been conveyed at the beginning of his attack. His wife was very reticent as to her symptoms, he said, and he could give no exact details. A few days afterwards she came to consult me, and she then appeared to be very ill. I learned the following facts:—She was last confined ten months before, and the child was weaned a month ago. Her symptoms have lasted already for over three weeks, and began with scalding in micturition, but not to a severe extent, and without unusual frequency. This discomfort had passed away altogether since an abdominal pain came on four days ago. After being on her feet for two hours or more she began

to have pain in the hypogastrium, and it has continued. She has resolutely gone about and attended to her duties, but has felt very languid and weak since undergoing the fatigue which was followed by the hypogastric pain. On examination, the vulva and labia were found to be smeared with purulent discharge, but without reddening or tenderness to touch. There was no sign of active disease about the urethra, but the orifices of Bartholini's glands looked *sore*, deep red, with area of lighter colour extending outwards on the pale vulvar mucous membrane, and moist, as if the epithelium were eroded. The vagina was slightly reddened, but not tender, and the duck-bill speculum was used in the course of examination without causing pain. The os was open, with a considerable laceration of the cervix with red raw surfaces on the right side, and there were extensive erosions of the vaginal portion. There was a copious flow of purulent discharge from the cervix, and this was found on examination to contain gonococci in abundance. High up to the left, behind the broad ligament, an ill-defined mass, or an area of stiffened tissues, could be felt, pressure upon which caused considerable pain. The ovaries could not be made out, and no further examination was attempted. Her pulse was 126: temp. 99° in axilla. When I next saw the patient, a week later, she was just ceasing to menstruate. The flow had amounted to flooding, and she had felt ill all the time. On examination it was now found that the pelvis was full of an exudation mass of very hard elastic consistency. The difference of resistance on pressure between the two sides implied that the diseased condition affected chiefly the left side, and I have no doubt the obscure thickening which I had felt at the last examination was the beginning of the process.

Under treatment for nearly a month the patient improved, and the mass began to feel more elastic and less hard, but she had again a flooding menstrual period, followed by an increase in the pain and the constitutional disturbance. The third menstrual period was not accompanied by any relapse. When last seen, less than a month since, she had still a

profuse discharge, but the perimetritic exudation could be only obscurely felt, and there was little discomfort.

This patient had acute symptoms for certainly over two months; even though the perimetritis came on comparatively early, the chronic stage could not be said to be reached within the first three months. It may be mentioned incidentally that if this patient had become affected while suckling, and she had come under my care, I think I would have vetoed the weaning in order to save the patient from the damaging effects of menstruation, and in this way we might have succeeded in aborting the perimetritis.

In the Chronic or Creeping Form.

Coming now to the consideration of the chronic and creeping form of gonorrhœal infection in women, let us take the facts of a typical case. A young woman, a year or less after marriage, finds that her health has undergone a serious change for the worse. Whereas, before marriage, she was as sound in health and as active as in childhood, she has now lost her buoyancy, her sense of physical well-being, and is distressed by unwonted pains and discharges. She has a persistent leucorrhœal discharge; she suffers from dysmenorrhœa more or less severe, and her menstrual periods, which were formerly painless and regular in occurrence, duration, and amount, are now painful, profuse, and variable. We elicit a history of gradual change in the type of menstruation, and the slow invasion of a sense of distress of an indefinite kind, calling attention to the pelvic and abdominal regions; or there may be the history of an abortion followed by more or less severe inflammation; or the patient may have borne a child at full time, and after some form of puerperal illness, she may have experienced a persistence of pelvic troubles, with subsequent sterility. In any such case a physical examination will probably reveal certain pathological changes in the sexual organs. There is the reddening, already referred to, at

the orifices of Bartholini's glands; the uterus is somewhat enlarged to the touch, and pressure upon it causes pain, whether from its own condition or from the pressure being conducted to sensitive neighbouring organs; the ovaries are enlarged, tender, and dislocated, and there is probably also a thickening and fulness about the broad ligament, implying a greater or less degree of disease of the tubes; and throughout the whole pelvic floor there is conveyed to the muscular sense of the examining finger the impression of a deviation from health of the tissues; there is loss of elasticity in the boundary walls of the fornices which is never felt unless the parts have been at some former time changed by an inflammatory process. Examination with the speculum shows that there is a discharge from the os uteri more profuse than normal, though it is not necessarily changed in appearance or in other characteristics; and there is probably some reddening and hypertrophy of the mucous membrane where it appears at the os.

Such are the chief points in a fairly typical case. But the symptoms and signs of the disease which I am attempting to describe vary greatly, from mere vague discomforts and slight derangement of the menstrual type to such a serious state of matters as is produced by pyosalpinx and its necessary concomitants. The symptoms and the apparent injury to health vary with the temperament and the social circumstances of the patient. If she can rest and be well attended to, there is only the inability to enjoy the more active occupations and amusements to complain of, and the injury to the general health as shown by the appearance and condition is comparatively slight. When the patient must exert herself to any considerable extent, and cannot rest even at menstrual periods, the effects of the disease are soon made evident. The superadding of nervous symptoms in long-standing cases, with perhaps no apparent relation to the original local troubles, is one of the common-place phenomena in gynæcology, and need only be mentioned.

The state of health just described is characteristic of gonorrhœal infection, and it is reached either through a more or less acute attack subsiding into the chronic form, or by the gradual development of the creeping form of gonorrhœal invasion, in which an acute stage either does not exist or altogether evades observation. How can we explain such serious changes in the pelvic organs as we frequently find without any preceding acute attack of gonorrhœa? The answer brings us back to Noeggerath's latent gonorrhœa in the male. The virulence of the gonorrhœal infection appears to depend upon the number and the vitality of the gonococci contained in the infecting matter. In an acute attack, the number of gonococci in the secretion is at its highest, and it would seem that the micro-organisms developing in fresh and suitable soil, are in the most vigorous state of vitality; hence the infection is conveyed quickly and with certainty, and, if to a virgin soil, with the result of producing an attack of the same virulent type. At the other end of the scale you have the sort of attack produced by the infecting matter from a man who has been the subject of an acute attack many months, perhaps years, before. The gonococci are few and decrepid, probably altogether absent from the periodic emissions of a continent man. It is only the post-nuptial sexual excess that rouses them into sufficient vigour to be harmful. Even then the gonococcus, developing under a fuller blood supply and a changed innervation, but in a comparatively worn-out soil, has not sufficient vitality to gain a footing in any part of the female genital tract except the most favourable to its growth; and its *locus electus* is the cervix uteri. It would seem that it is from this point that the disease in a woman who has become affected through the "latent" gonorrhœa of her husband, almost invariably spreads upwards and downwards. The discharge produced by the tissue-reaction set up by the feebly active development of the micro-organism may carry the infection downwards, and cause some slight vulvitis, with itching or discomfort, and it is possible that in this way the urethra and

the glands of Bartholini may become affected when the *materies morbi* is of medium vitality; but, as a rule, the disease spreads upwards only, and the first symptoms are those of an endometritis.

The further course of the disease is, as a rule, intermittent. Just as in the male the blood supply and innervation of repeated sexual intercourse may be required for the sufficient development of the gonococci to make them capable of fresh growth in new soil; so in the woman, the periodic blood supply of menstruation, and the *status menstrualis*, may be necessary for the further development of the disease, even when it has taken hold. We find clinically that there are exacerbations at the menstrual periods, and we can, under favourable circumstances, trace the course of the disease as it attacks one part of the genital tract after another, each new departure appearing to be from a menstrual period. If the woman has become pregnant before the infection takes place she may go on to full time, and then it is only in the puerpery that the disease begins to spread beyond the cervix, giving rise to the gonorrhœal form of puerperal fever, and all its after consequences. If the pregnancy and the gonorrhœal infection occur in quick succession, it would seem that then the development of the micro-organism may become the cause of abortion; to the abortion succeeding the further spread of the disease, in whose course, in fact, the abortion is a mere episode.

When the gonococci have once invaded the glands of the cervix uteri, they appear to linger there as long or longer than they do about the deeper parts of the male urethra. Developing in a new soil, they are endowed with greater vitality than the comparatively starved stock from which they sprung, and therefore the woman who has become affected with even the creeping form of gonorrhœa is probably in a much more contagious state than the man from whom she contracted the disease. A very intricate case bearing upon this point will be mentioned directly.

This long-continued vitality of the gonococcus in the cervix uteri, as a cause of the spread of contagion, has been already incidentally referred to. It is a fact not sufficiently recognised by the framers of rules for the inspection of *puellæ publicæ* in some countries, and hence the whole proceeding is a delusion and a snare.

The critical reader will have observed that in speaking of the "latent" gonorrhœa of the male as the cause of the creeping form of gonorrhœa in the female, no mention has been made of the presence or absence of a urethral discharge in the infecting individual. Here there is certainly a hiatus in our knowledge. Several men whom I have had occasion to question have admitted to observing after marriage the occasional return of a discharge or a moistening of the meatus which had long disappeared; others had failed to observe anything of the sort. Careful examination by the surgeon may sometimes lead to the discovery of a pathological condition, even when the patient quite honestly denies the existence of manifestations of it. Noeggerath, in the recent paper already quoted from (p. 22), says he has sometimes succeeded in a suspected case in bringing to light a drop of pus from the posterior portion of the urethra long after the patient believed all signs or symptoms of an attack to have disappeared. But, is a visible external discharge a necessary accompaniment of the contagious condition in the male? Probably not, and for the following reasons. The men whose wives seem never to escape are those who marry a few months after being "cured" of a gonorrhœa which has run a protracted course. These are the men who get nearly cured by several surgeons in succession; or who, after undergoing the routine medical treatment for a few weeks or months, without exercising the self-control essential to rapid and complete cure, let the affection take its course, and being no longer in pain, are satisfied if they can conceal the evidences of the disorder. Such men almost invariably become the subjects of posterior urethritis; and it is reasonable to suppose

that long after the signs of active disease, including discharge, have disappeared from the anterior part of the urethra, the micro-organisms, hybernating as it were, in the posterior part of the urethra, may be roused to a point of vitality sufficient to enable them to be carried away, and to develop in a new soil, without giving rise to such local irritation in the anterior portion of the urethra as to attract attention. If we could get at all the facts of one of the mildest of cases, we should probably learn that there was some change in sensation, some slight deviation from the standard of perfect physiological action, which would point to the posterior portion of the urethra as the seat of a pathological process. The most careful examination might not lead to the detection of the gonococcus. Neisser says he has discovered it as long as three years after the acute attack, but most investigators have failed to find it a comparatively short time after the acute symptoms have disappeared. In this respect the majority of observations agree with the results of Bumm's examination of the various stages of the disease in the conjunctiva, where it was found that the gonococcus disappeared from the tissues at a certain stage of the process. The question then arises, In what form does it persist? And here again we reach the limits of our knowledge. Sänger has suggested a spore, which has not yet been isolated, as the permanent form of the contagium in the tissues, but this is so far a mere hypothesis. The only fact which I can suggest in its favour is something which, so far, I have seen no reference to, and which may be a mere mistake in observation. In examining the discharge in a case of acute gonorrhœa with the highest powers, one is struck, not only with the vast number of diplococci, both connected with pus or epithelium and lying free, which are to be seen in the field, but also with the innumerable minute objects, call them granules or spores or *débris*, which are everywhere mixed up with the cocci. So far I have only seen this phenomenon in acute cases, and for aught that anyone can as yet allege to the contrary they may

be the spores of a fungus, such as we must see in tubercle were the bacilli to disintegrate and cast the spores about; and some portion of them may be destined to remain in the tissues, when the full-grown organism is cast out, until a fresh pabulum has developed or until there arrives a new stimulus to further growth.

I have repeatedly alleged that it is the neglected cases of gonorrhœa in the male—those which become chronic—which most frequently give rise to the infection of the female, even though they may have long ceased to show signs of activity. If this statement can be proved, the fact has obviously very important practical bearings.

Proceeding on the plan hitherto adopted, I shall give here two specimen cases, which, of course, illustrate more points than the one at present in question.

Case 17.—Hospital patient, wife of a working man whose occupation appears to be incompatible with personal cleanliness. Her married life, except a few months at first, is a history of constant bad health. The patient is now 38 years of age, and has been married six years. She had a still-born child at the end of the first year after marriage. She was attended by a midwife, and is said to have had a "low fever" after her confinement, and was ill for two months. Never been pregnant since. She had flooding and irregular menstruation for two years after her confinement, and one of these periods was supposed to be a miscarriage, but the assertion is founded on a mere midwife's diagnosis without the patient's knowledge of facts to warrant it. Menstruation is now scanty; period usually one day. Great pain in hypogastrium begins at periods, and is said to be worse about a week after. Profuse leucorrhœa in intervals. On examination, the vulva was found to be normal; the uterus was apparently in the normal position, and very tender to the touch, but more careful examination later showed a lateral flexion; the left ovary enlarged and sensitive, right not made out. The speculum showed the cervix slightly lacerated and flattened, with erosion round the

os; a thin yellow discharge, rather profuse. These facts were elicited at the first interview twelve months ago, and on a subsequent occasion it was discovered that there was narrowing of the internal os with a chronic endometritis and sensitiveness of the uterine canal. The patient has been under treatment ever since without any appreciable improvement. She is always ailing, but not so ill as, in my judgment, to justify me in proposing removal of the diseased ovaries and tubes, especially as I infer from the thickening of tissues in the pelvic floor and the deformity of the uterus that there must be strong adhesions of long standing. Suspecting the origin of the patient's troubles, I obtained an interview with the husband. I learned from him that he contracted gonorrhœa rather more than a year before his marriage, but he was not sure about the time. The pain was not very severe, and the discharge did not trouble him, so he "took no notice of it." It was better and worse for a long time. He took his "glass of beer of a Saturday night," but would not admit to any kind of excess. He rather thought he had some of the discharge shortly before his marriage, and he may have seen it sometimes after, but he was not certain. From the wife I could obtain no evidence of any symptoms that might not have been equally due to pregnancy.

My interpretation of the facts is that the wife became affected by a low creeping form of gonorrhœa after she became pregnant, and that the disease developed rapidly into a comparatively virulent form after parturition, with the results descr bed.

Case 18.—A lady, æt. 30, who, at the time she first came under my observation, had been married two months. Ten days after marriage she was seized with a sharp pain in the hypogastrium, and though she got up and dressed she could not walk, and had to spend some days on a couch. She and her husband returned home, owing to her illness, and she then for the first time sought for medical assistance. The pain in the pelvis continued, and she felt so ill that she had to

take to bed. She says she was treated for "inflammation of the bowels," and was under treatment four weeks, when she was considered cured. She had hardly attempted to attend to her domestic duties when the illness seems to have relapsed, but she went on for nearly a month without further treatment. It was then that I saw her for the first time. She looked very ill, and told me in answer to inquiries that she had lost flesh rapidly since the beginning of her illness. She still complained of a pain in the hypogastrium, in the groin, and round the loins. There was a profuse discharge, she said; but she used to have "the whites" before marriage, only the discharge was now much more profuse, and it was different in appearance. Since her marriage she has menstruated twice, both times very profusely, and for a longer time than formerly. On examination I found the uterus was fixed, with exudation which was most marked on the right side, but extended round behind the uterus and occupied the left half of the pelvis, where the inflammation seemed to have been less intense. It was not very tender on pressure. There was a profuse yellow discharge which bathed the external parts, but did not appear to have set up any intense inflammation about the vulva. I obtained some of the discharge for examination, and afterwards found the diplococcus in the characteristic relations, but the microscopic appearances were never those of a gonorrhœa in the acute stage.

I had an interview with the husband, and obtained from him a rather remarkable history. Seven years ago he became affected with gonorrhœa for the first time, and appeared to have had a very bad attack. He was in the hands of a quack and of several medical men in succession, and appeared to have got cured about twelve months after the first symptoms of the disease. He had been circumcised in his early youth or infancy, and there remained two sinuses in the foreskin, one of which ran parallel to the urethra, at the side of the frenum, and the other was rather more transversely placed. The former was about an inch deep, and the latter was much more

shallow. Ever since the attack of gonorrhœa these sinuses had remained moist, and were sometimes irritable; he could then squeeze out a little moisture, or a tiny drop of turbid fluid from them. Soon after his gonorrhœa was cured this man married. In the course of the first year his wife had a child, and died of puerperal fever. The child survived, and was under medical treatment from its birth; but as he himself had to be abroad on business, and, on learning about the death of his wife, remained away for several years, he could not give details concerning this period.

He never saw any sign of urethral gleet since his final cure before his first marriage, but about twelve months ago, owing to the irritation caused by the deeper sinus, he consulted a surgeon, who slit open and cauterised the canal. The smaller one was let alone.

Both husband and wife were perfectly well to all appearance at the time of the marriage, two months ago, and the illness from which the wife is suffering came on without any apparent cause. But since her illness the husband has begun to suffer from urethritis. It came on four weeks after marriage, and at the time of my first interview with him it had developed, though under treatment, into a rather acute urethritis, and it ran the course of a moderately severe attack of gonorrhœa. As he had been under treatment for three weeks or more, I was not surprised at being unable to detect gonococci in the discharge, and I entirely failed to discover any suspicious micro-organism in the minute speck of fluid which he could press from the orifice of the small sinus.

The question arises then, Whence came the infection to the woman? Of course, some accidental contact with a gonorrhœal poison is a possible explanation, but it is a marvellous coincidence that a woman of thirty should have escaped so long only to become accidentally infected at a time when the infection would be conveyed to her husband. From my knowledge of the facts, I would say that the suspicion that this respectable woman of thirty con-

tracted a disease from another source just on the eve of her marriage may be peremptorily set aside. Besides, the infection did not act like ordinary acute gonorrhœa. In the woman the perimetritis came on as soon as the discharge, and the dischage did not readily infect the husband, unless the husband is simply lying. We seem almost driven to the conclusion, therefore, that the gonorrhœal virus lingered in the sinus for years, only to develop actively when it reached the favourable soil of the uterine canal, and that it spread in the manner characteristic of "latent" gonorrhœa, but with exceptional rapidity.

The wife, who was kept under constant treatment for over three months more, considered herself well at the end of that time, but though the uterus was then movable, the thickening of the peritoneum was distinct. There was the peculiar loss of elasticity all across the pelvic floor, and the deep-lying sense of resistance. Probably both tubes were ruined, the fimbriæ matted together, or adherent to the ovary, and the abdominal orifices closed. There may be now no further complication; a sort of resolution has apparently gone on, and the patient may escape any of the more serious injuries to her health. But menstruation, which continued to be still too profuse, will never again be perfectly normal, and the closing of the Fallopian tubes can never be undone.

Chapter V.

CONSEQUENCES OF GONORRHŒAL INFECTION TO THE INDIVIDUAL.

In discussing the consequences which may, and most frequently do, arise from gonorrhœal infection in women, I shall not attempt to place the pathological changes in one series of paragraphs and the immediate and remote effects of these changes on the individual in another series, but mention

them together, and that as concisely as possible. This method of treating the subject seems to possess some advantages, although to a certain extent it involves repetition.

Urethral and Vulvar Gonorrhœa.

The urethral form of the disease is exactly analogous to the same disease in the male, and lays the subject of it open to nearly all the same complications. From gonorrhœa in the female may result cystitis, disease of the ureters, and of the kidneys, just as is the by no means rare consequence in the male.

Chronic inflammation of the glands of Bartholini is almost too trivial an ailment for mention in the present relationship. Acute inflammation may be a very painful ailment, and when the disease has spread onwards this painful affection may be a somewhat serious hindrance to effective treatment. In a case which came under my care in October, 1887, the right gland developed so rapidly into an abscess that it was impossible to carry out the proper treatment for preventing uterine blennorrhœa until the Bartholinitis was thoroughly dealt with. This required chloroform narcosis and the use of the cautery, and then measures could be taken which prevented the further spread of the disorder. In only one case (which has been mentioned) have I been able to convince myself that chronic Bartholinitis was more than an inconvenience—viz., that in which a pessary, when it slipped a little, seemed so to press upon the tender spots corresponding to the site of the glands, as to add very considerably to the patient's sufferings.

Uterine Gonorrhœa.

The invasion of the cervical canal is marked by the appearance of a profuse mattery discharge. It would appear that a rapid change takes place in the epithelium both of the cervix and of the cavity of the uterus. The cylindrical epithelium is destroyed for the time being, and is probably

never perfectly restored. Its place is taken, to some extent, by layers of a sort of pavement epithelium, in fact, a kind of cicatricial tissue. There thus occurs a deeper change than that which takes place at the menstrual period, profoundly modifying the fresh developments of the mucous membrane for the future. Without going into detail, these are the results obtained by Zeller[1] in his investigation into the subject of endometritis, and they are just the changes which we might expect from what we learn from Bumm's inquiry into the action of the gonococcus in the conjunctiva. The results obtained by Mr. J. Bland Sutton, in a recent investigation into menstruation in the human female and in monkeys, brings home to us more clearly the cause of a most important sign of gonorrhœal invasion of the body of the uterus. His conclusions are: 1. The uterine mucous membrane is normally not shed during menstruation, but only the epithelium. 2. The sanguineous discharge is due partly to oozing from the surface denuded of epithelium, and in part to active congestion. 3. The discharge from the uterus is largely augmented by mucus secreted in increased quantity at this period from the enlarged utricular glands.[2] Keeping this in mind as the physiological process, we can well understand that the superadding of the tissue reaction produced by the gonococcus would at first merely exaggerate the amount of menstrual flow, whatever the remoter effects might be. The pain and nervous derangements which ultimately supervene are probably due to changes in the tubes and ovaries as well. To the later changes in the lining of the uterus, when it assumes its almost cicatricial character, are probably also due the remoter changes in the menstrual discharge, which, instead of being profuse as at first, becomes scanty in amount and sometimes changed in character. In addition to the endometritis there comes on a greater or less amount of hyperplasia

[1] "Plattenepithel im uterus (Psoriasis uterina)."—*Zeitschrift für Geburtshilfe und Gynäkologie*, Bd. IX., Hft. 1. Summary in *Centralblatt für Gynäkologie*, No. 10, 1885.

[2] *British Gynæcological Journal*, Part VII., Nov., 1886.

of the uterus, and with this there must necessarily be some derangement of innervation. The sense of dragging and sacralgia in the early stages is not probably from mere weight alone.

The increased menstrual flow is such a constant feature in uterine gonorrhœa, that I shall introduce here two typical cases. In one of them it was the sudden change in menstruation, without apparent cause, in an unmarried woman, which excited suspicion and led to a correct diagnosis.

Case 19.—P. B., æt. 23, single, domestic servant, residing in Preston, sent to me by her mistress on November 9th, 1887. She was suffering from pain in the hypogastrium, supposed to be the result of a kick from a refractory child. There was a history of good health up to six weeks since, when her symptoms began. She had a rather sudden attack of severe pelvic pain four weeks ago. Her last menstruation was unusually profuse and continued for a fortnight. Since then there have been mattery discharge, hypogastric pain, etc. My diagnosis, after examination, was gonorrhœal endometritis, salpingitis, ovaritis, and perimetritis of the left side; and I elicited information from the patient which proved the diagnosis correct. She felt very ill, and I advised her to seek admission into Preston Infirmary, under the care of my friend Dr. Garner, to whom I wrote. She was accordingly admitted on Nov. 17th. Dr. Garner has kindly sent me the notes of the case, from which I select the points relevant to my present purpose. The patient was under treatment till the 13th of January, when she was dismissed cured. She was kept rigidly to the recumbent posture, and suitable measures were taken to diminish the congestion of the pelvic organs. Three days after admission the vaginal temperature became normal. She began to menstruate on Nov. 28th, and continued till Dec. 7th, Extract of Hydrastis having been administered from the 5th, owing to the excessive hæmorrhage. The general and local treatment was continued until the 1st of January, when she began to menstruate again with much less pain. The period lasted only till the 5th.

Examination on the 11th of January showed an entire absence of pain on pressure, though there was still considerable thickening of the tissues in the left half of the pelvis. The uterus, which had been fixed, had begun to recover its mobility.

Case 20.—R. N., æt. 21, single, living at home with her parents, who are of the respectable working class, applied for treatment at the Manchester Southern Hospital, on February 10th, this year (1888). After hearing several irrelevant and misleading statements as to the patient's past and present state of health, and the treatment she had undergone, I learned that she had had a profuse and prolonged menstrual period, without any apparent cause, at or about Christmas. This fact led to some pointed inquiries and a thorough examination, about which the condition of the pudenda indicated there need be no scruples, the result being the establishment of the diagnosis of perimetritis with salpingitis of both sides. The patient, after admitting certain facts, answered questions frankly enough, and finally the following points were settled:—(1) Scalding in micturition began four months ago; (2) the first profuse menstruation occurred at Christmas, and the last period, which ended a week before the date of our interview, was also extremely profuse; (3) the hypogastric pain began at the time of the profuse period at Christmas; (4) she felt so ill again, just after the last period, that she had to take to bed, and she had got up, the first time for a week, to come to the hospital. The cause of the increased pain and feeling of illness was no doubt a menstrual exacerbation in the perimetritis. But the sudden, apparently causeless, increase in the menstrual flow is the chief feature of the case, as an illustration of the point under consideration.

Tubal Gonorrhœa.

But by far the most important changes in the internal sexual organs which result from the gonorrhœal infection are

those affecting the Fallopian tubes and ovaries. With regard to the tubes, it would seem that the effects vary greatly, according to the virulence of the infection. If the virus is in a state of high vitality, the disease may spread so rapidly along the tubes that the abdominal ends become sealed by the peritonitis before the active stage of tissue reaction has ceased in the course of the tubes. The consequence is that the tube becomes distended by the collection of fluid that forms, thickened in its walls, and perhaps lengthened as well. We thus reach the condition of hydrosalpinx, which will, under favouring circumstances, sooner or later, advance to the still more serious condition of pyosalpinx. When the process of invasion of the infection is slow, as in the creeping form, we very seldom see it resulting in pyosalpinx. Yet there can be little doubt that many of the cases of puerperal pyosalpinx are the result of the assumption of a comparatively virulent type under favourable circumstances by a chronic or creeping gonorrhœa. Pyosalpinx is certainly not a rare consequence of gonorrhœal infection, and it does more serious injury to health and is more dangerous to life than any of the other complications. Yet the risk which the affected run of having their health ruined and their lives endangered by this condition is by no means even yet generally recognised and acted on by the medical profession in this country. As far as I can learn from the literature of the subject, Mr. Lawson Tait is the only English surgeon who has continued for years to call attention to this complication. He has taken occasion to refer to gonorrhœa, again and again, as the cause of the severer forms of Fallopian disease in cases where he found operation necessary, and even in his work on "Diseases of Women," published in 1877, frequent reference is made to gonorrhœal infection as a factor in the production of some of the more serious complications. He says,[1] in reference to ovaritis, "Acute ovaritis from gonorrhœa is a common result of the infection, and is a frequent cause of sterility. . . .

[1] P. 210.

This affection, as far as is known, generally results in disorganisation of the gland and the formation of adhesions round it." He also recognises gonorrhœal infection as one of the most ordinary causes of perimetritis. In the edition of his work on diseases of the ovaries, published in 1883, he says:—"I have already said enough about hydrosalpinx and pyosalpinx to render it quite unnecessary to discuss them further than to insert here a complete list of all the cases upon which I have operated for these diseases. Both conditions are far more common than was believed previous to my experience, yet they have been quite well known, and described for at least half a century. Of the forty-four cases only four have occurred in single women, and the leading feature in the history of many of the cases was an attack of gonorrhœa. In one case I had to operate in the acute stage of the disease, which had arisen, on the admission of the husband, from this cause."[1]

At a meeting of the Obstetrical Society of London, held on the 4th of May last, when Dr. A. H. N. Lewers read a paper founded on observations made on the pelvic organs, in a series of 100 cases, in the post-mortem room of the London Hospital, the essayist reported that disease of the Fallopian tubes—that is, pyosalpinx, hæmatosalpinx, and hydrosalpinx—was found in seventeen cases, and he read notes descriptive of these. Dr. Galabin, in the course of the discussion on the paper, mentioned that at Guy's Hospital the pathologists had found in 302 necropsies of women only twelve cases of distension of tubes, and two of these were very trivial, amounting in all to a proportion of 4 per cent. The cases of chronic inflammatory disease about the tubes amounted to 9 per cent. Mr. Lawson Tait spoke in eulogy of Dr. Lewers's paper. He found the conclusions drawn from the post-mortem room, as regards causation, progress, prognosis, and treatment, identical with those which he had been preaching for about ten years on the basis of clinical experience. He confessed that it was

[1] "The Pathology and Treatment of Diseases of the Ovaries." 4th Edition, 1883.

somewhat a staggering thing to find 17 per cent. of the women who died in the London Hospital suffering from tubal disease, and this did not include those cases which suffered the most, in which there were adhesions between the ovaries and tubes to the surrounding viscera, more particularly the peritoneal layer lining Douglas's pouch, resulting ultimately in complete retroversion of the uterus with its appendages, and forming one of the most dreadful conditions which the gynæcologist had to deal with. When removed it was difficult for an unskilled pathologist to see anything the matter with them. Dr. Lewers had not included such cases, and they must have been numerous. *He thought the explanation of the higher percentage at the London Hospital, and the small group at Guy's, must be due to locality, and that gonorrhœa was more common amongst the poor at the East End than on the south side of the river.*[1] I do not know if the speaker gave reasons for this final remark, but, to those who have no local knowledge, it may be as well to explain that the London Hospital contains, in the area from which it chiefly draws its patients, the localities where sailors most do congregate, and among the women who apply for its relief are the victims of the neglected venereal diseases brought into a focus from every sea-board slum in the world. The same state of matters prevails in such places as Liverpool and New York, and we have perhaps in this fact alone some explanation of the frequent occurrence of the more serious forms of tubal and ovarian disease in these cities.

In Germany, the man who has, perhaps, most persistently called attention to the more serious clinical features of the gonorrhœal infection in women, is Sänger, of Leipsic. His views may be concisely and conveniently indicated by a quotation from a recent paper read before the Chicago Gynæcological Society.[2] He says: "Salpingitis gonorrhoica is the only specific infectious form of salpingitis which is recognised as such by Lawson Tait, although he stops short of

[1] Summary in the *British Gynæcological Journal*, Part X. (August, 1887), p. 273.

[2] "Salpingitis gonorrhoica et syphilitica."—*The Obstetric Gazette*, February, 1887.

admitting that the gonococcus is the exciting agent. Without doubt the gonorrhœal is the form most frequently met with. This fact was clinically established as early as 1872, by Noeggerath, long before Neisser had discovered his gonococci, or Lawson Tait had performed his first operation 'for suppuration of the uterine appendages.' In Germany, I myself was one of the first gynæcologists who at our meetings showed the frequency of gonorrhœal salpingitis, emphasised its causal connection with pelvic peritonitis, and removed by operation the gravely implicated uterine adnexa. Gonorrhœal salpingitis is never followed by a 'destructive suppuration' of the uterine appendages; it remains invariably a disease of the surfaces of the mucous and serous membranes. The pus formed by the specifically diseased mucous membrane gradually distends the tube; in one class of cases, in which there is a great accumulation of free pus, the tube is transformed into a large sac with thin walls; in another, in which the wall of the tube, especially its muscular tissue, is hypertrophied to a greater extent, the tube becomes much thickened and rigid. In most cases both conditions are found, the uterine portion of the tube is thickened, the abdominal end dilated. The serous surface of the tubes, the albuginea of the ovaries, the serosa of the peritoneum are attacked or become pus-secreting surfaces only in cases in which gonorrhœal pus has escaped from the tubes and thus infected the above-named structures. . . . I do not believe that gonorrhœal pus ever penetrates the walls of the tubes and thus produces these diseases. But a specific gonorrhœal inflammation of the mucous membrane of the tube, with secretion of pus into the cavity of the latter, is accompanied by a non-specific inflammation of the entire tubal wall."

My present object is only to call attention to the most advanced opinion at home and abroad on the spread of gonorrhœal infection to the Fallopian tubes, and the consequences which result therefrom; it is not to assist in attracting attention to this polemic, much less to seek to take part in it.

But if the illustrative case of pyosalpinx, which I am about to mention, does not also amount to a case of "destructive suppuration of the uterine appendages," it would be hard to describe the state of matters in English.

Case 21.—Mrs. B., the wife of a well-to-do operative in a Lancashire town, is 34 years of age; has been married seven years, and has never been pregnant. She has always suffered from dysmenorrhœa since puberty, and this continued unchanged after marriage. Her husband contracted gonorrhœa six months ago, and at once infected his wife. Both husband and wife were under the care of the same practitioner, their family doctor, at the same time, the wife being ignorant of the nature of her ailment. She had a very severe acute attack, and about six weeks after the first symptoms, she completely broke down at a menstrual period, and had to take to bed. She was in a state of fever, and complained of intense pain in the pelvis, chiefly affecting the left side, and extending upwards towards the crest of the ilium, and down the thigh. The doctor found the uterus fixed, and the pelvic floor hard, rigid, and still painful. She was under treatment at home for four months, during which time she was chiefly confined to bed; she lost flesh, had night sweats to slight extent, and suffered almost constant severe pain in the pelvis, with nocturnal exacerbations. When she first came under my care, five months from the time of the infection, she was still in the condition just described. The uterus did not seem much enlarged, and the exudation appeared to be most marked on the left side of the pelvis. The chief pain was still in the left half of the pelvis. The profuse yellow discharge, which was said to have existed at one stage of the disorder, had almost completely disappeared. The patient was treated with glycerine and iodine tampons, and hot water douches, as well as medicinally. She was unable to be out of bed for even a very short time. She menstruated twice while under observation, each time with intense pain—an exaggerated form of the ordinary pain—accompanied with vomiting, excitement, and sleeplessness.

After persevering for six weeks with this treatment, I could observe no improvement except that the exudation in the pelvis began to permit more movement of the floor, and a tumour could be less indistinctly made out about the left broad ligament. This I concluded was formed by a Fallopian tube distended with pus. During the six weeks of treatment the patient menstruated twice, each time with the greatest disturbance to the ordinary state of health, including increased pain, vomiting, and headache. Instead of going home to resume an invalid life, the patient resolved, after consultation with her friends, to submit to operation, which was proposed to her. At the operation I found the omentum adherent to the bladder, so that it had to be ligatured and divided before I could reach the tumour. It was then discovered that the uterus was like a small projection in front of and between two bulging tumours which filled up the greater part of the pelvis. With great difficulty the adhesions of the tumour on the left side were partly broken down, and while I was working at the lowest and posterior part of the mass, trying to make a sort of pedicle, the cyst burst and filled the field of operation with a flood of stinking pus and venous blood. The cyst was got away, and after repeated irrigation, sponge-packing, and finally the application of perchloride of iron, the hæmorrhage was arrested, but this was done only after considerable loss of blood, much exposure of the parts, and the loss of much time. The cyst on the right side was larger and not so tense, and as it was clear that the patient could not stand a repetition of the proceedings, I resolved to stitch it into the abdominal wound. This was partly done, and the tumour was then cut open. Its contents were also offensive pus, which was got away by sponging and irrigation. The pelvic cavity and the whole field of operation were carefully cleaned by irrigation with saline solution. The pelvis was drained with a Kœberlé's tube, and the cyst with a rubber tube, and then the wound was closed. The patient seemed at death's door for about thirty hours. She then began to revive. When she was

apparently out of danger, she complained of an intense pain in the pelvis after a violent attack of coughing, and she sank rapidly and died. Examination of the wound showed that the stitched-in Fallopian tube had given way to a slight extent, but sufficiently to permit the entrance of the antiseptic fluid used in dressing into the pelvic cavity. In this case the left cyst was an abscess of the ovary, and the Fallopian tube enlarged, hard, and sinuous, could be felt firmly tied down in front of it, as it were, along the top of the broad ligament. The tube was let alone, as I have repeatedly seen perfect restoration to health in cases requiring abdominal section where such adherent non-distended tubes were not interfered with.[1] The cyst on the right was the Fallopian tube.

As far as the patient was concerned, we had here a frightful state of matters produced by a virulent attack of gonorrhœa, the relation of cause and effect being clear and unequivocal.

Pathologically, was it not a case of suppurative destruction of the appendages? the ovary a mere abscess, the other tube, from one end to the other, an abscess, and the corresponding ovary buried beneath it. The thick walled cyst is in my possession. Must I look upon it as a sort of sandwich consisting of two layers of specifically inflamed tissue, a mucous and a serous, holding between them a layer of non-specifically inflamed muscular tissue, as Sänger appears to allege? If so, what is the theoretic or practical value of such a view?

Anticipating here a point with regard to treatment, I cannot help thinking, from my experience of many similar cases, that is, of abscess of tube or of ovary *adherent to the pelvic floor*, that the best treatment is by operation from the vagina, instead of by abdominal section and the breaking down of the barriers raised by nature against the further invasion of the peritoneum by the process of inflammation. I have had several cases within the last two years which shew in a striking manner the efficacy and safety of vaginal incision with drainage.

[1] See *Medical Chronicle*, November, 1887, and January, 1888.

Effects upon the Ovaries.

Continuing the consideration of the anatomical changes which produce the clinical signs and symptoms of gonorrhœa, we now come to the spread of the infection to the ovaries.

We have seen that great changes may be produced upon the tissues of the Fallopian tubes, resulting in the closure of the ends of their canals and the formation of hydro- and pyo-salpinx. The fimbriæ not only become matted together by the inflammatory process, but they frequently become attached to the surfaces of the ovaries, and the parts become so modified by the disease in the course of months and years that when they are removed by operation, for the relief of the sufferings caused by the anatomical changes and interference with function, it may be impossible to identify in detail the parts belonging respectively to tube and to ovary. If the disease reaches the fimbriæ, it almost certainly goes on to produce perimetritis and ovaritis. There is no leap from one point to another; the susceptible tissues are continuous. It is the custom to speak of an interval between the ends of the tubes and the ovaries, and to speak of the acute affections of the tissues of the intervening space as peri-oöphoritis. Anatomically there is an interspace; physiologically there is none; and clinically there is no distinct form of disease arising from the inflammation of the particular portion of the peritoneum about the ovary. There is no peri-oöphoritis without inflammation of the ovary itself, and more or less extensive perimetritis; and the symptoms arising from this extension of the inflammation are the symptoms due to inflammation of the pelvic peritoneum and of the ovary. Olshausen, who devotes part of a chapter to peri-oöphoritis, finishes his remarks by admitting that no such disease is distinguishable from pelvic peritonitis. He says: "The symptoms of this peri-oöphoritis differ in no respect from those of a circumscribed peritonitis. . . . What I have here called peri-oöphoritis may be, in the majority of cases,

just as well designated perimetritis."[1] It is, in fact, not in the majority of cases, but in all, just the inflammation of the peritoneum within the area that the ovaries can reach in their physiological movements, and it is, therefore, the inflammation on which the adhesions ultimately formed by the ovaries depend. This fact, perhaps, justifies a distinct name.

Resisting the temptation to paraphrase the usual writing of the text-books on the inflammation of the ovaries, what I have to say on the effects of gonorrhœa upon these organs, whether correct or not, I can concisely state. The inflammation is for the most part superficial. It is a peritonitis rather than a process affecting the substance of the ovary, but that it also not infrequently is a parenchymatous inflammation is proved by the symptoms, by the acute enlargement of the ovary, and by the remote effects. The symptoms of the first acute attack may include the peculiar pain like that with which we are familiar in cases of orchitis, and we may be able, either before the peritoneum has lost its limpness or after the perimetritis, when its subsidence is rapid, to make out the enlarged ovary as an element in the case, but I question very much if this is not the exception. In some severe cases the parenchyma is certainly involved, and the process goes on rapidly to the formation of abscess; but there is then, as has already been remarked, probably some favouring circumstance, such as the pre-existence of some cystic degeneration in a part of the ovary. A case which may be referred to in illustration of this point was mentioned by Dr. Lewers, at a meeting of the Obstetrical Society on January 4th, 1888.[2] It was that of a woman who was admitted into the London Hospital suffering from parametritis a few days after her confinement. She died, and on post-mortem examination it was found that the right ovary was greatly enlarged, "it was adherent to the adjacent surface of the broad ligament by recent lymph, and on section an abscess containing half a drachm of pus was found."

[1] "Die Krankheiten der Ovarien," Stuttgart, 1877.

[2] *British Medical Journal*, January 14th, 1888, p. 78.

The broad ligament itself was as yet only in a state of phlegmon. Thus the ovarian abscess was premature; it was in advance of the general process of inflammation. Probably there was a small pre-existing cyst.

The enlargement which we find later in the history of a case is a secondary result, as I shall try to show. By the peritonitis which attacks the covering of the ovary, that covering, the tunica albuginea, is permanently injured. The acute inflammatory state, here or elsewhere, is followed by one of two results: the surface becomes adherent to another surface, or, remaining free, it becomes entirely changed in character—a sort of cicatricial tissue, thickened, toughened, and devoid of its columnar epithelium. There can be little doubt that in every case there is an exudation from the inflamed surfaces, and if this fluid could be imagined, in the severer attacks, as drying up, like the sap of some plants after injury, that is to say, becoming organised into a tough pseudo-membrane, embracing ovaries, tubes, and uterus, we would seem to have an explanation of a not uncommon effect. In some of the cases which we operate upon we may have diagnosed enlargement of the ovaries, dilatation of the tubes, or some other condition accompanied with symptoms which justify surgical interference. On making an abdominal incision we find that by reason of this membranous product of inflammation the examining finger seems to be almost as far from the affected organ as it was in exploring per vaginam. Now the difference between such an extreme case and the mildest, as far as the changes in the tissues are concerned, is one of degree. After an attack of medium severity the ovary becomes in part adherent, and in part the surface is thickened, or covered with a membrane different altogether in character from its original tunica albuginea. The most inportant consequence of this change appears to be that although the ovarian stroma is little affected, and the Graafian follicles mature as usual, they do not burst externally to the ovary. Where the surface of the ovary is adherent to the bowel, or uterus, or broad

ligament, or pelvic peritoneum, the follicles cannot burst; this is obvious enough. But where the surface of the ovary is apparently free they do not burst. A crisis comes in the development of the follicle, and a change takes place in it, but that which would have been a corpus luteum under normal conditions will be found after the same lapse of time a mere apoplectic cyst. Such cysts grow. How they increase I do not know; perhaps by affording a more favourable surface for other follicles to burst through; perhaps by hæmorrhages during subsequent menstrual periods. I have many a time seen such cysts the size of a pigeon's egg, and once or twice even as large as a hen's egg. I do not say that in all these cases the origin of the disease was gonorrhœal, but in all there were signs of old peritonitis, with thickening of the covering of the ovary, and with an entire absence of the signs of recent ovulation near the surface. When this thickening of the covering of the ovary occurs, we can see how certain it is to be accompanied with clinical signs. When the periodic congestion returns, the organ cannot expand as it does under purely physiological conditions. What part of the pain is caused by a sensitive organ pulling upon the adhesions, it is not possible to say, unless the same cause be proved to act, and its amount be ascertained, in the intervals; but that most of the pain is caused by the compression exercised by an unyielding capsule there can be little doubt. The first sufferings caused by the acute onset are those of an attack of peritonitis; they can be relieved, and will subside; but the pain produced at a later period by the efforts of the ovary to expand, or relieve itself from adhesions, is an ever recurring form of suffering. It may bring on a variety of secondary symptoms, or become so urgent, merely as pain, that operative treatment may be the only mode of giving relief. When the process of disease has reached this stage, the danger to life may be unimportant, but the misery produced by the pain and disturbance of function may be intolerable.

Abscess of the ovary is not one of the common results of

gonorrhœa, but that it may occur as the direct consequence of infection there can be no doubt; and it is therefore to be kept in mind as one of the complications by which an attack of gonorrhœa in the woman may lead to a fatal result. Having occurred, it is about as dangerous as pyo-salpinx, but it is by no means such an ordinary result of the disease. The great majority of cases of abscess of the ovary are puerperal, or they arise in apparently healthy girls from sudden suppression of the menses, or they occur in scrofulous and tubercular subjects. Gonorrhœa probably results in abscess only in very violent attacks, or when some pre-existing pathological state of the ovary, such as a cyst near the surface, is favourable to its development. To what extent there is a "mixed infection" when acute ovarian abscess occurs, we have as yet not sufficient clinical material for forming a judgment.

The possibility of an ovary, or tube become cystic in the way I have just described, by a unilateral attack of perimetritis, permitting impregnation to occur by means of the healthy side, and ultimately becoming the seat of fatal puerperal septic abscess, has been suggested in a recent paper by Dr. Grigg.[1] The four cases described formed nearly the whole of the mortality of Queen Charlotte's Lying-in Hospital in one year; the patients were all unmarried women of questionable antecedents; and careful post-mortem examination in every case showed that the fatal result was owing to old inflammatory disease of the pelvic viscera, very suggestive of the changes produced by gonorrhœal infection. But for the post-mortem examinations the cases would have been, in all probability, set down as simple puerperal sepsis originating at the time of parturition.

Sterility a Consequence of Gonorrhœal Infection.

We speak of the physical suffering resulting to women from the gonorrhœal infection under various names, implying greater

[1] "On the Dangers arising from Disease of the Uterine Appendages in Childbed." *British Gynæcological Journal*, Part VII., November, 1886.

or less structural changes in the internal sexual organs. We say one suffers from leucorrhœa, another from dysmenorrhœa depending upon changes in the position of the uterus, contraction of the canal of the uterus, disease of the tubes and ovaries, or some other cause; another is menorrhagic, and another shows symptoms of one of the more serious affections of the tubes or ovaries, and so on. But, perhaps, the most important consequence may be summed up in the word *sterility*. This is by far the most common result of one or other of the anatomical changes produced by the gonorrhœal infection. *A woman who has suffered from gonorrhœal perimetritis is barren.* Sterility is the result of one or more of the anatomical changes which have been referred to, and co-exists with one or more of the groups of symptoms which we designate by various names, as if they were distinct diseases. It is easy to see how the inflammatory process, resulting from the gonorrhœal infection, should have sterility as one of its consequences, whatever other clinical signs or symptoms of disease might be produced. My belief is that perimetritis of both sides must necessarily be followed by sterility. In this condition we see the possibility of fruitful intercourse being attacked and destroyed; the ova are hindered from even leaving the organ which is their source, and, consequently, their impregnation by the male element becomes an impossibility. Even in cases which do not extend to perimetritis, we can conceive that the condition of the Fallopian tubes might be rendered such as to make sterility an infallible result. The tubes become sealed at either end as the direct consequence of the inflammatory process, and even when the canal remains pervious the lining epithelium must be so injured or destroyed that the passage of the ovum is prevented. In such cases of comparatively slight damage, there is danger of the congress of ovum and sperm resulting in tubal pregnancy, or some other form of ectopic gestation.

Should the ova escape from the ovaries, and the tubes remain pervious, there are still the changes in the uterine lining, and in the calibre of the canal, to interfere with the

normal course of the impregnation and the development of the ovum in utero. The secretion from the uterine mucous membrane may be so changed as to act as a poison to the ovum, on its arrival in the uterus; but it must be confessed that this condition is more likely to result from a syphilitic taint than from gonorrhœa. The mucous membrane of the uterus may be in such a condition that every attempt at nidification is rendered abortive, or as a somewhat later consequence, stenosis of some part of the canal may occur and interfere mechanically with the passage of the spermatozoa. The usual seat of contraction is the internal os. I am quite well aware that there is a fashion with some therapeutic nihilists among the gynæcologists of sneering at the mention of mechanical obstruction to the passage of spermatozoa as a possible cause of sterility. Being microscopic objects, to them a needle's eye would be a wide thoroughfare. That is clear enough as a question of proportion between the size of the spermatozoon and the diameter of the eye of a needle, but there must be something more in the question than a simple arithmetical relation. From the nihilists we have not yet obtained a rational explanation of the cases in which dilatation of the uterine canal is directly followed by conception, after years of barren conjugal life. Even if it be alleged that there is a dammed up and changed secretion in the uterine cavity which is the direct cause of separating ovum and living sperm, still the stenosis is the cause of the retention of discharge, and therefore the cause of the sterility.

The stenosis may be secondary, and come on long after sterility has been established by gonorrhœal perimetritis. I have under treatment at the present time a woman of twenty, who has been married two and a half years. There is a clear history of gonorrhœal infection during the first year of married life, and when she came under my care, for the first time, a year ago, there could still be made out some thickening in the perimetrium. There was also a profuse uterine discharge, but the gonococcus could not be detected in it. Since then

well-marked stricture of the internal os has come on, with intense dysmenorrhœa of the mimic labour type. A long probe, with a head about half the size of that of the ordinary sound, passes with some hesitation, causing a distinct type of pain, which the patient says is similar to that which precedes and accompanies the menstrual flow. I do not doubt but that this patient will at some future time, in some other hands, be confidently treated for simple stenosis, for the relief of dysmenorrhœa and sterility. The pain may be then relieved, as it will now be by me; the dysmenorrhœa may be temporarily cured, but the sterility never.

The sterility which results from gonorrhœal infection may be produced by the first acts in consummating marriage, as in Case 2, page 8; or pregnancy may occur and end in abortion produced by gonorrhœal disease of the uterine mucous membrane, as in Case 9, page 14; or pregnancy may go on to full term, and be followed by a gonorrhœal puerperal illness with perimetritis. This perimetritis then produces the anatomical changes on which life-long sterility depends. An example of this class, one-child sterility, we have in Case 3, page 9. Whether abortion is ever produced by a gonorrhœal disease of the fœtal or maternal coverings of the ovum cannot be as yet said to be proved, but there is ground for a strong presumption in favour of the existence of a gonorrhœal abortion, and a sterility post abortum gonorrhoicum. The sterility produced by disease developing in the woman directly after marriage is a familiar and common occurrence. Every practitioner of experience must be able to call to memory cases of the kind, and those who have not been disposed to give to gonorrhœa its just share of the blame, will find, if they carefully investigate the possible causes of sterility in women who were apparently robust at marriage, that the more closely the subject is examined the greater are the dimensions which gonorrhœa assumes as a factor in the production of sterility in the female.

Gonorrhœa is also the cause of sterility in the male in some unknown proportion. Gross inquired into the facts of 192

cases of sterile marriage, and found that the male was the cause in 33 cases, or 17 per cent. of the whole, and that azoospermia existed in 31 of the 33.[1] Kehrer's cases, which are included in these figures, gave 14 in 40 of male sterility, all owing to azoospermia, and in the majority gonorrhœa was shown to be the original cause of the pathological condition. Sänger states that he has found one-third of all sterile marriages to be owing to azoospermia in the male, the result of gonorrhœa. "If we consider, in addition to this, the cases in which sterility is caused by gonorrhœal disease in the woman, the man retaining his potency, we find that gonorrhœal infection takes the first place in the etiology of female barrenness, and is of far more importance than all the other causes put together."[2]

While on the subject of sterility, I have only to add that cases are not unknown in which the gonorrhœal infection sets up perimetritis, and yet the inflammation remains entirely confined to one side. We have an illustration of this in Case 13, p. 43, quoted from Dr. Angus Macdonald's paper. In such cases the women may go on bearing children, just as women do with one ovary removed, as after ovariotomy; but such cases are rare. It is but seldom that the inflammatory process produced by the spread of the micro-organisms remains circumscribed. Either as the result of a continuous process of development the disease reaches the other side of the pelvis, or there is a sudden invasion at some of the early menstrual periods after the infection. A perfect example of this class of case is mentioned in Mr. Lawson Tait's "Diseases of Women":[3]

Case 22.—"Some years ago a gentleman, who had been a short time married, visited a neighbourhood where he unfortunately met a friend of his bachelor days. Within 48 hours he came to me in terrible distress, with the initial symptoms of

[1] J. Matthews Duncan, *Gulstonian Lectures*, 1883.

[2] "Über die Beziehungen der gonorrhoischen Erkrankungen zu Puerperalerkrankungen."—*Verhandh. d. deutschen Gesellschaft für Gynäkologie*, Leipzig, 1886.

[3] P. 211.

gonorrhœa, but with the still more terrible dread that he might have conveyed it to his wife, for intercourse had taken place a few hours before his symptoms appeared. Of course, I at once cautioned him to refrain absolutely from intercourse with his wife, advice which I have no reason to believe he disregarded. His gonorrhœa proved very trifling, and passed off entirely in less than a week. Wishing to take his annual holiday he brought his wife to me to make sure that she was free from disease, and I could not find the slightest trace of vaginitis. I therefore sanctioned their travelling to a considerable distance. But within three days I was summoned to her, and found her suffering from a most severe attack of inflammation of the left ovary. After some weeks she got well, though the ovary could be felt, both by rectum and vagina, as large as a small orange, firmly fixed and exquisitely tender. Suddenly the right ovary became similarly affected, and after a most severe illness, during which she seemed frequently at the point of death, she recovered, with the right ovary similarly large and fixed. She never menstruated after this second illness, and she now lives a semi-invalid life, hardly ever free from pain, and unfit for any great exertion, though, as time goes on, her sufferings seem to obtain slight amelioration. She is quite unable to endure marital intercourse."

Whatever exceptional cases we may meet with of women bearing children after an unequivocal attack with pelvic gonorrhœal complications, still we may hold firmly, for all practical purposes, to this conclusion, that *the woman who has suffered from gonorrhœal perimetritis is barren.*

Gonorrhœal Puerperal Fever.

As to the extent to which gonorrhœal puerperal affections occur there is a great difference of opinion, partly because there is a want of sufficient observed facts to compel unanimity. Sterility after one pregnancy, whether ending in abortion or full-time parturition, is a fact of frequent occurrence. In all

such cases efficient observation would have revealed the presence of puerperal inflammation of the uterus or adnexa, or both. The question is, in what proportion of the cases is the gonorrhœal infection the efficient cause of the barrenness, and in what proportion does the condition depend upon a puerperal septic inflammation? Sänger professes to have already succeeded, by some process of clinical observation, apart from investigation for the presence of micro-organisms, in differentiating the gonorrhœal from the other cases. He has found a type of puerperal fever in which the symptoms come on late in the puerperium. This is his gonorrhœal form; and he maintains that it occurs frequently in women who have been infected with gonorrhœa. "In the gonorrhœal post-partum affection it is the salpingitis which secondarily produces the affection of the pelvic peritoneum, and it does so with a frequency which does not occur in puerperal infection, and also in the pre-antiseptic period could not have occurred. The septic-puerperal salpingitis to which Buhl, E. Martin, Spiegelberg, and others attached so much weight in the causation of puerperal peritonitis, is met with almost exclusively only on the post-mortem table. The gonorrhœal tubal disease of lying-in women leads, perhaps, never to a fatal end, and, after the resorption of the accompanying pelveo-peritonitic exudation, it can usually be readily made out by the bi-manual examination. From this it follows that if there is present a disease of the tube, of the uterine appendages, of the pelvic peritoneum after confinement or abortion, there is reason to suspect a gonorrhœal origin to the ailment. I have been able to find among 230 cases of gonorrhœal infection 35 cases, equal to 15 per cent., in which the gonorrhœal affection of the uterine adnexa and of the pelvic peritoneum could be referred back to the puerperal state, and in the majority of these cases the acute symptoms appeared for the first time six or eight weeks post partum or post abortum."

Sänger may be right in his observations and conclusions. From the present state of our knowledge of the subject, I sup-

pose no one is in a position to assert dogmatically that he is wrong—altogether wrong. I can only say that his statements do not agree with anything I have observed or anywhere read; and there seems to be nothing in the nature of the case to require the symptoms in the puerperal gonorrhœal infection to be always late in showing themselves. We know that in ordinary non-puerperal cases the spread of the infection is often very rapid, and it is hard to believe that a coarse process of washing away by the lochia is one which would greatly retard the development of the micro-organisms in an otherwise favourable soil. So confident is Sänger in the position he takes up that he goes the length of referring to Angus Macdonald's cases in order to say that the diagnosis was wrong. They were, it seems, not cases of gonorrhœal, but of septic puerperal infection. It is an easy method of supporting a theory; still the conclusion, if true, would have to be accepted. The argument would, however, have been weightier if the author had seen his way to attacking the observations and conclusions of some of his living German contemporaries, who would have been obliged to reply. As the matter stands no reply is possible except from the candid reader; and whoever will take the trouble to refer to the cases (*Edinburgh Medical Journal*, June, 1873) cannot fail to be impressed with the clearness with which the sequence of events is stated, or to be convinced that the diagnosis, made by the experienced and scientific physician who knew all the facts, was in every case correct.

Kroner, of Breslau, has also investigated the relations of gonorrhœal infection to puerperal fever, and reached conclusions widely different from those of Sänger. He made a careful examination of women who had borne children that became affected with blennorrhœa of the conjunctiva, showing the presence of gonorrhœa in the puerperium. He found that 75 out of 82 mothers of children affected with ophthalmia neonatorum passed through a normal puerperal state both early and late. Only one woman, who became affected fourteen days post

partum with a severe form of septicæmia, died in childbed, and her illness had no causal relation to the gonorrhœa. Two had a tedious illness beginning with fever soon after the confinement, and only four had any special troubles in the later period of the puerperium. Examination of these revealed the existence of para- and perimetric "cicatrices." Thus Kroner found a comparatively rare concurrence of gonorrhœa and puerperal illness.[1]

In a paper more recently published[2] he maintains that he has obtained still more evidence in support of his original position, and gives details.

I have purposely noticed this subject at a length somewhat out of proportion to the rest of my essay, although it is still almost purely controversial matter, because it seems to me to be a new and important subject for further observation. My own notes bearing on this question must be reserved for the present; they are as yet too few and inconclusive. I am, however, disposed to agree with Noeggerath that most of the cases of salpingitis, which we have been accustomed to look upon as of puerperal septic origin, must be classified as gonorrhœal. A peculiarity of this form of so-called puerperal fever is that the patients recover very slowly, and a large percentage of them remain invalided for years, because of pelvic adhesions and deformities, whereas women who have survived an attack of genuine puerperal sepsis or sapræmia pass with comparative rapidity into robust health.[3] There is, unfortunately, too much of a polemical element in the German contributions on this question. It suggests rival schools rather than earnest laborious research with scientific truth only in view. Independent unemotional observation towards the elucidation of the points yet in obscurity is a desideratum.

[1] "Ueber den Sitz der gonorrhoischen Infection beim Weibe." von Dr. Steinschneider in Franzensbad.—*Berliner klin. Wochenschrift*, April 25, 1887.

[2] "Ueber die Beziehungen der Gonorrhœ zu den Generationsvorgängen."—*Archiv für Gynäkologie*, Bd. XXXI., Hft. 2.

[3] "Ueber latente und chronische Gonorrhœ beim weiblichen Geschlecht."—*Deutsche med. Wochenschrift*, December 8th, 1887.

Chapter VI.

TREATMENT, PROPHYLAXIS, AND CONCLUSION.

Treatment.

The treatment of gonorrhœal disease in women may seem, in view of all that has been said, a rather large and complicated subject for exposition. But if we set aside mere theoretical details, and deal with that which concerns only cases met with in practice, the varieties of treatment that can be reasonably employed shrink into comparative insignificance. As a specific disease there is, as a rule, little or no scope for treatment of it in the female; we have only the opportunity of trying to minimise the consequences.

Gonorrhœa as a local disorder requires topical treatment; as a specific disease, depending for its development and symptoms upon the growth of a micro-organism, it requires for its topical treatment the employment of a germicide, one or other of the antiseptic and astringent class of chemicals, which are known to destroy the ordinary micro-organisms.

In women the urethra and bladder become affected as in men, and the disease may spread from thence to the ureters and kidneys. The treatment of this phase of the disease must be practically the same as in men. Now it has been quite recently proved again by an efficient observer that the balsam of copaiva is about the best internal remedy. It was found by Dr. Oscar Oppenheimer, of Heidelberg, that applied directly to the micro-organisms it had little effect, but the urine of a person who had taken the balsam internally acted as a poison to the bacteria.

Oppenheimer[1] experimented with a large number of sub-

[1] "Untersuchungen über den Gonococcus (Neisser)."—*Archiv für Gynäkologie*, Bd. XXV., Hft. 1.

stances, testing the antimycotic power of the individual chemical or drug by cultivation experiments with the coccus-containing matter. Perhaps the most important result of his laborious investigation is that already mentioned with regard to the effect of the decomposition products of copaiva balsam.

Professor Isidor Neumann, of Vienna, has recently published in the *Wiener med. Blätter* some chapters of a forthcoming work on the venereal diseases, and there he calls attention to the danger of kidney disease involved in an attack of gonorrhœa. Now if the danger of kidney disease be as urgent as Neumann asserts, and if Oppenheimer's observations and conclusions are correct, then the rational treatment of urethral and cystic gonorrhœa in the female, as in the male, would be to keep the urine impregnated with the balsam, or that which results from passing it through the body, so that it might act as a germicide, and prevent the invasion of a vital organ by the micro-organisms. It is surprising in the face of these observations to find Dr. Fritz Levy,[1] of Copenhagen, objecting to the use of copaiva in the treatment of women, apparently on the trifling ground that it may cause gastric derangement or a cutaneous eruption.

Along with a suitable internal medicinal treatment there can be little doubt that the best local treatment is antiseptic, and there is a consensus of opinion in favour of the sublimate, although it has disappointed expectation to some extent. Dr. Ulisse Malusardi[2] has lately published a paper, in which he passes in review the history of the therapeutics of gonorrhœa in England, France, and Germany, and gives the results of his own observations and experiments; and he concludes that the sublimate is the most efficient and safest of the antiseptics, while in the later stages of topical treatment the sulphate of zinc may most advantageously be combined with the sublimate.

These facts chiefly bear upon the urethral form, but they

[1] "Om den 'latente' Gonorre hos Kvinden."—*Hospitals-Tidende*, Jan. 19, 1887.

[2] "Studio etiologico e terapeutico sulla blenorragia."—*Gazetta medica di Roma*, May, 1887.

may also apply to the treatment of that phase of the disease which we now come to consider, viz., the vulvar and vaginal stages of gonorrhœa in the female. Here I must confess that to me it is a matter of almost purely theoretic speculation. I have seldom seen a case of gonorrhœa in a woman in which the disease had not already reached the uterus, and I am disposed to think that this has not arisen from want of clinical experience, but from the nature of the facts. We are called upon to treat only the advanced stages. One would expect an opportunity of averting the disease under the circumstances of Case 16 (p. 91), for example; but the opportunity is almost invariably denied. The guilty husband hopes for the best; and believing that if only he can deny and conceal, the wife, even though affected, cannot suffer much harm, and can never be quite sure of the facts, whatever her suspicions may be, he always puts off taking the steps which would procure suitable treatment until some serious symptoms set in. I do not know what may be the experience of those who officially examine professional prostitutes, but I believe decent women in this country who become the subjects of gonorrhœal contagion seldom or never obtain suitable treatment in time. What then are we called upon to treat? Let us take two examples in cases which have come under my notice within the last few months, in order to fix attention upon this point and once more upon the cruelty and ignorance of the gonorrhœic seducer:—

Case 23.—Quite recently I saw, in consultation with a gentleman practising in one of our suburbs, a delicate young lady who was about to be married, but had been compelled, unfortunately, to give up her preparations for marriage, and take to bed on account of some serious illness, supposed by herself and friends to be "inflammation of the bowels." At the time I saw her she had been almost entirely confined to bed for several weeks. Her female relations knew that the illness seemed to begin with profuse and prolonged menstruation, and this surprised them very much, as their young friend had, as a rule, menstruated in a slightly irregular and scanty fashion.

The doctor in attendance told me, before visiting the patient, about the state of matters in the pelvis, whose existence we verified together. The patient was feverish, and appeared to be ill. On examination we found that there was an entire absence of the usual signs of virginity; the uterus was large and fixed. There was a great mass of exudation on the right side, some exudation behind filling up Douglas's space, and an indefinite fulness, without so much hardness, on the left side. This state of matters led me to inspect the vulva, and I found the orifices of the ducts from the glands of Bartholini highly inflamed, and distinctly tender to touch as compared with the surrounding mucous membrane. The discharge from the genital tract was profuse and yellow. My colleague and I were agreed as to the anatomical condition: the only question was as to the origin of the disease, because of its bearing on the prognosis. I expressed to my colleague the belief that the disease was gonorrhœal, and I then learned that such was his suspicion. He had cautiously enquired into the matter, and ascertained that the man whom he most naturally suspected was at the very time confined to bed with some ailment, supposed to be cystitis. Although I could not obtain a satisfactory sample of the discharge for microscopic examination, I do not think there can be any doubt about the diagnosis; the clinical features and collateral facts are quite sufficient. With regard to this case it should be noted that the disease had spread to the perimetrium before medical advice was sought, probably without any consciousness as to cause and effect on the part of the patient, and that among people who would not for a moment hesitate to obtain any medical aid that might seem to them needful. If they do these things in the green tree, what shall be done in the dry?

Case 24.—A. B., æt. 25, single, dressmaker, a respectable-looking modest young woman, from a small country town, seeks advice on account of intense dysmenorrhœa, which unfits her for work for two or more days every month. It affects chiefly

the left side, but for over twelve months it has been gradually growing worse on the right side, which is now nearly as bad as the original seat of pain. From the anamnesis I learned that until two years and a half ago she was a strong healthy girl, who never had a day's illness. Menstruation used to come on from puberty until then with absolute freedom from pain. She then began to menstruate profusely and somewhat irregularly. She had a leucorrhœal discharge, and commenced to suffer at the periods. For a long time the pain was confined almost entirely to the left side of the pelvis, and it came on the day before the flow, and continued to be very severe during the first two days of the menstrual period. Since the first change in menstruation the periods have continued to be profuse, lasting five or six days. The inter-menstrual leucorrhœa has ceased. On making a vaginal examination of this patient, I found, as I expected, an absence of the hymen and loss of tonicity in the vagina. The uterus was small, with a slight retroversion: the right side of the pelvis was apparently normal to touch, but somewhat tender on deep pressure; the left side was occupied by a hard firm band, evidently an adhesion from old perimetritis; there was pain on pressure upwards in the region of the ovary, but the bowels were so loaded that during this, the only examination, it was not possible to define the position and relations of the parts. The orifices of Bartholini's glands were bright red and sore-looking, while the surrounding mucous membrane was rather anæmic. I told this patient without further parley that two years and a half ago she became affected with the poison of a contagious disease, and was proceeding to give my reasons, when she interrupted me, and asked if she might explain; and then she told her story. About three years ago she was "keeping company" with a young man to whom she expected to be married. His occupation required him to be absent for several months in a large town named, and soon after his return the patient began to have certain symptoms which she described. On telling her young man of her condition he admitted that he had been

suffering from a certain disorder, and he appears to have given her the benefit of his experience in treating herself. From her description of her symptoms she went through a mild attack of gonorrhœa, including perimetritis, but she never once consulted a doctor. She solemnly assured me she had lived a perfectly chaste life since her paramour left her, and when she consulted me about the dysmenorrhœa she had no idea that her present symptoms and her former illness were in any way related.

These are by no means extreme cases of gonorrhœal infection in women as it presents itself to the doctor for treatment. But the treatment of such cases is no more treatment of gonorrhœa than the performance of a plastic operation on a contracted cicatrix is the treatment of a burn. We are not treating the venereal disease, and, in private practice, we seldom or never get an opportunity of doing so.

However, if we should meet with cases in the early stage, before the uterus is invaded, we must be prepared to act energetically, and the question arises as to what is best to be done. When men become more impressed with the serious nature of the disease, it will probably be the rule to see cases in the early stage. Schwarz,[1] of Halle, who speaks so as to give the impression of having had a large experience of purely vulvo-vaginal gonorrhœa, describes his method of treatment in the following terms: "First of all the vulva and vagina are thoroughly cleansed of the adhering secretion by means of a 1 : 1,000 sublimate solution, then with the help of a Simon's speculum, the vagina and vulva, including every fold and recess, are energetically swabbed with a dossil of cotton-wool soaked in a one per cent. solution of the sublimate, and rubbed with it for several minutes, so that the superficial sheaths of the epithelium containing the gonococci are removed. The Simon's speculum, or some other with separable blades (such as Bozeman's, &c.), is essential for the purpose in view; by this means it is possible to distend the folds of the vagina to their utmost extent, and to obtain a complete controlling view

[1] *Loc. cit.*

of the whole process, so as to avoid missing any of the diseased patches. Special care is taken with the introitus, which contains numerous folds.

"The next step is copiously to dust over the vagina and vulva with iodoform, which is still more effectively applied by rubbing it into the mucous membrane with the tip of the finger.

"To complete the process, the vagina is with moderate firmness packed full of iodoform gauze.

"If the treatment is very painful, a thing which depends upon the intensity of the disease process, and the idiosyncrasy of the patient, a narcotic or anæsthetic must be administered.

"The process is of value only when thoroughly carried out, but then it is certain to succeed.

"If, as is usual in rubbing the vagina, there occurs extensive capillary hæmorrhage, it is only a favourable sign, inasmuch as it shows that at the bleeding points the diseased epithelial covering is for the most part removed, and, at the same time, a large number of the superficial, perhaps diseased, capillaries are destroyed.

"The iodoform gauze is permitted to remain for three or four days, and then the whole process is repeated with the same thoroughness, and over the same area.

"After four or five days more the gauze is finally removed, and then, for eight to fourteen days, the patient carries out a copious irrigation of the vagina with a sublimate solution of 1 in 2,000."

This process, he says, is hardly ever known to fail. The vagina is red and raw after the second tampon has been removed, and there is usually a copious purulent discharge, "but the gonococci are annihilated, and have for ever vanished."

Schwarz goes on to recommend the use of iodoform to the vulva, in order to eradicate the disease from Bartholini's glands, and he further employs compresses soaked in warm sublimate solution with the same object.

In estimating the value of this treatment, however, it may

be as well to recollect that Malusardi's experiments tend to discredit iodoform as a germicide for the gonococcus; and Schwarz is still a believer in a gonorrhœa of the vagina, a phase of the disease whose existence has been rendered still more problematical by some recently published observations[1] made by Dr. Steinschneider, in Neisser's Clinic at Breslau.

The chief objection to Schwarz's method is, however, not so much its inefficiency as its severity. It is clearly unsuitable for even hospital practice in England, and, however efficient it may have proved, it must give way to some milder method.

Fritsch, of Breslau,[2] strongly recommends a solution of chloride of zinc instead of the sublimate. He says he has obtained "quite surprisingly good results." He prescribes a solution of equal parts of water and chloride of zinc. Of this solution about five drams are added to a quart of water. This fluid is warmed and used by means of the syringe twice a day, not leaving off during menstruation. If the simple syringing fails to cure he applies a stronger solution of the zinc chloride to the internal surface of the uterus, and then introduces a pencil of iodoform.

Perhaps a large part of the disappointment with the sublimate, of which so much was expected, arises from an inefficient manner of using it. It partially fails in the gonorrhœa of the male urethra, because it has to be merely injected, and probably forms on the surface of the mucous membrane an albuminate which actually protects the deeper-seated gonococci from harm. In the female genital tract, on the other hand, it can be rubbed in, and if the new pathology of gonorrhœa be correct, it ought never to fail.

As to the treatment of the disease after it has reached the uterus, I can speak with confidence. In order to be effective treatment must be energetic and immediate. If we have fair grounds for believing, from the absence of thickening of

[1] *Berliner klinische Wochenschrift*, April 25, 1887.

[2] "Notiz betreffend die Behandlung der gonorrhoischen Vaginitis und Endometritis."—*Centralblatt für Gynäkologie*, No. 30, 1887.

tissues, or of pain on either side of the uterus, that the disease has not reached the tubes, we may still hope to prevent the worst complication of all. Nothing should be done that could increase the congestion of the uterus and interfere in any way with the uterine canal until the moment the germicide is to be applied. Therefore we cannot stop to dilate with tents; the interference and delay would be fatal to success. Only once, when the hollow sound would not pass, I have rapidly dilated, wounding the mucous membrane, before applying the germicide; and this is an undesirable incident, although it does not necessarily do harm. My routine treatment has been to steady the uterus by holding its anterior lip with a vulsellum, after exposing it well with a duck-bill speculum, and to introduce the full length of the canal a Fritsch-Bozeman sound. The sound is kept in a hot disinfectant, and at the last moment the air in it is expelled and replaced by the ordinary tincture of iodine, which is injected from an ordinary two-ounce glass syringe, connected with the sound by indiarubber tubing. When the sound is in position in the uterus the tincture is slowly injected as long as it continues to flow from the opening in the outer tube of the instrument. It is almost always necessary, however, to withdraw it, in order to clear it of coagulated blood and mucus before we can efficiently complete the application; and this is a serious defect in an otherwise satisfactory instrument. The vagina can be protected from the action of the returning fluid either by rapid and frequent changes of pledgets of cotton-wool, or by constant irrigation by gravitation with warm water.

A strip of lint wrung out of sublimate solution is left in the vagina for two or three hours to give the patient a rest, and then a copious vaginal douche with a weak sublimate solution is used, and this is repeated before the next intra-uterine application. The applications should be repeated three days in succession, if no symptoms arise. The Fritsch-Bozeman sound is laid aside for several days after the third application, and the vaginal irrigation is continued, careful note being

taken of both the axillary and vaginal temperature. When the eschar or iodised uterine lining has had time to break down and get more or less expelled, the process is repeated. So far, I have seen no harm come of the intra-uterine applications, and I am confident that the proceeding has saved several patients from the further spread of the disease. Tincture of iodine is so far the only fluid I have employed. Perhaps a spirituous solution of corrosive sublimate might be used with advantage.

Schwarz employs, at the stage of the disease under consideration, a process of constant irrigation of the whole uterine canal with carbolic acid or corrosive sublimate solution. He mentions some details of three cases in which this method was most successful. The irrigation is carried on for from two to four days through a modified Fritsch's sound, and the return fluid is collected and drained away by means of a special apparatus.

Dr. Fritz Levy, in the paper already referred to, speaks of curetting the uterine canal "without previous dilatation," before applying tincture of iodine or other germicide solution. The treatment seems irrational and barbarous. No good can come of cutting up the endometrium with a curette, which, if so small as to pass the internal os without dilatation, cannot possibly bring away the bacterium-containing débris of mucous membrane which its employment produces. You cannot in this coarse mechanical way get nearer to the gonococci, and you can only succeed in choking up the catheter used to inject the germicide fluid, while laying the tissues open to the further ravages of the disease.

So much, then, must serve here as suggestions for the treatment of the uterine stage. I must confess that the opportunities which have presented themselves to me have been too few for trying variations in treatment. In the vast majority of the cases which I have seen the disease had already spread beyond the uterus by the time the patient applied for advice.

When the disease has advanced beyond the reach of topical treatment, it must be dealt with on a totally different plan.

The treatment cannot now be too cautious. Nothing should be done that could possibly increase the blood-supply to the internal sexual organs, and special care should be taken when the menstrual periods are impending. It should be remembered that some pathological conditions of the ovary may already exist which may greatly exaggerate the effects of the infection. The patient's sexual health is almost certainly about to be ruined, but her life is also in danger. If the ovaries are healthy and the tubes do not become sealed, this danger to life is comparatively slight. If even a small amount of fluid has collected in the tubes it appears to have a tendency to change into pus; and, if the fimbriated end of the tube has not become firmly sealed, undue manipulations setting up strong peristaltic action may produce rupture, followed by a fierce conflagration over the pelvic peritoneum. Such an inflammation, when set up by a fluid resulting from mixed infection, would probably not become rapidly circumscribed, but might be the origin of a general peritonitis.

It is usually necessary to keep down the vaginitis by a *warm* douche, and this is really all the local treatment which appears to be called for beyond poulticing in the acute stage of the perimetritis. The warm water, medicated or plain, may have some soothing effect; the *hot* douche may be injurious. In one of my early cases, which ended fatally (Case 6, page 11), I have always blamed the hot douche for again lighting up the inflammatory process. In order to prevent the uterine discharge from keeping up the disease in the lower portion of the genital tract, I direct the patient, even in the later stages, to use a lotion made by means of tablets of corrosive sublimate and ammonium chloride.[1] Each tablet contains two grains of the sublimate, so that when one of them is broken and thrown into a pint of warm water, the resulting solution is practically the strength of 1 in 5,000. A solution prepared in the same way should also be employed in the earlier stages of the disease, con-

[1] These tablets are prepared by Messrs. Wright and Barnaby, chemists, Oxford Road, Manchester.

comitantly with the intra-uterine applications. This treatment is continued until the dangers of the acute and subacute stages are over, and it is time to endeavour by suitable measures to remove the resulting exudation, to break down adhesions, and to prevent deformities.

The remoter stages of the disease, those of complications and consequences, must be looked upon as a separate chapter in gynæcology, apart, to a large extent, from their primary cause. Gonorrhœa in a woman, when it has once passed beyond the uterus, is an incurable disease. Such an outrage as the invasion of the Fallopian tubes by a pathogenic organism Nature never forgives. Just as a burn inflicted on a child that falls in the fire is followed by a deforming cicatrix, the effects of which may be ultimately more or less relieved by surgical measures; so the consequences of gonorrhœal invasion of the tubes and peritoneum are adhesions and deformities which cannot be cured, but whose miserable consequences may be sometimes palliated by operative gynæcology.

Prophylaxis.

When we come to consider the prevention of the disease under discussion, we are met by the question: What is the legitimate function of medicine in relation to the venereal disorders? It cannot be to make vice and excess safe and easy. Medicine is not called upon to become "Procuress to the Lords of Hell." How far it may be legitimately requested to give instruction in prophylaxis, with a view to stamping out the maladies, is a question in ethics for which, fortunately, I am not called upon to offer a solution.

One relevant question, a portion of the subject, presents itself and cannot be thrust aside; and regarding it the reader, who has not given it special attention, may justly claim from the essayist, who has had the temerity to take up the subject, some suggestion, the fruit of his presumed special thought and experience. The question is: How are women to be pro-

tected from the consequences of their husbands' pre-nuptial or post-nuptial vice and folly? I fear no concise and adequate answer is forthcoming. One of our greatest living philosophers has well said that the abrogation of the sexual relation would eliminate most of the poetry from human life. The destruction of that relation in the individual case, and the substitution of loathing disgust, and physical suffering, at the moment when aspirations, unconsciously the outcome of sexual vigour, which lend poetry and dignity to existence, and make men and women something more than mere mammals, are in process of reaching fruition, is a result peculiarly repulsive, and productive of resentment against its causes. And we naturally ask: How can the sum of human misery, resulting from this special cause, be diminished? Can the women protect themselves or through their guardians? The less that women know of these matters, and are capable of suspecting, the better for society; and we can hardly conceive of a state of society in which this evil received so much attention that the guardians of young and innocent women usually inquired as jealously into certain details in the antecedents and present physical condition of suitors as they are wont to do now into their worldly circumstances.

Can we expect anything from legislation? Hardly. We have probably gone as far in that direction already as a healthy public sentiment could permit. Some of our legislation has been useless or worse, and has had to be repealed; and while recent legislation for the protection of young women may do good, if the laws be calmly and justly administered, it does not to any considerable extent reach the causes of the suffering with which we are at present concerned. If legislation could do something for the protection of young and thoughtless lads, thrown upon their own resources in our great cities, against the harridans who lie in wait for them, and in modern times perform the functions attributed to the fabled harpies, there might be some diminution in the amount of contagion afloat; but we need not look for such legislation. Men must protect them-

selves: they must avoid the evil or take the consequences. If the consequences were confined to themselves, nothing more need be said. But the innocent suffer most. Gonorrhœa in the woman is as ruinous as syphilis; there is little to choose betwixt the diseases. The men must protect the women. The great majority of them are amenable to reason, and would listen to the dictates of humanity and of honour if their consciences were appealed to. With regard to their wives, there is also the sentiment of self-interest to influence their actions. It only needs definite knowledge to be diffused among them as to the risk of inflicting untold suffering upon those whom they wish to protect, to greatly influence their conduct; and the only guardians of the necessary knowledge are the medical profession. While the doctors look upon gonorrhœa in women as a mere bagatelle, what can be expected of their self-indulgent male clients? As long as the medical practitioner believes that he can produce a "precious result" at a critical time with a little nitrate of silver solution, the education of the layman will not begin; he will not be adequately impressed with the physical grounds for exercising self-control in order to escape infection, or for the need of persevering industry and self-denial in order to completely and rapidly eradicate the disorder once contracted.

The attentive reader of the notes of cases given in the foregoing pages will have observed that the worst results followed to the women whose husbands had been the victims of gleet or neglected gonorrhœa even long before marriage. The practical lessons from this observation is obvious enough: (1) Measures should be taken to have the disease cured as quickly as possible on symptoms beginning to appear; and (2) when a chronic disorder has become established it should be a positive bar to marriage until there is sufficient proof that it has been cured for many months.

And what is the criterion of cure? The question is perhaps as difficult to answer as the analogous question with regard to syphilis. We have seen that in some cases, where serious

consequences to the woman followed soon after marriage, a slight urethral discharge or moisture reappeared in the male owing to post-nuptial sexual indulgence. Taking a hint from this fact, we may find a criterion of cure in some cases. The local effects of sexual excess may be sufficiently reproduced, in a given case of suspicion, by the injection into the urethra of a nitrate of silver or corrosive sublimate solution, so as to irritate and produce a slight urethral discharge, in the same way as a conjunctival discharge is produced by Credé's method of preventing ophthalmia neonatorum. The urethral discharge resulting should be carefully and repeatedly examined for the gonococcus, and a negative result would afford a strong presumption of cure. The slight sacrifice of comfort thus made by the patient would be too trifling to be considered when the importance of the result was kept in mind. This is far from a perfect method of gaining definite information, but as a criterion of cure it is better than nothing at all.

Sound judgment is hard; and it may be that in writing this essay I am joining the band of those who exaggerate the importance of the form of venereal disorder under discussion, or at least see too much in recent observations and experiments. That such observations and experiments must be continued and greatly extended, sifted, discussed, and subjected to the most rigorous logical processes before we can fill up *lacunæ* in our knowledge, reconcile differences of opinion, and "in its season bring the law," I willingly admit; meanwhile we have learned enough for that practical application of our knowledge which in its turn becomes a method of research and an agent of progress. In putting this subject before the readers of my essay, I do not think I in any way exaggerate; I believe rather that in attempting to depict the fruits of our newer knowledge I use but feeble colours. I believe that the gynæcologist who fails to closely examine into this subject, repulsive though it may be apart from its scientific interest, must constantly fail in his duty to his patients; and I am con-

vinced that when the general practitioner, to whom the domestic *arcana* are an open book, comes sufficiently to observe the phases, and duly to appreciate the import, of a large class of ailments with which he is constantly called upon to deal, the view which I expressed in the commencement of this essay will become the generally accepted opinion of the medical profession, viz., that the gonorrhœal infection in women gives rise to a group of diseases which, by reason of their clinical interest and their social and moral consequences, surpass in importance every other class of affections which claim the attention of the gynæcologist.

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