Thesis for the degree of M.D.

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Gonorrhœa and its Commoner Manifestations, Primary and Secondary, in Women - Description and Discussion of a Virulent Case, marked by extreme Hyper-pyrexia.

By

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The history of gonorrhoea dates back to the days when mankind first formed itself into communities. Gonorrhoea is, in fact, the oldest of all known diseases. The first reference to it is found in the Old Testament. The whole of the fifteenth chapter of the book of Leviticus (B.C. 1490) is devoted to a homily by Moses on the subject of a "running issue of the flesh." He lays down the most precise directions as to how the children of Israel - men and women - must deal with this condition, and gives them sound advice. Further references to it are found in Numbers v. 2., Deuteronomy xxiv., 1. and Samuel iii., 29.

Herodotus (about B.C. 500) refers to a disease inflicted on the Scythians as a punishment for plunder-

ing the temple of Aphrodite at Ascalon:- "Venus inflicted on the Scythians who pillaged her temple at Ascalon, and on their descendants, the feminine disease." This may well have been gonorrhoea, and is so regarded by competent critics. Hippocrates, alluding to what is evidently the same story, discusses the causes, prominent among which he places the Scythians' habit of horse riding.

Gonorrhoea was very prevalent among the ancient Greeks and Romans. Then, as now, it was considered shameful. Then, as now, it extended over the known globe.

Although known long before his day, gonorrhoea took its name from a misconception on the part of Galen, (A.D. 131-A.D. 201 circa) who regarded it as a flow of semen unaccompanied by erection. The semen

itself he believed to have taken on a poisonous quality. Aretæus a Cappadocian physician, who flourished about A.D. 100, and who was considered second only to Hippocrates in skill, came nearer to a true understanding of the disease. He thought it was a form of cystitis, and gave a detailed account of the symptoms, prominent among which was pain with concomitant thick whitish discharge.

Celsus believed that the essential lesion was an ulcer of the urethra, and looked on the purulent discharge as part of the curative process. The following is his own description:- "Quibus in fistula urinæ minuti abscessus, quos φύματα Græci vocant, esse coeperunt, ubi pus ea parte profluxit, sanitas redditur. Ex quibus cum pleraque per se proveniant, scire licet, inter ea quoque, quæ ars adhibet, naturam

plurimum posse" (Lee - Aur. Cor. Celsus on Medicine Lib. ii. p. 90. London, 1831).

In the fourth century we find one, Paul of Egina, giving a detailed account of complications well known at the present day - balanitis and consequent paraphimosis.

Avicenna, a famous Arabian physician, a follower of the Greek school, lived from A.D. 980 to A.D. 1037, and exercised great influence on the medical thought of his time. In his "Canon" he describes ulcers of the bladder and relates how he dealt with retention of urine by means of a silver catheter, drawing off the urine, and washing out the bladder.

With the advent of the middle ages the clinical features of the affection were becoming clearly defined, and we find many remarkably accurate descrip-

tions of it in the writings of the period. Among the best known authorities were John of Gaddesden, an Oxford professor, (thirteenth century), Valescus of Tarentum who, writing early in the fifteenth century, attributes the disease to "intercourse with a dirty, vile, or chancrous woman" and Arculanus, (fifteenth century) whose teaching is particularly interesting. He used silver to wash out the bladder - a remarkable foreshadowing of modern treatment.

About this time, syphilis made its appearance in Great Britain. This, as may be readily imagined, led to confusion. Out of confusion grew controversy - controversy which forms a close parallel to that which so long divided medical opinion on the subject of typhus and typhoid fever. It reached its culminating point when John Hunter, in 1767, offered himself

a willing victim on the altar of Science. Inoculating himself with pus derived from a patient supposed to be suffering from gonorrhœa, he developed syphilis. From this he concluded that the two affections were different phases of one disease. He defended this conclusion to the end of his life with the greatest persistence and determination. "If any doubt", he says, "still remain with respect to the two diseases being of the same nature, it will be removed by considering that the matter produced in both is of the same kind, and has the same properties; the proofs of which are that the matter of a gonorrhœa will produce either a gonorrhœa, a chancre, or the lues venerea; and the matter of a chancre will also produce either a gonorrhœa, a chancre, or the lues venerea." (The works of John Hunter, Edited by Palmer 1837,

Vol. ii, p. 145). Hunter's great reputation and influence secured him a strong following and, not till twenty years later, do we find any one taking a very definite stand against his hasty conclusion. About 1790 however, Howard, and then Bell, after carefully conducted experiments, were able to produce strong evidence on the other side. Between 1830 and 1837, a series of experiments was carried out by Ricord (Philippe) who, basing his findings on many hundreds of inoculations, may be said to have finally established the separate identity of gonorrhœa and syphilis. He failed, however, to conceive the specific nature of the infection, believing that it was brought about by irritation, and that the part played by gonorrhœal pus, in producing the disease, was that, merely, of an irritant. Discussing Hunter's experiment, and the conclu-

sions drawn from it by that observer, he makes the following criticism:- "Sans doute, dans cette observation, on voit de nouveaux chancres reparaître et disparaître encore d'eux-mêmes: des symptomes, en apparence vénériens se manifestent par la suite: un bubon et, après sa résolution, des ulcères à la gorge, dont la guérison fut suivie de pustules; mais ce qui devait être charactéristique, les ulcères, vrai produit de l'inoculation, ne furent pas vénériens. Le bubon peut appartenir à l'ètat d'irritation de l'ulcère du gland ..... L'ulcère de la gorge, les pustules pouvaient tenir à d'autres causes." So that he clearly perceived what Hunter did not, that he (Hunter) was the subject of two separate diseases. Again, referring to an experiment, in which Bell inoculated the prepuce and glans of two young men, with pus derived from

their own gonorrhœal discharges, he relates how there formed at the points of inoculation "de petits ulcères qui n'avaient point l'apparence de chancres, et qui guérirent sans mercure"[2]. Here he recognises definitely the difference, so well understood to-day, between the "soft" or septic sore and the "hard" or true syphilitic chancre.

One more conclusion of Ricord's may be quoted:- "Enfin le seul moyen rigoreux de diagnostic est, dans l'état actuel de la science, l'inoculation. Tout blenorrhagie soumise a l'inoculation dans ses différentes phases, sans donner de résultat, ne constitue qu'une affection simple, et incapable de communiquer la syphilis, soit primitive sur un autre sujet, soit constitutionelle sur celui qui en est d'abord affecté."[3] (Philippe Ricord - Traité pratique des maladies véné-

riennes, Paris 1836. pp. 106.[1], 107.[2], 133 and 134[3]).

About 1870, Voillemeier took a considerable step in advance by showing that, while pus derived from abscesses in other regions of the body, did not, when introduced into a healthy urethra, produce gonorrhœa, pus from a gonorrhœic urethra, did. This practically established the specific nature of the infection, but it was left to Neisser to add the coping stone to the edifice of proof, by his discovery, in 1879, of the gonococcus. Watson-Cheyne's discovery of the micro-organism was practically simultaneous, if, indeed, it did not antedate that of Neisser. It was communicated in an article, "On a new method of arresting gonorrhœa," which appeared in the British Medical Journal of July 24, 1880. "Having been" he writes "for some time past occupied with the problem of the infective

diseases of wounds, the problem of gonorrhœa has occupied my attention. The extreme contagiousness of the disease, the existence of a distinct period of incubation, and the steady spread of the inflammation, all point strongly to a parasitic origin. Acting on this idea, I made in the spring of 1879 a number of inoculations of gonorrhœal pus, under certain precautions into flasks containing infusion of meat or infusion of cucumber. In these flasks micrococci grew in large numbers, showing that these organisms were present in gonorrhœal pus. Circumstances prevented me from pursuing the subject at that time. In the meantime Dr. Neisser published an elaborate research on the subject, in which he showed the presence of enormous numbers of micrococci in gonorrhœal pus and in the pus from contagious ophthalmia. He further asserted that

these organisms were always of definite size, and that they differed in respect of size from the micrococci found in wounds. Whether these micrococci are the cause of gonorrhœal inflammation I do not attempt to say, but the general history of the disease, taken together with these facts, points strongly to the idea that its essence consists in the growth of these or allied organisms."

Watson-Cheyne goes on to express his belief that these were not only free in the urethra, but also in the substance of the inflamed mucous membrane. This, as we now know, is actually the case.

Up to the beginning of the eighteenth century, gonorrhœa, as possibly affecting women, had received scant notice. This is hardly matter for surprise, for the manifestations and symptoms in women are often

so slight as to attract little or no attention, even from the patient herself. Early in the second half of the nineteenth century a few tentative suggestions were put forward by certain observers - notably West - as to a probable connection between gonorrhœa and pelvic inflammatory diseases of women. But the idea gained no extensive support from the scientific world, until, in 1872, there was published a treatise destined to revolutionise the whole subject of gonorrhœa in women. This is the well known monograph of Emil Noeggerath "Die latente Gonorrhoe in Weiblichen Geschlecht" - Bonn 1872 - a work which threw a flood of light on much that had hitherto been wrapped in dark and impenetrable mystery. His description of the disease as it attacks a young married woman, of its onset soon after marriage with slight leucorrhœa and

slight disturbance of menstruation, progressing gradually to well marked, even profuse leucorrhœa, dysmenorrhœa and menorrhagia, culminating in severe pelvic inflammation, as evidenced by pain, tenderness, and fever, dying away finally in chronic invalidism and permanent sterility, presents a picture so vivid and true to life, that it could hardly be surpassed for accuracy in the full light of present-day knowledge. Nor did he fail to realise how difficult of cure was the disease, how prone to relapse.

In 1879, as already stated, Neisser and Watson-Cheyne independently isolated the gonococcus. Not even then was controversy finally stilled. Nevertheless the conclusions of these two observers steadily gained ground, - many others making experiments and achieving confirmatory results - till, by 1896, all

opposition was extinguished and the gonococcus was universally accepted as the responsible agent in gonorrhœal infection. Prominent among these workers was Bumm who gave one of the earliest and best detailed accounts of the pathological changes found in tissues invaded by the gonococcus.

The origin of the gonococcus is, of course, shrouded in mystery. Whether, under accidentally favourable circumstances, a micro-organism, originally non-pathogenic, took on a pathogenic character, no man can say. It is a commonplace of experimental bacteriology that, given suitable methods of cultivation, a micro-organism of low virulence will take on a much higher degree of pathogenic intensity. Something analogous to such experiments may have occurred in the early days of prostitution, when public and personal

hygiene were non-existent. Naturally, and, as we say, accidentally, conditions may have occurred so favourable to its growth, that a non-pathogenic organism was enabled to take on a pathogenic quality, which has been developed and perpetuated from generation to generation. It is at least conceivable that such conditions might occur in the case of a prostitute giving herself to many men, and taking no steps to cleansethe vagina of pollution.

Socially and geographically, gonorrhoea is one of the most widespread of all diseases. It attacks impartially, rich and poor, high and low, male and female, adult and child. Now, as in the earliest days, it is distributed throughout the globe. It confines its activities strictly to human beings, all attempts to convey it to the lower animals having failed.

Its frequency is enormous. American observers, who have done so much to clear up some of the more obscure workings of the disease, have also devoted much time to compiling its statistics. The following facts and figures are culled from the excellent monograph "Gonorrhœa in Women" by Dr. Charles E. Norris.

"Of the 500,000 prostitutes who constitute a part of the population of our great cities, it is estimated that 40,000 die annually. Of these deaths 30% are due to gonorrhœa."

"Neisser states that 30 to 50% of all childless marriages are directly caused by gonorrhœa. In France, statistics have been accurately compiled and it has been found that, of about 10,000,000 families 2,000,000 are without issue. These results would tend to show that gonorrhœa is the etiological factor in nearly

1,000,000 sterile marriages in France alone and this does not include the vast number of 'one-child' sterilities due to this condition."

"Placed at a low estimate gonorrhœa may be said to cause 20% of all the blindness of the world."

"The Royal Commission on the blind..... estimated that 7,000 persons in the United Kingdom had lost their sight as a result of ophthalmia."

"The following statistics, taken from the Committee of prophylaxis of venereal diseases, Washington State Medical Association, state that 80% of all men in large cities have had gonorrhœa once or several times, 45% infect their wives, 80% of all operations upon women for diseases of the uterus and adnexa are caused by gonorrhœa, and that 20% of all blindness results from the same cause."

Statistics are notoriously liable to error and there are obvious reasons in the case of gonorrhœa why accuracy should be specially difficult to attain. It is to be observed, however, that the special difficulties in this case would tend rather to under - than to overstatement. At least, it is evident that the disease is not only extremely wide in its incidence, but also of enormous importance in its effects.

It is natural to ask what are the reasons for this wide incidence of the disease and for the difficulty in controlling it? They may be grouped under four headings:-

First, the extreme infectivity of the organism causing the disease, and its great tenacity of life when in its natural habitat, the human body.

Second, ignorance on the part of many patients

that they are suffering from the disease. This is especially likely to occur in the case of women, who may easily and innocently overlook a mild attack. A very large proportion of women suffer greatly from leucorrhœa, and a slight increase in the discharge may attract very little attention. Even should the urethra be attacked the sufferer may be conscious merely of a slight burning or itching on micturition. This may pass in a few days, and be immediately forgotten.

Third, ignorance of the high infectivity of the disease, and of the persistence of the infectivity even after the discharge has diminished to a vanishing point. There remains, perhaps, no more than one clear drop - and that visible only after pressing on the urethra - before urination in the morning. Or there may be simply an occasional slight stickiness at

the meatus - perhaps no recognisable discharge at all. This group applies especially to men, who frequently look upon gonorrhœa as a subject for jest, rather than as a disease fraught with serious dangers to themselves, and to the community at large. In the experience of the writer it has often been extremely difficult, sometimes impossible, to bring home to such a patient the danger lying in that clear "morning drop." It is indubitably true that many men marry, believing themselves cured, and pass the disease on to their wives.

Fourth, wilful concealment. This class is probably small and includes both men and women. Uncured men have been known to marry e.g. for financial reasons, wilfully neglecting the danger. Norris instances the case of a prostitute, suffering from

venereal disease, who boasted that she had infected more than two hundred men, and ~~who~~ stated her intention to refuse treatment until she had infected five hundred.

The consideration of the various ways in which the disease is propagated leads us naturally to the question of prophylaxis. And of prophylactic measures none is more important than that of seeing to it that a complete cure - so far as that lies in our power - is effected in each case that comes under our care. It is necessary to institute a vigorous treatment, to carry it on with perseverance, and not to desist from it, until the end sought for has been achieved. The patient must be impressed with the importance of this, as being in his or her own best interests, as well as in those of the community. He

must have the fact impressed on him that he is suffering from a disease dangerous to himself and others. It is necessary that the physician should be on his guard against a too ready assumption of cure. Not only should repeated microscopic examinations be made of the discharges, before a case is accepted as cured, but, where there is doubt, material for examination should be carefully sought for in those regions where the organism is specially prone to lurk, as in the urethral glands, the glands of Bartholin, or the mucous membrane of the cervix uteri. If necessary, by means of irritants, applied locally or through the system, an attempt may be made to stir any dormant infection into activity. Where these means fail, an examination of the urine will often demonstrate the presence of the so-called 'clap-shreds' containing gonococci. Latent gonorrhœa is the most dangerous

of all forms of the disease.

Equally important from the prophylactic point of view is the education of the community with regard to venereal affections. Nothing is more disheartening than the light and indifferent way in which the average man regards an attack of gonorrhœa. Therefore the educative process should be commenced during the impressionable age. It should form an essential part of the curriculum at every boys' and girls' school. Instruction should begin at puberty or very soon after.

Much might be done by well-judged legislation. Something has already been effected. Since 1911, there has been compulsory notification of ophthalmia neonatorum in London. Similar measures have been adopted in Glasgow and other towns in the United Kingdom. Steps have been taken to secure instruction in

treatment - prophylactic and otherwise - for midwives, who, in accordance with the regulations of the Central Midwives Board, must summon medical aid immediately on detecting any signs of ophthalmia. In this way the numbers of cases have been greatly reduced, while, in such cases as develop the disease, a cure is much more rapidly effected. In the words of an inspector, whose letter is before the author, "We find, perhaps, a tiny speck of pus, take a swab which turns out 'positive' but, having used 50% argyrol, find eyes normal at the next visit." So far as this goes it is satisfactory, but it does not go far enough. Much remains to be done. What has already been done for one small group of gonococcal infections might well be extended to include gonorrhœa as a whole. No doubt the day will come when all communicable disease will

be compulsorily notifiable, and when marriage will be by health certificate. Public opinion is slow to arouse in this country and as yet the public is unaware that there is anything in gonorrhœa to which it specially needs awakening.

Under the head of legislation too, falls for consideration the difficult question of how far the ethical code should be relaxed in favour of doctors who might use knowledge gained in professional confidence to prevent, for instance, a marriage which would be no less than a crime. Under no circumstances, in the writer's view, could it be right for a doctor to stand by in silence and watch the perpetration of such an infamy. It is probable that sooner or later, the wilful communication of venereal disease will be a crime in the eyes of the law. Indeed this is already

the case in certain of the American States, while in Great Britain, proof that a wife has been infected, by her husband, with venereal disease, has been held to constitute legal cruelty.

The question of the registration and routine examination of prostitutes has long been debated. It is the rule in several continental countries. In Great Britain, chiefly on moral grounds, it has not met with much favour. Apart from the moral question, it is doubtful whether it would be particularly efficacious as a prophylactic measure. Public women as a class are familiar with the danger, and with efficient ways of meeting it, while those consorting with them are likely to take means to minimise the risks. Furthermore, registration would place no embargo on men suffering from venereal disease. They could continue

to spread it at will. It is, moreover, probable that the majority of infections are conveyed by the innocent and the ignorant, men and women alike.

How far increased hospital and dispensary facilities for dealing with venereal disease would help in prophylaxis, it is difficult to estimate. Probably to some extent. Unhappily, however, the great majority of the patients who seek the aid of such institutions are of a class very hard to impress with the idea that a disease which has ceased to give rise to symptoms is not necessarily, or even probably, cured. The writer, for several years, acted as Medical Officer to a "provident dispensary" where he saw much venereal disease. Very rarely did he find it possible to induce patients to persist with treatment for any length of time after symptoms had passed into abeyance.

Finally, from the point of view of prophylaxis, it is important to consider what steps should be taken to safeguard those recently exposed to possible or probable infection. The results of such prophylaxis can be best studied in the case of large bodies of men whose movements can be controlled by observers in positions of authority. Georges Luys in his "Text-book on gonorrhœa" states that good results have been obtained in France "by lectures delivered to the various regiments, in order to warn the soldiers against the dangers of venereal disease." But experiments have been carried out on a far more comprehensive scale in the Navy of the United States of America. The results are so remarkable as to demand the closest attention, and to suggest the advisability of similar measures being adopted in other countries. The best

expert opinion is agreed that the organism does not make its way into the tissues for some hours after exposure to infection. It is, doubtless, to this fact that the prophylactic measures adopted, owe their striking success. Conversely, the success of the treatment is the best possible corroboration of the expert view. Norris (Gonorrhœa of Women), who deals extensively with this subject, states that compulsory measures have been adopted on the majority of the ships of the United States Navy. Rules have been drawn up to which all men returning from leave must conform. They must report themselves at once to sick bay. Should they have been exposed to infection they must immediately act on the following rules of treatment:-

1. "Before coming to sick bay, urinate and wash well with water."

2. "In the sick bay wash well with the solution (bichloride 1-2,000)."

3. "Use half a syringeful of the injection, and retain it in the canal for 3 minutes (The Solution consists of 3% protargol and 15% glycerine. About 1 c.c. is injected, so as to reach the first inch of the urethra only)."

4. "Rub the ointment (30% calomel) well into the whole penis and leave it on for two hours."

"The results of this treatment were as follows:- Number of liberties, 39. Number of men on liberty, 949. Number of men exposed, 256. Number of men not exposed, 693. Result, no venereal disease." Similar results were obtained on every ship in which those prophylactic measures were practised. The only

failures were in a negligible number of cases where, for one reason or another, treatment had not been carried out, or had been delayed more than twelve hours. Many of the ports where the liberties were given were known to be rife with disease. "On board the Baltimore, on the Asiatic Station, visiting Sidney, Melbourne, and Auckland, for one month each, with prophylaxis there was 'practically no venereal disease', whereas the British ships, in the same environment, had 25% of their crews infected."

The morphological characteristics of the gonococcus are too well known to call for any very detailed description. It is readily recognisable under the microscope by its reniform shape, and by its characteristic grouping in pairs and, occasionally, in sets of four. This results from its method of

reproduction, which is by fission. The concave surfaces are always found facing one another. The size of the organism varies somewhat. Its average length is about 1μ its breadth 0.8μ . At one time the gonococci will be seen adhering to the surface of the cells, at another contained in them. They are never found in the nucleus. It is important to note whether the organism is intra- or extra- cellular, because in this way information, important from the point of view of diagnosis and treatment, may be obtained. In the early stage, the gonococci will be found more superficially than in the later. It must not be assumed that the absence of the micro-organism in the discharge negatives a diagnosis of gonorrhœa. Quite commonly there are repeated failures to find it

in cases which eventually prove to be gonorrhœal. The special danger of the chronic form of the disease has already been pointed out.

The gonococcus is gram-negative and stains readily with the aniline dyes. Biologically it is an organism with very striking and well defined characteristics. Generally it may be said that, in its natural habitat - the male or female genito-urinary tract - it is second to none in its tenacity of life. Outside the human body, on the other hand, it is extremely delicate. It grows best at blood-heat and is highly sensitive to changes of temperature, perishing rapidly even when left at room-temperature. It is cultivable on artificial media only with difficulty. Where growth is obtained it is usually scanty. In the body it shows itself extremely resistant to

changes of temperature. Attempts to deal with gonorrhœa in the genital tract by the application of dry heat, have proved abortive, an indication of the power possessed by the organism of penetrating the tissues, where the heat cannot reach it. This same power of penetration goes far to explain what is known as latent gonorrhœa, which is a specially insidious form of the disease. Failure to recognise it has not infrequently led to disastrous results. It accounts doubtless for some of those puzzling cases where a man after long cohabitation with the same woman - she being apparently healthy, and there being no reason to suspect her fidelity - suddenly develops an attack of gonorrhœa. Georges Luys ("Gonorrhœa and its complications", translated by Foerster, 1913 p. 18) instances such a case:- "A young man had attached himself to a

little lady who had once suffered from gonorrhœa, but had given up her former life, and he enjoyed two years of uninterrupted happiness with her. One day, as the couple were on a cycle-tour in the Alps, the solitude and the bracing air revived their evil desires, which they satisfied on the spot, surrounded by magnificent scenery. There being no water near, all washings had to be omitted, and six days later the young man had a typical discharge."

Some five years ago a similar case came under the writer's notice. He was consulted by a young man suffering from a very acute attack of gonorrhœa, accompanied by profuse purulent discharge, violent pain, and even hæmorrhage, on urination. The patient stated that the attack had come on just 48 hours after he had last had connection with his mistress,

with whom he had cohabited for over a year. Previously to that connection, he had not seen her for a fortnight, having been away on business. He had never had gonorrhœa before, and said that, since he had lived with this woman, he had always been faithful to her. As he had spoken frankly of his mode of life, there was no reason to doubt his veracity. On the following day, by arrangement, he brought his mistress for examination. She also made a very frank statement, owning that about ten years before she had been treated for gonorrhœa, that two years later, believing herself cured, she had lived with another man, and that six months after she had infected him with the disease "in a severe form." She had then undergone another long course of treatment and, when she entered into the present relationship, had felt quite confident

that she was absolutely well. She stated emphatically that she too had been faithful to her partner. In spite of her appearance of frankness and her evident distress at the contretemps, the simplest explanation of the mystery would have been to doubt the truth of her story. Certain facts, however, elicited in the course of cross-examination, provided a more probable explanation of the affair. It appeared that it had been the man's habit to go about twice a week to the woman's flat to spend the night with her. On these occasions she had always used a douche before retiring to bed, while he had always, immediately after each coitus, got out of bed, washed and urinated. The sole exception to this rule was the occasion now under suspicion. This time the man went unexpectedly to see his mistress and had connection with her without

preparation made on her part, or precaution taken on his. She did not use her douche beforehand. He neither washed nor urinated for a couple of hours after. These omissions almost certainly explained the infection and the matter was placed beyond reasonable doubt, when, after two abortive attempts, the gonococcus was finally demonstrated microscopically, in discharge derived from the mucous membrane of the cervix uteri. The organism had doubtless been lurking there for years, in and between the cylindrical cells of the epithelium, awaiting, as it were, a suitable soil and favourable conditions in which to develope.

This case illustrates well the danger to the community that lies in such latent cases of gonorrhœa. It suggests for consideration also several

other points of interest and importance. The man's gonorrhœa proved to be of a most virulent and intractable type. It will be remembered, too, that the female patient had herself stated that her former victim had had the disease "in a severe form." It is evident, therefore, that gonorrhœa may be latent in its host, giving rise to neither sign nor symptom, and yet be conveyed to another in a very virulent form. It may be inferred that, with lapse of time, a certain immunity is established in the host.

The correspondence in type between the two cases, whose source of infection was this one woman, lends some support to the view - now widely held - that certain strains of gonococci are more virulent than others. The truth of this view is not, however, readily demonstrable, for it is obvious that a differ-

ence in severity in cases of gonorrhœa may depend on causes quite apart from inherent virulence in the gonococcic strain. For example, such a difference frequently depends on the presence or absence of certain predisposing causes.

Of these a few may be cited:-

Alcohol is notoriously a predisponent to infection. It acts in two ways.

First, it is obvious that a man under the influence of alcohol is less likely than normally to take such personal prophylactic measures - for example washing and urination - as might obviate the danger of infection.

Second, alcohol undoubtedly has a direct deleterious influence on the tissues, reducing their power of resistance.

Another predisposing condition is found in any cause tending to produce a medium favourable to the growth of the micro-organism. It is known that this grows best in a slightly alkaline soil. Sexual excitement too long sustained, by causing an excessive flow of mucus, will produce such a soil and may therefore be regarded as a predisponent to infection. In considering predisposing causes, menstruation must not be overlooked. By producing a local congestion before, during, and after the period it unquestionably predisposes to infection. Not only is this true of a primary infection but also of secondary extension of an already existing condition. It is a common experience to find the disease spreading, during the menstrual period, from the mucous membrane of the cervix uteri through the endometrium to the lining membrane of the fallopian tubes, and to the pelvic peritoneu

Here it is necessary to enter a caveat against a too ready assumption that the enhanced infectivity is due to the direct effect of the congestion produced at the time of menstruation. Professor Bier has shown how, on the contrary, the bactericidal action of the phagocytes is much increased by the induction of hyperæmia. It is more probable , therefore, that menstruation acts indirectly by causing a flow of blood serum which, after its escape from the tissues, forms - in addition to increased mucus - a favourable nidus for the development of the micro-organism.

Another reflection suggested by the case above cited, depends on the shortness of the incubation period. It will be observed that the disease came on only 48 hours after exposure. This is considerably earlier than the rule, though, occasionally, an even shorter period may

elapse between infection and the development of the disease. The average length of incubation probably lies between three and six days. The writer has paid a good deal of attention to this point and believes it may be taken as an almost invariable rule that the shorter the incubation period, the severer the attack. Twelve days must be regarded as a very long incubation. Probably most such cases are recrudescences of pre-existing latent disease. They run a mild and sub-acute course.

Two other cases which came under the writer's observation serve well to illustrate the persistence of the chronic form of gonorrhœa. These were a husband and wife who had been married for twelve years. They had three children, the eldest ten years of age, the youngest three. The husband admitted that a year before marriage he had contracted gonorrhœa and that, at the time of the marriage,

there was still an occasional "morning drop" at the meatus urinarius. He had not regarded this as important and was much perturbed when, a week after marriage, his wife developed an acute attack, accompanied by such usual symptoms as scalding on micturition and profuse mucopurulent discharge. A diagnosis of acute gonorrhœa had been made by the doctor in charge of the case. After six months of separate life, during which time active treatment was carried on in the case of both husband and wife, they were pronounced cured, and resumed cohabitation. They enjoyed good health except for the fact that from time to time, sometimes the one, sometimes the other, sometimes even both together, suffered from slight discharge. This was never profuse in either, and, in the man's case, was always very slight, and usually, quite colourless. The two elder children had been born without any abnormal incident, but the youngest had, a few

days after birth, developed a severe ophthalmia of both eyes This, after causing great anxiety for the child's eyesight, had gradually yielded to treatment, but had left evidence of the attack in the shape of a slight opacity on the cornea of the left eye. The opacity was, fortunately, not in front of the pupil, the sight being unaffected. In the man's case, the gonococcus was found in the discharge only on one occasion, and that only after several attempts. On examination of the woman there was found a red granular patch at the outlet of Bartholin's gland on the right side, and on pressure, a bead of muco-pus exuded. In this there was no difficulty in demonstrating microscopically the presence of Neisser's diplococcus. Nothing was found in material derived from the urethra and from within the cervix.

With regard to these patients it seems probable that

each, from time to time, re-infected the other. No doubt there was established in them a certain immunity, which accounted for the mildness of the manifestations subsequent to the original attacks. It must be borne in mind however, that, while, mutual reinfection is the most plausible explanation of the train of events, these are easily explicable apart from such an hypothesis. It is a well established fact that, given a latent gonorrhœa, it is not necessary, in order to account for a recrudescence of symptoms to presuppose a re-infection. A little over indulgence in alcohol, or in sexual pleasure, will often suffice, owing to the irritation produced, to re-start the whole train of symptoms.

The <u>symptoms</u> of gonorrhœa vary greatly in different cases. In women, they are often so mild, that they are scarcely noticed, and have no importance attached to them

by the patient herself. A little scalding on micturition, a little itching in the vulva, may be ascribed to a chill and, passing in a few days, be forthwith forgotten. In more severe attacks, discharge is almost always a prominent symptom. It is important to be familiar with the main microscopic features of gonorrhœal discharge. These vary so much at different stages that, for purposes of description, it is possible to divide them into three stages, each with well marked characteristics:- 1. The stage of invasion, 2. The stage of full development and 3. The stage of decline.

1. The stage of invasion is marked by steadily increasing muco-purulent discharge, in which are found epithelial cells, perhaps a few blood cells, and large numbers of free gonococci. The point to note is that the micro-organisms are all outside the cells.

2. In the stage of full development the discharge

is frankly purulent, there are again many cells, - epithelial elements and leucocytes - and many gonococci. But, in this case, the organisms are found largely inside the cells, both the epithelial and the pus cells.

3. In the third stage, leucocytes and gonococci are alike comparatively scanty. The leucocytes often show signs of fatty degeneration. Such micro-organisms as are present, are found, some enclosed in the cells, some free in the discharge.

The classification of the microscopic characteristics of gonorrhœal discharge under the above three headings has a certain practical value in helping the physician to form an estimate of the intensity and probable duration of an attack. But it is not meant to suggest that the three groups are so crisply divided one from another, that it is easy, at a glance to relegate any submitted specimen to its

proper class. On the contrary, one group merges so imperceptibly into another, that the distinction may be extremely difficult to make and, sometimes, in one field the characteristic features of two stages may be seen.

The first stage - that of invasion - is so short that as a matter of practice the second is usually well established before the patient comes under observation. For this reason the characteristics of the second stage are much more frequently seen under the microscope than those of the first. Its average duration is about ten days. It passes so gradually into the third that the line of demarcation is extremely vague. In different specimens all referable to the third group, there may be found, in some both cellular elements and micro-organisms in fair numbers - in others perhaps no more than one or two gonococci of aberrant form. It has already been shown with

what difficulty the specific organism is demonstrated in the latent form of the disease. In some cases which, from their history and their clinical features, must inevitably be classed as gonorrhœal, it cannot be found at all.

In considering prophylaxis it was shown how the position of the micro-organism is at first superficial and how this fact could be, and sometimes is, turned to profitable account in treatment. Very soon, invasion of the mucosa takes place, and here it is of importance to note the power of selection, or, to express the same idea in different words, the natural affinity for a certain type of tissue, possessed by the gonococcus. If we consider for a moment only the lower part of the genito-urinary tract, that is to say all the passages from the vulva up to the internal os, we find that in the vast majority of cases the micro-organism selects for attack one or more of three

special regions - the urethra, Bartholin's glands, the cervix uteri. All of these structures have one characteristic in common - the possession of a true mucosa. The vulva and vagina do not possess this. The vaginal mucous membrane in its structure much more nearly approaches skin, and is almost devoid of glands. It is in keeping with this peculiarity that only rarely do we find the vagina primarily attacked, except in children. In them the squamous vulvo-vaginal epithelium is soft and easily penetrable. Some authorities altogether deny the occurrence of primary gonorrhoeal vaginitis in adults, asserting that it is seen only as a secondary phenomenon after protracted exposure to infected discharge from some other region - e.g. the cervix; so resistant is the stratified squamous epithelium lining the vaginal canal.

As with the lower, so it is with the upper portion

of the genito urinary tract. The same selective power is evidenced and we find, accordingly, that the endo-metrium is rarely attacked, whereas the tubal mucosa is a very frequent seat of secondary infection.

The selection by the gonococci of one region rather than another undoubtedly depends, to some extent, on other causes than the presence there of cylindrical epithelium. Special conditions existing at the moment of infection naturally play their part. It is obvious, for example, that where, during coitus, complete entrance has not been effected, such structures as the urethra and the glands of Bartholin are more likely to be attacked than the cervix. Where, on the other hand, entrance has been complete the cervix will be primarily affected. The urethra rarely escapes. In children, the victims of outrage, or who may have been in contact with soiled linen, the infection will,

in all probability, be applied outside the vaginal entrance. The vulva whose epithelium, although of the squamous type, is, in their case, soft and easily penetrable, is often the seat of primary infection which rapidly passes to the vagina.

What is it that in true mucosa specially attracts the infective organism of gonorrhœa? Is it some inherent vital quality in the cells? There is no evidence to support such a view. It is more probable that the predilection shown depends merely on the shape, arrangement, and softness of the superficial cells of the mucosa.

Only for a very short time does the infective agent remain on the surface. Rarely, too, does an opportunity occur of turning to account in treatment, the short interval between exposure to infection and invasion of the tissues. That it can be so turned is shown by the results - already cited - attained by prophylaxis in the Navy of the

United States. The following case also forms a suggestive commentary on the same problem:-

A good many years ago Dr. Chapman Grigg related at a meeting of the London Gynæcological Society, a remarkable case which had come under his notice. He was consulted by a man who stated that, a week before, he had returned home unexpectedly after a prolonged residence abroad. Within an hour of his return, he had connection with his wife. Four days later he experienced a burning sensation on micturition, and observed a discharge from the urethra. By the time Dr. Grigg saw him he had a typical attack of acute gonorrhœa. He asserted that during his absence he had remained faithful to his wife, and Dr. Grigg knew him well enough to be confident of his veracity. She, on her part, had convinced him of her fidelity.

On the following day the wife came for examination.

Dr. Grigg made careful tests then, and on subsequent occasions. All results were negative, and so, for the time being, the mystery was complete.

A few years later, however, the husband died, and the wife, in a moment of remorse, made a confession which doubtless provided the true explanation. She admitted that less than an hour before her husband's arrival she had yielded to another man. He had hardly left her when her husband appeared and almost immediately had connection with her. She had no time to use a douche after the previous connection but used one soon after that with her husband. The inference was strong that the stranger had infected the husband through the medium of the wife, who escaped by using a douche while yet the infective organism was superficial.

It is right to point out with regard to these inci-

dents that one link is missing in the chain of evidence. There was no opportunity of proving that the stranger had gonorrhœa. Nevertheless the presumptive evidence against him is very strong.

The inflammatory process moves very rapidly. Within a few hours the superficial cells are found to be swollen and the penetration of the tissues is proceeding apace. Pari passu, serous effusion occurs between the cells, pushing them apart, and so providing at once a pathway of advance, and a suitable medium for growth. All the conditions favourable to the development of the micro-organism are now present, including the ideal soil at the ideal temperature. The penetration of the tissues does not depend on motility inherent in the gonococcus. Expert opinion is almost unanimous on that point. The organism progresses rather in the process of multiplication, which, as

already stated, takes place by fission. It advances in proportion as it multiplies..

A point open to discussion is whether the organisms, now present in the cells and especially in the leucocytes, are there in virtue of their power of penetration or whether the phenomenon must be regarded as an attempt at phagocytosis. The balance of evidence appears to be against the latter view, expert microscopists having observed multiplication within the cells.

As the inflammatory process progresses, cells are thrown off in large numbers and go, as already pointed out, to form a characteristic element in the gonorrhœal discharge. The glands of the mucosa are now attacked and in the more severe cases, destruction of their endothelial cells is rapidly accomplished. The basement membrane is next overtaken by the same process of destruction and replaced by a

true pyogenic membrane.

The appearance and results vary in accordance with the particular region involved. Thus, in the case of the vulvo-vaginal glands, large retention cysts may be formed by occlusion of the duct. This is more likely to happen in the milder cases. Should suppuration supervene, as occurs in the more severe types, a bartholinian abscess - involving sometimes one or more lobules, sometimes the whole gland - will be formed. Similarly, in the urethra, as the result of the inflammatory process, retention cysts or abscesses may occur in the glands of Skene. Even in the small glands of the cervical mucosa and in those of the fallopian tubes a kindred condition of affairs may be brought about. All the layers of any structure attacked may, in the severer types of infection, become involved, stage by stage, so that not even the muscular and serous

coats escape invasion. In the case of the fallopian tubes, for example, even where rapid occlusion of the fimbriated extremities prevents escape of infected discharge into the peritoneum, the microscope often provides evidence that all the coats are involved by direct penetration, while, macroscopically, the serous membrane may be found covered with fibrinous effusion adhering to its outer surface.

The history of gonorrhœa, its bacteriology, the biological characteristics of its exciting agent, including a brief consideration of its behaviour within and without the human body, its danger to the individual and to the community at large, its prophylaxis, its general pathology and histology, have all been passed rapidly in review. The ground is thus cleared for a detailed consideration of its commoner manifestations, primary and secondary, in women. Treatment will be dealt with in connection with each phase

of the disease as it is considered.

Gonorrhoea is almost always due to infection acquired during the sexual act. The proportion of cases due to such alleged causes as dirty closets, soiled linen etc., is, except in children, almost negligible.

Primary infection never takes effect higher than the mucosa of the cervix uteri. That is to say, it is bounded above by the internal os.

It has already been pointed out that the three commonest sites of attack are the urethra, the glands of Bartholin, and the cervical mucosa. Of these, the first-named seldom escapes; and symptoms due to its involvement are among the earliest and most characteristic in a typical attack of gonorrhoea.

Urethritis.

In the acute form of this affection, the mucous

membrane, especially in the anterior portion, is violently red and swollen. Frequently it is seen protruding from the meatus, like a pad of moist red velvet. Special attention should be paid to the glands of Skene and Schüller for, in them, the micro-organism is specially likely to find a lodgment. If the finger be passed into the vagina, and then pressed gently along the line of the urethra, the latter is felt as a hard band very tender to the touch. The pressure will often cause a drop of pus to exude, and microscopic examination of this will readily reveal the presence in it of numerous gonococci besides epithelial cells and debris.

The symptoms vary greatly in different cases. In one there may be intense irritation, constant desire to urinate, and severe scalding on micturition; in another, barely perceptible itching. Between these two extremes

all degrees are met. Where the symptoms are severe it is frequently found that the inflammation has extended further back in the urethra than is usual. There may be secondary involvement of the bladder.

The chronic form of urethritis usually emerges from the acute. Certain cases, however, run a subacute course and are characterised frombeginning to end by the mildness of their symptoms. So true is this that, not uncommonly, the attack passes unrecognised. If we examine the urethra in a case which has become chronic, we find it much indurated. Histologically, the sub-epithelial layer is found to be densely infiltrated with round cells. The glands of Skene can often be felt as small hard masses lying in the floor of the urethra, close to the meatus. From these, pus or muco-pus can frequently be pressed. Abscesses may form there. "Proliferation from or about Skene's glands

occurs with continued irritation." Such outgrowths are known as caruncles, "which are polypoid hyperæmic growths in the anterior third of the urethra, originating from the inferior wall. They are covered with mucosa and protrude from the urethra. They consist of a loose, vascular, inflammatory infiltrate." (Bandler - Medical Gynæcology. Third Edition p. 481).

The absolute diagnosis of both forms of urethritis depends on the demonstration of the specific diplococcus in the discharge. In the chronic form this may be difficult or impossible. If the latter, reliance must be placed on the history of the case, and on its clinical features.

In the acute form of the disease, and especially where it is ushered in by constitutional symptoms such as headache, malaise, and fever, the patient should be sent to bed. She should be kept for some days on a fluid diet,

free from all irritants such as alcohol, tea, coffee, pepper, etc. Diluents should be freely partaken of with a view to rendering the urine as bland as possible. For the first few days, when perhaps pain and a burning sensation are prominent symptoms, alkalies combined with hyoscyamus and buchu, may be exhibited with advantage. Sandal-wood oil and copaiba, old and tried remedies, are still most useful in reducing pain. Later, such drugs as salol and salicylate of soda, in virtue of their antiseptic action, are likely to prove beneficial.

Local treatment should be deferred until the acute stage has passed. Of all local remedies nitrate of silver is undoubtedly the best. Protargol also, is very efficacious. Bandler's plan of using the two together has been adopted with success by the writer in several recent cases. It is as follows:- The urethra, after the patient has

urinated, is massaged. By means of a catheter, several ounces of solution of protargol ($\frac{1}{6}\%$) are then injected into the bladder. The catheter is next removed, and a pipette with rubber bulb is used to inject several tubefuls of 1% silver nitrate solution, the pipette being manipulated so as to allow half to go in the bladder, half to run out of the urethra. The protargol solution is retained in the bladder for 5 minutes before being passed.

Caruncles may be dealt with in various surgical ways. When they are pedunculated a good plan is to apply round the base a fine ligature, by the gradual tightening of which the tumour may be cut through. Its base may then be touched with a Paquelin's cautery, to ensure complete destruction of the outgrowth, and to arrest hæmorrhage. The more sessile type of caruncle should be dissected out by means of a fine-pointed pair of scissors, the edges of the mucous membrane

being afterwards brought together by fine catgut sutures. For several days after the operation, the urine should be drawn off every eight hours, by means of a soft catheter, so as to facilitate healing by first intention.

Gonorrhœal cystitis is usually a secondary consequence of urethritis and varies widely in different cases, both in regard to the area attacked, and the depth to which the bladder wall is penetrated. It is brought about by a backward extension of the disease in the urethra. In one case the infection may extend no further than the trigone, in another the whole mucous membrane of the bladder is implicated. In one case the process remains comparatively superficial, in another the gonococcus penetrates the wall as far as the sub-epithelial connective tissue. Women are more prone to cystitis than men. On the other hand the disease is more easily dealt with in women.

The symptoms do not differ from those observed in cystitis brought about by other septic organisms. Indeed, in a large proportion of cases, other organisms - notably the bacillus coli - are associated with the gonococcus.

Frequency of micturition, tenesmus, burning pain on urination, are constant symptoms in acute cases. Blood cells, pus, epithelial cells and débris are present in the urine, which may be frankly bloodstained. Gonococci are easily demonstrable in the centrifugalised sediment.

The symptoms, in chronic cases, are similar, but naturally less severe. The urine contains less sediment, and gonococci cannot always be found in it. The bacillus coli very often can.

Acute gonorrhœal cystitis should be treated by rest in bed, a milk diet, diluent drinks, and a free exhibition of saline aperients. Should pain and spasm be severe, a

morphia suppository will usually give relief. Salol and urotropine are probably the two best antiseptics for internal administration. Both act extremely well in clearing up septic conditions in the bladder.

Local treatment should be postponed until the acute process has subsided. Then the bladder should be irrigated with weak solutions of the silver salts. Of these the best is undoubtedly nitrate of silver.

Bartholinitis is a common manifestation of gonorrhœa. It may be either primary or secondary but is much more commonly the latter. Some authorities deny that it ever occurs as a primary condition.

Bandler (Medical Gynæcology. Philadelphia and London. 1914. p. 495), states that "infection of either of the two vulvo-vaginal glands of Bartholin by the gonococci may occur as early as fourteen days after the primary infection,

but it generally occurs weeks, or months, or even years, afterward." Norris (Gonorrhœa in Women. Philadelphia and London. 1913. p. 202), on the other hand, believes that both primary and secondary infection occur. His view is expressed in the following passage:- "The frequency of bartholinitis is dependent on a number of factors - the location of the gland opening, which naturally makes it peculiarly likely to infection during coitus; the activity of the gland during sexual excitement; it seems fair to assume that, during the process of lubrication of the introitus, the opening of the duct of the gland opens somewhat: the location of the duct-opening which facilitates secondary infection by gonococci-bearing cervical and urethral discharges; and, lastly, the histological structure of the gland and the chemical reaction of its secretion, which favour the growth of the gonococcus." Secondary

infections then, may be taken to constitute more than 90% of all cases. Nevertheless, in one recent case seen by the writer, primary infection was indubitably synchronous in the urethra and in one of the vulvo-vaginal glands. It is rare for the latter to escape infection in the vulvitis and vulvo-vaginitis of children.

On examination, at the entrance of one or both glands a red patch or macula may be seen. Pressure elicits tenderness and may cause to exude a drop of pus, in which gonococci are readily found.

Not infrequently, as the result of the inflammatory process, occlusion of the duct takes place. In this way is formed a bartholinian cyst. It nearly always occurs in the milder types of infection, not in those which go on to suppuration. A cyst of this kind may slowly increase until it attains the size of a hen's egg. Such a cyst is

associated with discomfort rather than pain. Bilateral cysts of large size have occasionally been observed.

The infection may be so acute as to cause suppuration. If, at the same time, the duct be occluded, an abscess of Bartholin's gland results. This usually leads to destruction of the basement membrane and its replacement by a pyogenic membrane. Where this occurs it will be found, in the majority of cases, to depend on a mixed infection.

In the acute stage of bartholinitis it is best to put the patient to bed and to apply hot fomentations. The ice-bag sometimes affords relief. After the subsidence of the acute process, which usually comes about in a few days, the gland may be washed out through the duct by means of a syringe provided with a blunt pointed needle. Or again, a fine probe may be wrapped round with cotton wool, dipped in a silver solution, and passed down the duct.

There is only one treatment for a bartholinian cyst- excision. An abscess, should be dissected out - where this is possible - entire. Where it is not, it must be incised, an attempt made to destroy the membrane by cauterisation, and the cavity packed, say, with iodoform gauze.

Cervicitis or, as it may be more correctly named, Endocervicitis, is probably the commonest of all the primary manifestations of gonorrhœa. It is no exaggeration to say that it is by far the most important. This will be readily understood if we consider not only how difficult it is to eradicate the disease from the cervix, but how frequently it gives rise to secondary consequences of the gravest import. From the cervix, infection frequently spreads both downwards - to such structures as the vagina and the glands of Bartholin - and upwards, to the endometrium, the mucosa of the fallopian tubes, the ovaries and

the pelvic peritoneum. For this reason, in a case of primary gonorrhœa, it is of great importance that the physician consulted should satisfy himself as to whether the cervix be, or be not, infected.

In this connection Dr. Arthur Giles states that a drop of clear mucus exuding from the external os may be construed as a favourable sign inasmuch as it shows that the infection has not spread above the vagina. In chronic cervicitis, however, such a clear drop may be present, and prove to be highly infectious. If infection of the cervix has not already occurred, it is of great importance to prevent it.

The lining membrane of the cervix uteri between the external and internal os is a true mucosa, possessing numerous glands. These, as McCann (Trans. London Obstet Soc. 1896, Vol. xxxviii, p. 244) pointed out many years ago, are

"the chief seat of manufacture of the discharge met with in leucorrhœa, and also of that met with in gonorrhœa." In this region the micro-organism finds an ideal soil for its growth.

In the early stages of acute cervicitis, the cervix is found swollen and tender. A thick, profuse, yellowish discharge is seen issuing from the external os, and, on examination, presents the microscopic characters which have already been described. It consists of epithelial cells, pus cells, and gonococci, many free, many intra-cellular.

As the attack progresses the cylindrical epithelium of the cervical mucosa, swells, proliferates, and finally protrudes as a red pouting mass - bleeding on the lightest touch - from the external os.

Pain is not a characteristic of this phase of the disease although a burning sensation in the vulva is often

complained of. This is due to secondary infection by the cervical discharge.

The gonococci penetrate between the cylindrical cells and may be found deep in the mucosa. Hence the chronicity of this form of gonorrhœa. Here too, lies the explanation of the so-called "latent" cases.

A characteristic sign of chronic cervicitis, which supervenes on the acute, is the "catarrhal patch" or "erosion." This is not a true ulceration, but results from a great proliferation of the cylindrical epithelium lining the cervical canal between internal and external os. "Essentially the 'catarrhal patch' is the result of replacement of the squamous epithelium of the vaginal portion of the cervix by a secreting surface closely resembling that of the cervical canal." (Stevens - Diseases of Women - London, 1912. p. 110).

It is in the chronic stage of cervicitis that the 'Ovula Nabothi' are usually seen. The formation of these small shot-like cysts is variously explained. Some authorities believe that they arise from occlusion of the gland orifices by infective exudations formed in the course of the inflammatory process. Others state that the occlusion results from the formation of new squamous epithelium in the process of natural cure.

In no infective condition is it more difficult to carry treatment to a successful issue than in cervicitis. In none is it more important to do so. The problem with regard to the acute phase is, not only to obviate a rapid and early extension of the disease to other regions, but also to prevent it from merging into a chronic or latent condition such as is likely to remain a permanent and continual danger. No manipulations must be carried out

calculated to convey infection through the internal os to the endometrium. The passing of a sound into the uterus, for example, must be regarded as a dangerous proceeding; since, should the endometrium become infected, a rapid involvement of the fallopian tubes and other pelvic structures may be looked for. It is to be borne in mind that in cervicitis the infection is confined to that portion of the lining membrane which lies between the external and internal os. Nothing must be done likely to extend the disease either upward or downward. In the acute stage, therefore, no active manipulation of the cervix should be undertaken. Copious vaginal douches of bland solutions should be used night and morning. Chinosol (1-5,000) serves excellently for this purpose. Under such treatment the acute phase soon passes, secondary infections are prevented, and the way is paved for dealing more actively and directly with

the cervical condition.

The cervix is always found plugged with mucus or muco-pus. The first step is to get rid of this. It may be done by spraying or swabbing it through a speculum with an alkaline solution. One of the best is dilute liquor potassæ. When the mucus has thus been removed, an attempt should be made to eradicate the organisms lurking in the mucosa of the cervix.. A probe, wrapped round with cotton wool, should be dipped in some antiseptic solution and passed into the cervix, so as to thoroughly search its mucosa. Of antiseptics for this purpose, none are better than tincture of Iodine or nitrate of silver (strongly concentrated) unless it be a saturated solution of picric acid in 90% alcohol. In making these applications, means must be taken to protect the vagina. Each morning and evening a copious vaginal douche of some bland antiseptic

solution should be self-administered by the patient. Tampons soaked in Argyrol (25%) may be introduced daily, and left in situ for many hours at a time. The applications are to be extended, if necessary, over many weeks, at intervals of two or three days. It is of cardinal importance that the probe should be passed up to, but never within, the internal os.

Vaginitis is rare in adults. It is almost always secondary, in children, to vulvitis, in adults to cervicitis. The vaginal lining membrane of adults, as already explained, conforms much more closely to the characters of skin than to those of epithelium. Moreover it possesses few glands. It is, consequently, very resistant to the infective micro-organism of gonorrhœa except in the case of children whose vaginal epithelium, although squamous, is very tender and easily destroyed. In children, vaginitis

is nearly always associated with vulvitis, the infection being introduced usually through some abrasion near the hymen, and thence extending upwards. In adults, the vast majority of cases results from long-continued exposure of the vaginal mucous membrane to the action of infected discharge from the cervix. Under the soddening and macerating effect of such discharges the superficial squamous epithelium is destroyed, thus paving the way for the penetration by the gonococcus of the less resistant underlying epithelium. In the view of many eminent authorities, before such an invasion of the mucous membrane can take place, an important change in the vaginal secretion must first be brought about. This secretion is normally acid and has the power of destroying very quickly, pathological micro-organisms. Dr. Arthur Giles, who has kindly allowed me access to his manuscripts now in course of preparation for

a new edition of "Diseases of Women" (Bland-Sutton and Giles) expresses the opinion that, in vaginitis, the part played by the gonococcus is to overcome the resistance of the acid vaginal secretion, to kill the bacillus which forms it, and so to pave the way for other organisms such as staphylococci and streptococci. In vaginitis these are constantly associated with the gonococcus.

Vaginitis is marked by profuse, thick, yellow discharge, found microscopically to consist of pus cells, epithelial elements and débris, gonococci, and other septic organisms. The mucous membrane is unduly red, frequently patched over with numerous bright red spots. These consist of the congested and hypertrophied papillary bodies. Sloughy ulcers may be seen here and there. The finger of the examiner may detect a vaginal pulse.

To the patient the vagina feels burning hot, while

coitus, which excites vaginismus, is painful. The recognition of the gonococcus in the discharge is, as in all manifestations of gonorrhœa, necessary to an absolute diagnosis.

The first and most important indication in treatment is to eradicate the source of infection. In adults this, as already remarked, is usually a pre-existing cervicitis. The appropriate treatment for that condition must accordingly be carried out.

Rest, combined with a milk dietary and regulation of the bowels, must be enjoined. Alcohol should be forbidden. The bladder should be flushed out by the free imbibition of bland diluent drinks.

Large douches of non-irritant antiseptic lotions are beneficial. Should there be great irritation in the vagina, a solution of Sod. Bicarb. (1 dr. to 1 pint) may be employed as a douche. Ulcers should be touched with

caustic, or with pure carbolic acid.

Endometritis. Many observers doubt the existence of this condition as a separate entity. "It is a remarkable fact" says Giles, in the manuscript above referred to, "that, though a gonorrhœal endometritis has been assumed as a stage in the inward progress of the disease, this condition has not been demonstrated and some authorities hold the view that though the cervical mucosa may be actually affected, the body of the uterus acts merely as a channel by which the infection is conveyed to the tubes and is not itself attacked." Wertheim, on the other hand, claims to have found gonococci in various layers of the uterine wall - in the epithelium, in the inter-epithelial spaces, and likewise in the sub-epithelial connective tissue. This must be taken as establishing the existence of gonorrhœal endometritis. Nevertheless, the condition is rare, and so

does not come within the scope of this treatise, except in so far as the endometrium may serve as a conductor of infection from the cervix to the fallopian tubes, the ovaries, and the pelvic peritoneum.

Salpingitis is one of the commonest of all the complications of gonorrhœa. It is also one of the most serious. This is true not only on account of its effect on the individual suffering from it, but also by reason of its influence on the future of the race. Very various estimates have been formed as to the extent to which pelvic inflammatory disease depends on gonorrhœa as a cause. Some authors place the proportion as high as 90%, others as low as 20%. Probably the truth lies between the two, but nearer to the higher than to the lower.

Salpingitis may be acute or chronic. The latter usually emerges from the former, but not a few cases run a

mild course from start to finish. Every physician is familiar with the picture presented by the chronic and recurrent variety. Every physician has amongst his clientèle, women who from time to time are laid aside by attacks of abdominal pain, accompanied often by slight fever, coming on usually during or immediately after a menstrual period, sometimes following on unwonted bodily effort. Such attacks vary greatly in intensity, at one time, laying the victim up for a few days, at another, sending her to bed for many weeks on end. The more severe cases usually eventuate in chronic invalidism, from which not even the surgeon's knife can always save. Many of the women suffering from such attacks can trace their origin to within a few weeks or months of marriage. Many of them are childless, few the mothers of large families.

On examination of such a patient, through the vaginal

vault can be felt on one or other side of the uterus - sometimes on either side - a thickened tender mass. This is the inflamed fallopian tube which, in one case, may be felt as no more than an indurated band rather sensitive to the touch, in another, as a definite elastic tumour - a pyosalpinx. In association with this condition the uterus itself is often found large and somewhat tender. Very commonly it is retro-displaced and bound down by dense adhesions, the result of plastic exudation. Such adhesions have other unpleasant consequences - as, for example, dysuria and dyschezia - which add greatly to the victim's sufferings. Menstruation is often irregular and painful, metrorrhagia a common occurrence. The accepted explanation of recurrent attacks of pelvic inflammation is that from time to time a little infected material escapes from the peritoneal extremity of one or other tube, so setting

up a local peritonitis of greater or less severity. Where one tube is seriously diseased, in the great majority of cases the other is more or less damaged. At one time, therefore, the symptoms may point to one tube as the offender, at another time, to the other.

Given serious disease of a tube, it may be regarded as favourable, should the outer extremity be early and firmly sealed by exudation. Early and complete sealing would tend to obviate such recurrent attacks of pelvic peritonitis as have just been described. On the other hand, it would predispose to pyosalpinx.

If, at the time of the initial inflammatory attack examination be made of material derived from the mucosa of the cervix, the gonococcus may or may not be disclosed. The cervical infection, as a rule, antedates the tubal by many weeks, sometimes by many months. A negative result,

therefore, must not be taken as a ruling out gonorrhœa as the causative agent.

So far we have considered the comparatively mild type of pelvic inflammation to which the great majority of cases conform. These are characterised by moderate fever and no excessive constitutional disturbance. Seldom is there immediate danger to life.

Occasionally however, the picture is painted in much more lurid colours. The attack amounts to a veritable storm, fraught with grave danger to life. These are the "cases in which the pus is poured out rapidly and in large amounts, or else adhesions do not form readily, in which the amount of purulent discharge, into the peritoneal cavity is so great that a more extensive peritonitis takes place, and, in several well-authenticated cases, a so-called general purulent gonorrhœal peritonitis has resulted."

(Bandler - Medical Gynæcology. 1914. p. 514). Such cases are commonly characterised by the early supervention of secondary tubal and peritoneal symptoms on the primary infection of the cervix. To this type belongs the case which forms, in part, the title and subject matter of this treatise, and which may now be related:-

On the nineteenth of December 1910 the writer was consulted by a young man just returned from a tour in Italy, where he had contracted gonorrhœa. The acute stage had passed and he desired to know whether it would be safe for him to resume cohabitation with his mistress. He was told emphatically that it would not. Nevertheless he did not take the warning to heart for on January 1. 1911 - that is thirteen days later - the writer was summoned to attend the aforesaid mistress. She stated that for a week she had experienced irritation and a burning sensation in the vulva,

together with frequent desire to urinate and pain on micturition. For several days she had noticed a thick yellowish discharge from the vagina. On December 31, her period came on. She began to feel very ill and, a few hours before she was seen by the writer, was seized with violent pain in the lower part of the abdomen, and with vomiting. Menstruation ceased abruptly.

Inquiry into her previous history elicited the fact that she had enjoyed excellent health until three years ago when she had been treated for four months in the Wallace Hospital, in Paris, where she was then resident. She was unable to say what was the nature of this illness, but remembered that she was isolated, that her blood was tested, and that she was kept on milk exclusively, for two and a half months. No operation was performed.

The only other illness from which she had suffered

was an attack of biliary colic with jaundice in the summer of last year. For this she was treated in a hospital in Manchester. At that time she passed a gall stone.

The patient stated that she was now twenty-four years of age. At twenty she had given birth to an illegitimate child. When seen by the writer, she looked very ill. She lay on her back with the knees drawn up. The temperature was 103.4, the pulse 130, the respiration hurried and shallow. The tongue was covered with a thick whitish fur, the bowels were constipated.

On examination the abdominal wall was found very rigid, and great tenderness was experienced on pressure, especially in the right iliac region.

Vaginal examination disclosed a thick yellowish purulent discharge. Separate swabs were taken from urethra and cervix. Later, these were both found to contain

gonococci in great numbers.

The cervix was tender to touch and the slightest attempt to press on or move the uterus caused great exacerbation of abdominal pain.

A diagnosis of acute right-sided salpingitis was made. Complete rest was enjoined, was indeed rendered obligatory by the condition of the patient. Very hot applications were advised, while a dietary consisting of milk and bland diluent drinks was ordered. Instructions were given for an immediate dose of calomel, to be followed by the administration of a saline purge in the morning. At the studio where the pair lived there were no facilities for supervising such a case and, after several days, it was evident that the patient was losing ground. The temperature remained very high and the symptoms suggested involvement of the appendix. It was advised therefore that she

should be moved into hospital. Accordingly, on the morning of January 4. 1911, she was removed to the Hospital of St John and St Elizabeth, to be under the care of the senior surgeon, Mr. Ernest Ware. To his courtesy the writer owes it that he was able to have the patient under constant observation, during her prolonged and eventful residences there.

In the evening of the same day she was seen by Mr. Ware in association with the writer. The tongue was furred, the pulse small and frequent, the eyes sunken. Her general condition was bad. The right rectus was extremely rigid and there was considerable suspicion that the appendix was involved in the inflammatory process. Immediate laparotomy was decided on.

At 6 p.m. accordingly, the patient was anæsthetised and an incision made through the right rectus muscle. The

appendix was found thickened and kinked in several places, while the right tube was adherent to it. This tube was itself swollen and intensely congested, having a dark bluish look, while from its outer extremity exuded a creamy, purulent discharge. The right ovary, as well as the left tube and ovary appeared normal.

The appendix and the right fallopian tube were forthwith removed. The right ovary was conserved.

The tube was full of pus, which was found microscopically to contain great numbers of gonococci. A section disclosed them in and between the cylindrical cells of the tubal mucosa.

The patient stood the operation well, and for 36 hours after seemed so much better and easier, while the temperature and pulse moderated, that great hopes were entertained that a period had been put to the attack. Unfortunately,

on the 6th of January the temperature and pulse again ran up, and it became clear that more trouble was brewing. The bowels were constipated and the tongue furred. At this time vaginal discharge became very profuse and lysol douches were administered night and morning.

On the 12th of January the patient began to complain of pain under the site of the wound, which had healed well. This pain gained in intensity while the temperature continued to fluctuate until the 25th, when a further operation was decided on.

The wound was reopened and the right ovary found much enlarged and suppurating. It was firmly adherent to the adjacent viscera and especially to the bladder. It was separated as quickly as possible, and then incised. A rubber drain was inserted.

On the following day the patient stated that the

abdominal pain was much less. Nevertheless her temperature reached 105, and she complained of violent frontal headache.

On the 27th the temperature had fallen to a much lower level and so continued for about a week.

On the 29th a distinct odour of urine was observed in the discharge from the wound, with which came occasional gushes of clear fluid. The urine passed per vias naturales contained much pus, in which the gonococcus was easily demonstrated. Continuous catheterisation was resorted to on February 1.

On February 3. it was again noted that urine was passing from the wound, which looked sluggish and unhealthy. The temperature was oscillating greatly while the patient again complained of feeling very ill, as, indeed, she looked. Intense frontal headache was intermittently present. In

view of the possibility of trouble in one or more of the sinuses of the head she was seen by Dr. Barry Ball, aurist to the hospital. No evidence of it was found.

During the whole of February, urine continued to come from the wound, and the catheter was still kept in the bladder. At this time, both gonococci and colon bacilli - the latter in enormous numbers - were present in the urine. Nothing further of note occurred until February 26th, when, for the first time, fæces passed from the wound. By means of a charcoal meal it was discovered that the fistula was very low in the small intestine or in the cæcum.

In the last few days of the month, the temperature began to rise to a higher level frequently touching 104° and 105°, while fæcal matter continued to be discharged from the wound. Urine and fæces were both passed per urethram. The patient was very weak.

The first of a remarkable series of temperatures, all occurring in the first half of March, was recorded on March 1. On that day the temperature taken in the rectum reached 108.2.

The following is a list of the highest temperatures, with the dates on which they were registered:-

1st	March	108.2°	3rd	March	106.2°
6th	"	107°	7th	"	107°
8th	"	107.2°	9th	"	107.2°
10th	"	109°	12th	"	107°
13th	"	109.4°	14th	"	106.2°

All the temperatures were rectal, and each reading was checked by a second thermometer. Both thermometers used were sent to Kew, and pronounced accurate. During the whole period of extreme hyper-pyrexia, urine and fæces continued to pass through the abdominal wound as well as per urethram. The patient's aspect was very bad but no great complaint was made of abdominal pain. What troubled

her chiefly was intense frontal headache.

A second examination by the aurist failed to discover any sinus disease. The pulse, although of poor tension, was very moderate in comparison with the temperature. Several blood examinations were made, but no micro-organism, gonococcic or otherwise, was discovered. On March 13. a treatment by polyvalent gonococcic vaccine was initiated, but no appreciable result was obtained.

On March 14, a vaginal examination was made under chloroform. A thickening and bulging were felt in the left posterior fornix. In the hope that some easily accessible pus might be found and evacuated, an incision was made through the left rectus muscle. A large indurated mass, involving apparently the left tube and ovary, was found lying to the left and in front of the uterus. No abscess was detected and the patient's condition was so bad that it

was deemed wise to close the abdomen, without, at that time, doing anything further.

For some weeks thereafter the temperature continued to fluctuate greatly, frequently reaching 105° and, once or twice, 106°. Never again, however, did it reach the extravagant limits recorded during the first half of March.

On March 23, the following note was made:- "Temperature still high. Condition no better. Faecal discharge from wound continues."

Again on the 29th, "Last incision firmly healed. Pain situated in the pubic region. Very tender. Vaginal discharge in occasional gushes. Headache intense in frontal region."

On March 30, Dr. Barry Ball once more reported that there was no evidence of frontal or other sinus disease.

In the first week in April the patient's condition

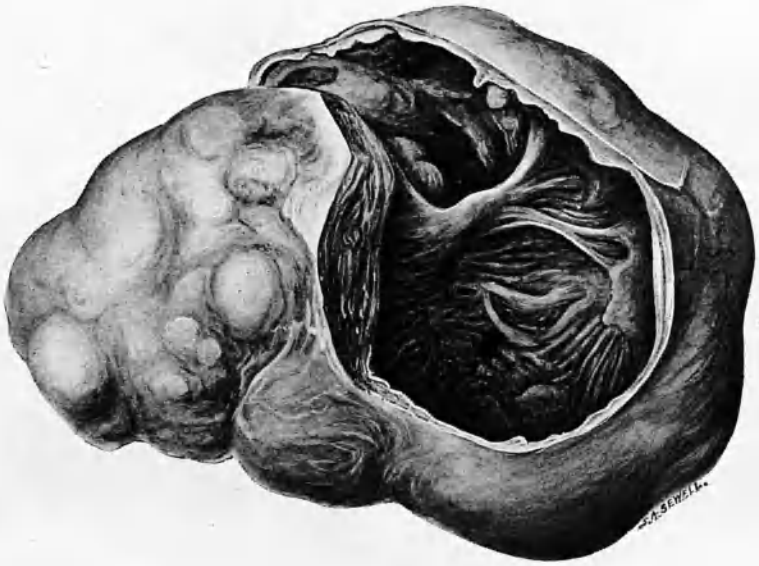
began to improve somewhat, in spite of a temperature which daily reached the neighbourhood of 105°. No urine was now coming from the wound and, occasionally, the fæcal discharge would cease, to return after a few days.

By April 21, the patient's condition had so far improved that, the temperature still remaining high, and pain having persisted over the pubes for some weeks, a further operation was undertaken. An incision was made in the middle line. In front of the bladder a large fluctuating tumour was felt to the right side of which the small intestine was densely adherent. On the left the rectum was likewise firmly attached. The old sinus was explored and found to connect with the cæcum. No diverticulum of the bladder was seen. In the process of separation from the inflammatory mass the small intestine was torn in several places, but no fæcal escape took place. The injured in-

testine was at once placed outside the wound. A large rent was torn in the rectum during its separation from the mass. A little fæces escaped but was quickly cleaned up with a swab. Another swab was then used to temporarily block the hole.

The next step in the operation was to separate the inflammatory mass (a thin-walled sac) from the bladder in front, and from the uterus behind. This was comparatively easy. A sound introduced into the bladder failed to disclose any rent in it.

The patient was now very collapsed. The rent in the rectum was rapidly closed by a double row of continuous sutures. About five inches of small intestine were next resected, together with a V shaped portion of mesentery. The cut ends were joined by end to end anastomosis, cat gut sutures being employed.



The cæcum was then separated from the old sinus and the orifice closed by suture. The sinus having been cut out, the wound was sponged thoroughly with hot saline. Finally the abdomen was closed by through and through silk-worm gut sutures, a tube and gauze drain being left in.

As soon as the patient had been got back to bed, continuous intra-cellular saline was administered.

The inflammatory mass removed was found to consist of the left fallopian tube and ovary. It is shown in the accompanying reproduction of a black and white sketch. In this can be seen the characteristic muscular fibres converging to a point opposite to the window made in the wall of the pyosalpinx, and near the upper surface of the cavity, which was lined with a thick greenish membrane. This was found to consist of pus. No gonococci were discovered in it, nor in the contents of the sac.

The patient rallied well from the operation. For several days urine was passed through the wound as well as per urethram. On the 24th of April the plugs were removed and, three days later, the tube. From that time all urine was passed naturally and the bowel function was soon re-established. The temperature fell to the normal line on April 25, and the patient rapidly convalesced, although she did not leave hospital until the end of June.

During the whole of her residence she saw no periods at all. Two days after leaving she menstruated, the period lasting five days and being accompanied by a good deal of pain in the lower part of the abdomen. She did not menstruate again until the following November.

Only for about a month after leaving hospital did she remain well. At the beginning of August she began to pass water very frequently and to suffer a good deal of

cutting pain in doing so. The urine was thick and smelt offensively. She accordingly presented herself at the hospital and, on August 16, was again received as an in-patient.

The urine, which was very offensive, was found to contain pus cells and numerous specimens of the colon bacillus. There was only slight fever. Until the end of September the treatment was rest in bed, a milk diet, the exhibition of urotropine and an autogenous vaccine of bacillus coli. From this, however, no benefit was derived.

In the beginning of October the bladder was examined by cystoscope, when four calculi were disclosed adhering to the wall at the base. The urethra was dilated and the calculi removed by means of a pair of forceps.

The nucleus of each was found to consist of a silk suture which had evidently traversed the bladder wall.

The patient now rapidly got well and was dismissed on November 1. Menstruation recommenced about the middle of November and, except that the flow is rather more scanty now than formerly, has been normal ever since.

Her health became thoroughly re-established and remained excellent till December of the following year (1912), when she married a man to whom she had recounted her whole history. She continued in good health till September 1913, when she became pregnant, the pregnancy proceeding normally until February 1914. She then miscarried and was very ill, being confined to bed, with high fever, for several weeks. At that time she was not under the observation of the writer, who is dependent, for this part of the history, on her own story.

Menstruation recommenced at the end of the following March and was normal each month until September of that

year (1914), when she again became pregnant. At the beginning of January 1915 she began to notice a pain in the right lumbar region. This steadily increased in intensity and, since the beginning of February last, has been associated with frequency and pain on micturition.

On the first of March she went to Brighton and, on the following day, was seized with agonising pain in the right renal region. Vomiting was almost incessant for 24 hours. She states that the doctor who attended her made a diagnosis of renal colic and injected morphine hypodermically. Her temperature reached 103.

At the end of a week the patient was sufficiently recovered to be brought home, and, on the following day (March 9. 15) was once more received in the hospital of St John and St Elizabeth, where she now is.

Her chief complaint, on admission, was of pain and

tenderness in the region of the right kidney, which symptoms, although varying from time to time in intensity, have never entirely ceased. Her temperature during the whole of her present residence has fluctuated greatly, reaching 103 or higher on most days. Pain, on the whole is greatly reduced.

Large quantities of pus continue to be discharged daily in the urine and colon bacilli are present in great numbers. Palpation fails to discover any swelling in the kidney region, but a certain amount of tenderness is elicited. Radiography has failed to disclose a calculus in the kidney or bladder. A vaccine treatment which has again been carried out has, so far, produced no improvement.

The patient is now seven and a half months pregnant. To complete the history, there remains only one more point to mention, viz. that in May 1914 the husband contracted

gonorrhœa from his wife. Being forewarned of the danger, he had made a habit of washing and urinating always, immediately after coitus. On this occasion he omitted the precaution with the result stated. The attack was of moderate severity.

The case as a whole serves well to illustrate many points made in discussing the subject of gonorrhœa and the details of its commoner manifestations. The light way in which the disease is regarded by the uninitiated, is well exemplified in the conduct of the young man who was the 'fons et origo' of the terrible illness above described. In spite of the emphatic warning, he re-entered into sexual relationship with his mistress, and, when taxed with his conduct, had no better excuse to offer than that he had thought the warning of danger exaggerated. It would certainly seem that legislation to penalise such wilful

communication of disease is urgently called for. The education of the community is the natural precedent step to such legislation.

It may be noted in passing how the primary infection showed its usual predilection for urethra and cervix. What is more unusual is the short space of time which elapsed between the primary infection and the development of a severe secondary complication. The lapse of many weeks and even months is the rule. The writer believes that an early extension of the infection almost uniformly denotes special virulence of the disease. It was characteristic that the extension should have taken place during menstruation. The probable reasons for this have already been discussed.

The question of an expectant attitude versus early operation in salpingitis has been much debated. The bal-

ance of modern opinion leans heavily to the former, and there can be no doubt that the great majority of cases tend to subside under rest in bed and appropriate therapeutic measures. Where subsidence takes place - and it generally does - it is certainly best to reserve operation for the quiescent stage. After several months, the contents of a pyosalpinx are usually found to be sterile, and the tube can then be removed with much less danger of post-operative peritonitis. Furthermore, the milder degrees of salpingitis do not call for operative interference at all. Nevertheless from time to time a case is met, in which it is impossible to maintain the attitude of expectancy. In the case under review there were special features which rendered early and repeated operation imperative. Of these special features the most important were the occurrence of appendicitis, the strong tendency to profuse

suppuration and abscess formation, and the severity and persistence of the constitutional symptoms. The extreme degree of hyper-pyrexia which occurred is not easy to account for satisfactorily.

At no time were there symptoms of general peritonitis: at no time was there evidence of arthritis. Repeated examinations of the blood failed to disclose the presence in it of gonococci or other associated organisms. It would appear, then, that the condition was one of profound toxæmia rather than septicæmia. Doubtless the infection producing the toxæmia was a mixed one, for it will be remembered that the period of extreme hyper-pyrexia coincided with the time when there existed both urinary and fæcal fistulæ. Colon bacilli were present in the urine in enormous numbers as well as a small number of gonococci. Absorption of toxins therefore was taking place from a very large area, and from

very diverse organs, bladder, bowel, tube, ovaries, and peritoneum. It seems not unlikely that, to some extent, the hyper-pyrexia depended on what is called idiosyncrasy. During the whole of the illness, the pulse - as a reference to the charts which accompany this treatise will show - was always of very moderate frequency in proportion of the temperature. Moreover, although the patient looked and felt very ill, her condition, even during the first half of March 1911, never struck those observing her as really desperate. At the present time, with a temperature swinging daily up to 103° and over, she maintains a moderate pulse, eats and sleeps well, and shows no undue degree of cachexia.

Vaccines proved useless in her case. In only two gonococcal conditions, so far as the writer's experience goes, are vaccines of much value - arthritis, which is usually regarded as a septicæmic manifestation, and ophthalmia.

In those, vaccines frequently prove most valuable.

It will be remembered that the right tube, as well as the left ovary and tube, had been removed. In the right ovary an abscess had formed, and this had been incised and drained.

It seemed probable, then, that it would have no further value as a functionating organ and the belief was that an artificial meno-pause would come about. So far from that, however, menstruation was re-established soon after the patient left hospital for the first time in 1911, and, except during two pregnancies, has been practically normal ever since. It must be presumed that the destruction of the right ovary was much less complete than seemed probable and this emphasizes once more the importance - now universally recognised - of conservative surgery where ovaries are concerned. The occurrence of pregnancy gave less ground

for surprise.[1] It is well known how frequently attempts to produce artificial sterilisation - as, for instance, after Cæsarean section - by the ligation and division of the fallopian tubes, have failed.

The danger of puerperal septicæmia from gonococcal infection, in view of the pregnancy now existing calls for careful consideration. How grave is the danger? Widely different views have been expressed on the point. At one extreme is Krönig who found the gonococcus in 35% of a series of nearly 200 cases of puerperal sepsis; at the other are Bonney and Foulerton who together analysed fifty-four cases, in not one of which did they find that micro-organism. Streptococci, either in pure culture, or in association with other bacteria, accounted for twenty-five of the cases. (Foulerton and Bonney. Trans. Obstet. London 1905. Vol. xlvii. p. 11). The writer's experience

1. That is, after the menses were normally reestablished.

on the point is purely empirical, but he has attended many cases of child-birth where gonococcal infection of the mother was known to exist, and has seen no septic sequela. What proportion of cases, in whom unsuspected gonorrhœa exists, is delivered without the occurrence of sepsis, cannot be estimated; but it must be very high. Generally it may be said that gonococcal infection is so enormously widespread, while all cases of septicæmia are so comparatively few, that the percentage of gonococcal septicæmias must be very small. In many of those that do occur, other micro-organisms are found in association with the gonococcus; and these probably play the more important part. So far as the case now under discussion is concerned, the incidents reported as having occurred after the miscarriage in February 1914 must, in this connection, be borne in mind. If the patient's story be accurate, the accident was followed

by several weeks of fever and abdominal pain. It must not be overlooked that the gonococcal infection lurking in the cervix, the endometrium, or perhaps the intra-corporeal portion of one or other tube not completely removed, may have been stirred to new activity, and so acted as the starting point of a localised pelvic peritonitis. That the gonococcus was not even then completely eradicated is evidenced by the attack of gonorrhœa from which the husband suffered soon after that very event. It is, in fact, more than probable that the occurrence of the miscarriage and the favourable developmental conditions which it would supply, induced a new activity of the infective agent which played an important part in conveying the disease to him.

The train of symptoms - the pyuria, the bacilluria, the lumbar pain and tenderness, the hectic temperature, all most persistent - now complicating pregnancy presents an

interesting problem both from the diagnostic and prognostic point of view. All the evidence points to the region of the right kidney as the seat of the trouble. The failure of radiography to detect a calculus there does not, of course, prove its absence. But this fact, taken with others already touched upon, seems to point to another explanation of the phenomena. The condition, in fact, appears to be one of pyelitis complicating and produced by pregnancy. It is brought about by the growing uterus, which pushes over and compresses one or other ureter against the bony pelvic wall. In more than 90% of the cases, the right ureter is alone compressed, the reason being that the uterus as it increases in size, usually inclines to that side. Inclination to the right side is very marked in the present instance. Several times during the last five weeks a pure culture of bacillus coli communis

has been obtained from the urine. No blood has been detected.

The condition would appear to commence as a simple hydro-nephrosis which becomes infected either by ascent from the bladder - as seems probable in this case - or through the blood. Such at least is the opinion of Dr. Cumston who collected and published a series of cases in the "Journal of Obstetrics and Gynæcology of the British Empire," Vol. viii, p. 221. Dr. Bellingham-Smith, who does not consider the condition very rare, published notes of three cases in the same volume of the same journal.

The onset of symptoms does not occur until after the third month when the uterus rises out of the pelvis. By the patient now under discussion lumbar pain was not felt till the end of the fourth month; the severe symptoms - agonising pain and vomiting, which were very evanescent -

not till six weeks later. No tumour has ever been palpable as would appear to be the rule. Pressure causes considerable pain and elicits tenderness. It cannot be claimed that treatment which has consisted of rest in bed, a milk diet, an autogenous vaccine, and the exhibition of urotropine, has had any appreciable effect on the symptoms.

The question of terminating the pregnancy must clearly be decided by the progress of events. At the present moment, in spite of a temperature which reaches a high level every night, the patient's condition is remarkably good. No indication, therefore, exists for immediate interference. Bellingham-Smith sums up the position with regard to interference in the following words "In the less severe ones, the disease runs its course without affecting pregnancy, whilst, in the more serious cases, relief is afforded by miscarriage or premature labour."

In conclusion it may be said that the patient whose case has been reviewed in these pages has provided many problems, some solved, some now in process of solution, others awaiting it. For the present it seems clear that the proper attitude is one of expectancy, and readiness to deal with any new complication which may occur. Some of these may conceivably present great difficulties. In all circumstances, however, it is possible and wise to act on the counsel of Horace:-

"Aequam memento rebus in arduis
Servare mentem, non secus in bonis."

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PATIENTS NAME Mollie Manville

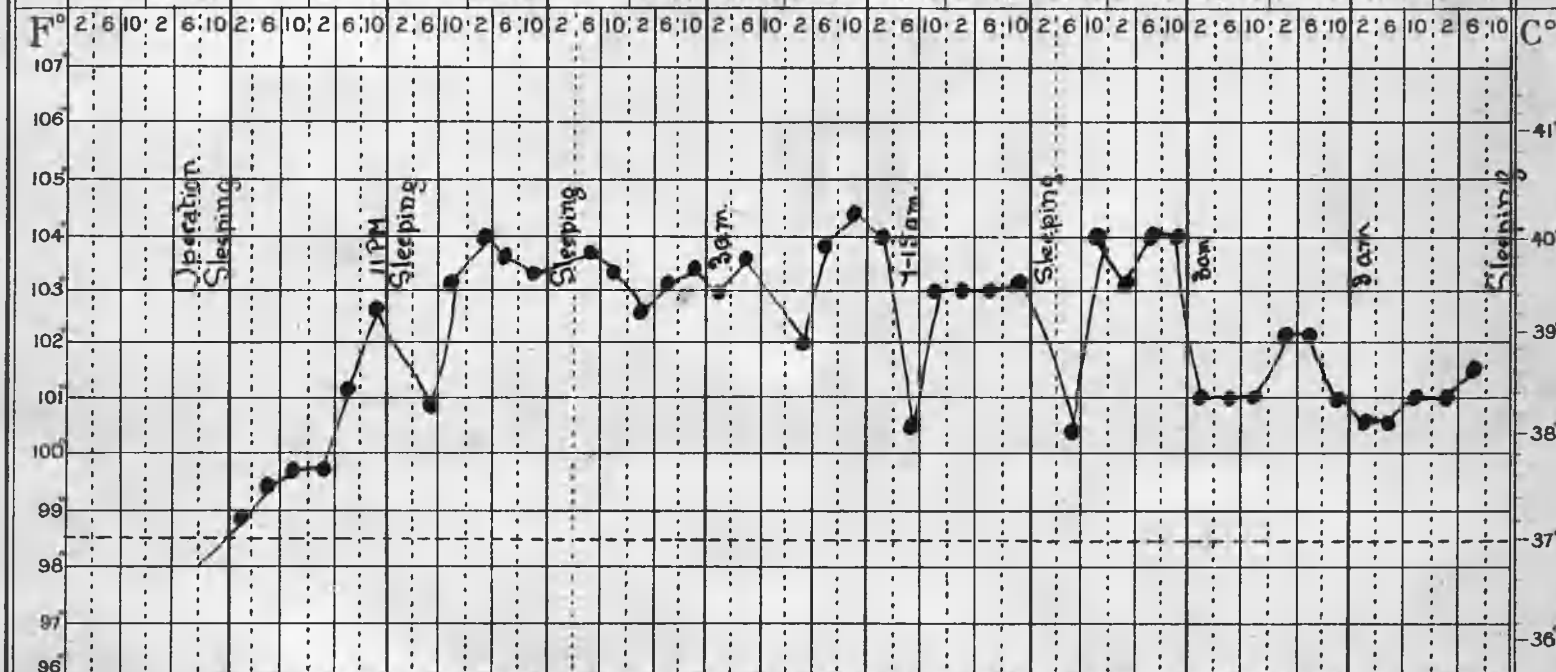
WARD & No OF BED No 4 St Joseph's Ward.

PHYSICIAN OR SURGEON Mr Ware.

CLINICAL CLERK -/-

MONTH January 1911.

DAY 4 5 6 7 8 9 10 11 12



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RESP.				22/22	22/22	22/28	/24	/26	24/22
B.O.				•/E	•/•	•/•	/E	•/E	•/•

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PULSE	/142	140/124	132/138	130/142	132/124	132/124	127/118		136/130
RESP.	/28	24/26	28/24	24/28	28/24	28/24	20/24		28/26
B.O.	•/E	•/•	•/E	1/•	•/•	1/1	•/E		•/•

	10	10	10	11	11	11	12	12	12
PULSE	·/132	129/124	120/120	·/104	100/110	•/•	/100	/100	104/
RESP.	·/28	24/28	18/20	·/26	29/26	·/·	/22	/22	24/
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9 A.M. URINE AMT

BODY WEIGHT

DAY OF DISEASE

URINE									
DATE									
COLOUR & REACTION									
SP GR DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME Mollie Maurice

WARD & No. OF BED St Joseph's No 4

PHYSICIAN OR SURGEON Jm Wa[illegible]

CLINICAL CLERK

MONTH: Jan 1911

DAY	13	14	15	16	17	18	19	20	21
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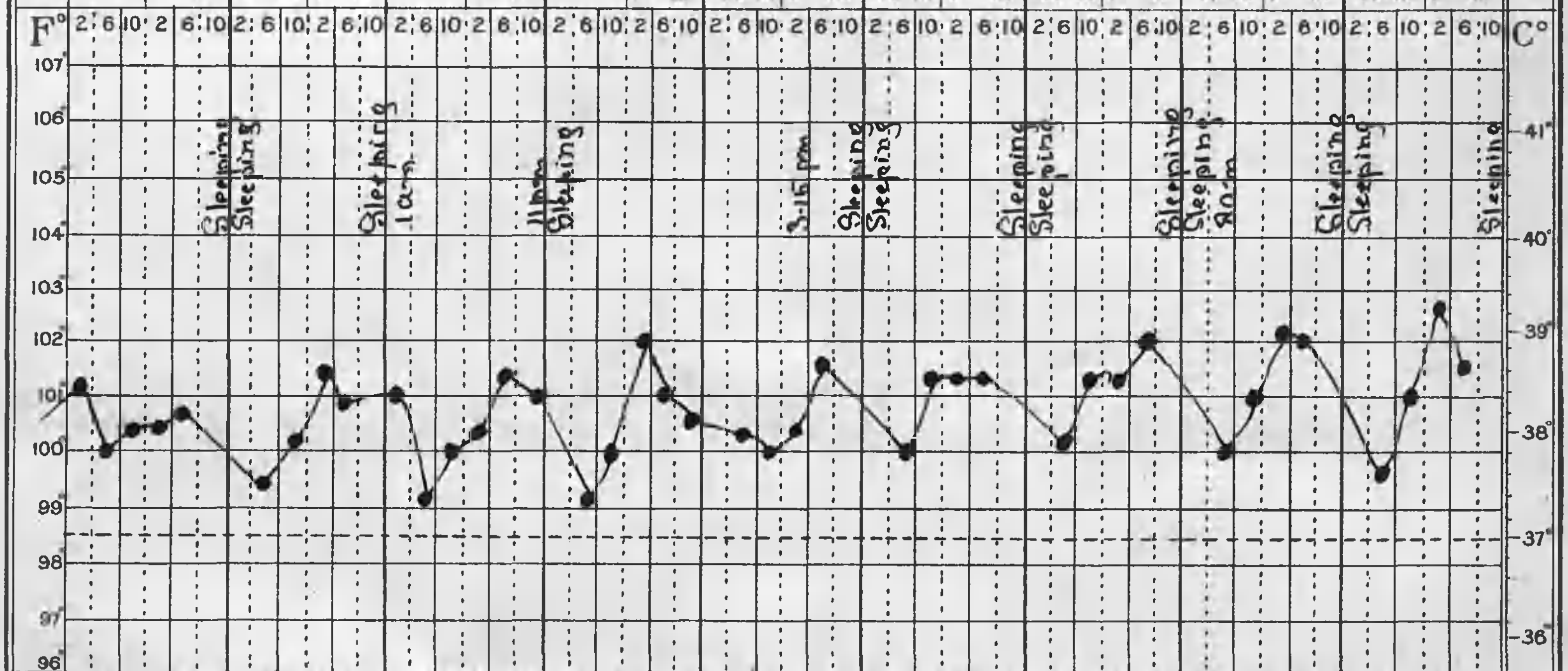

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PULSE	· / 100	96 / 96	98 /	/ 92	- / 104	98 /		98 / 92	102 /	/ 88	98 / 100	100 / 100	/ 84	92 / 96	100 /	/ 108	98 / 98	100 /	/ 108	108 / 100	108 /	/ 88	100 / 118?	108 /	/ 88	/ 96	108 /
RESP.	· / 22	24 / 22	24 /	/ 16	- / 20	22 /		20 / 20	24 /	/ 20	24 / 20	20 / 18	/ 16	18 / 16	20 /	/ 16	24 / 24	22 /	/ 20	20 / 20	24 /	/ 18	20 / 20	20 /	/ 20	/ 20	20 /
B.O.	· / •	• / •	• /	/ 1	• / •	• /		• / •	• /	/ •	1 / •	• / •	/ 1	• / •	• /	/ 1	• / •	• /	/ 1	• / •	1 /	/ E	• / •	• /	/ •	/ •	• / •
9 A.M. URINE AMT.																											
BODY WEIGHT																											
DAY OF DISEASE																											

URINE									
DATE									
COLOUR & REACTION									
SP. GR. DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME: Mollie Manville

WARD & No. OF BED: St. Joseph's Hosp.

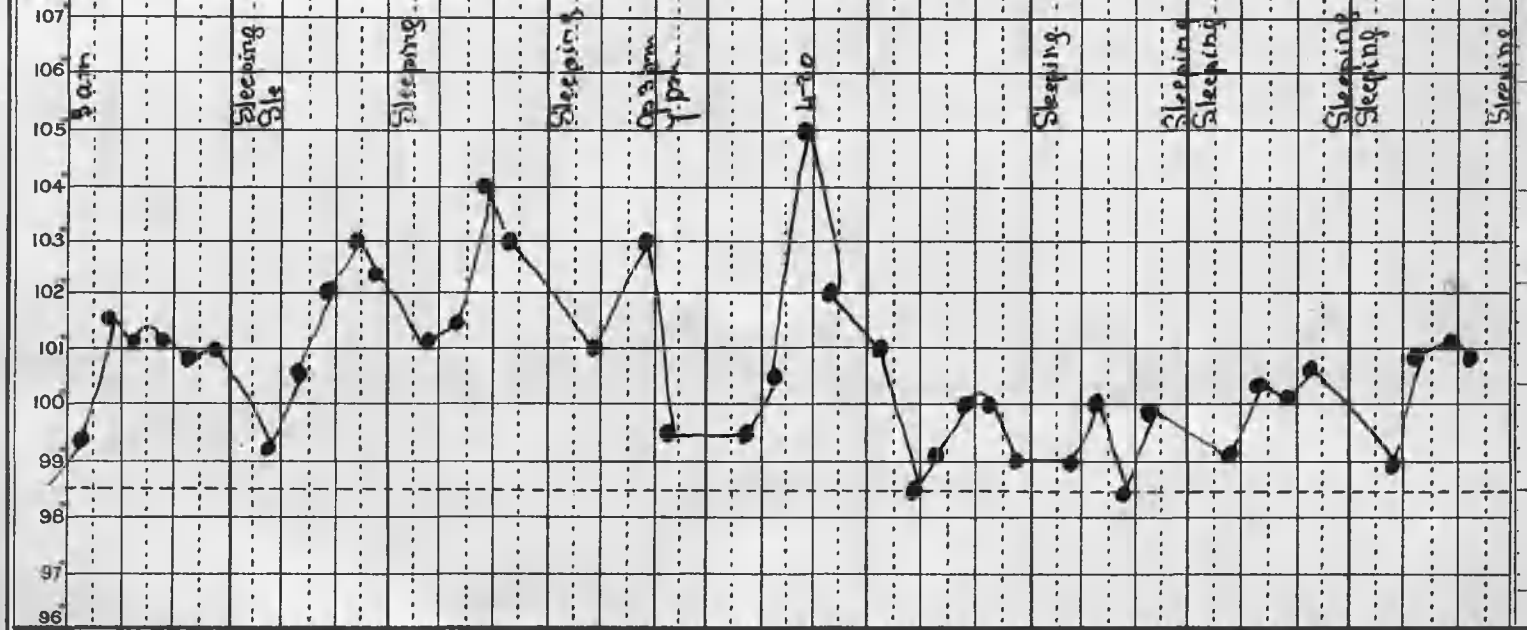
PHYSICIAN OR SURGEON: Dr. Ware

CLINICAL CLERK: /

MONTH: Jan 1911 — 22 23 24 25 26 24 28 29 30

DAY: A M | P M — 2 6 10 2 6 10

F° / C°: 107 106 105 104 103 102 101 100 99 98 97 96 — 41° 40° 39° 38° 37° 36°



	22 AM	22 PM	23 AM	23 PM	24 AM	24 PM	25 AM	25 PM	26 AM	26 PM	24 AM	24 PM	28 AM	28 PM	29 AM	29 PM	30 AM	30 PM
PULSE	82	92/96	96	100/112	112	92	96/100			112	104	102	128/124	130/120	124/130	100/104	100	94	100	100/100	100	100	100
RESP.	20	20/20	20	22/24		20	20/20			24		20	32	28/20	27	24	22	20	20	22	20/20	24	20	20
B.O.	1	1			1	E		E		1											1	1		
9 A.M. URINE AMT																								
BODY WEIGHT																								
DAY OF DISEASE																								

URINE

DATE										
COLOUR & REACTION										
SP. GR. DEPOSIT										
ALBUMEN										
SUGAR										

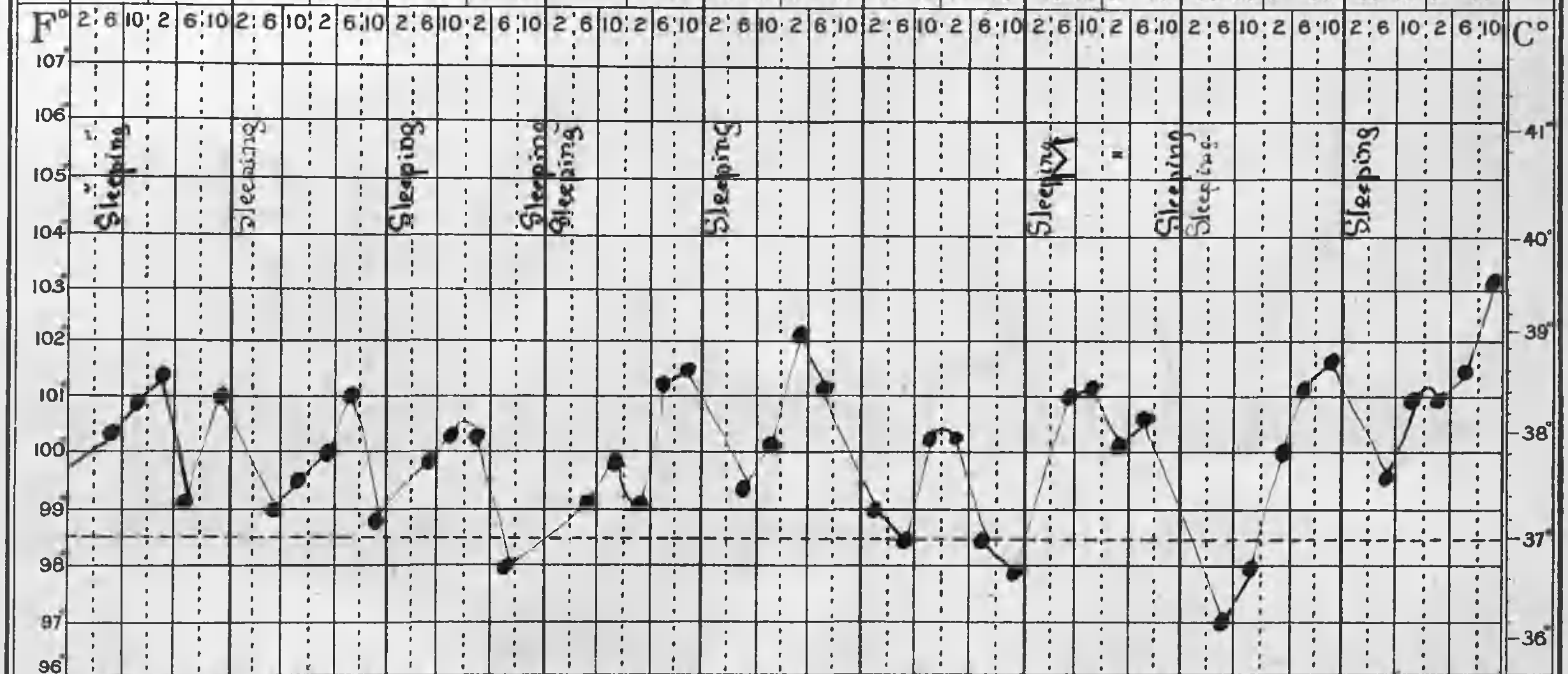
PATIENT'S NAME Mollie Manoree

WARD & Nº OF BED Ward 2 No 4

PHYSICIAN OR SURGEON Jn Ware

CLINICAL CLERK —

MONTH	Jan: 1911	Feb							
DAY	31	1	2	3	4	5	6	7	8
	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)	A M P M (2 6 10 2 6 10)



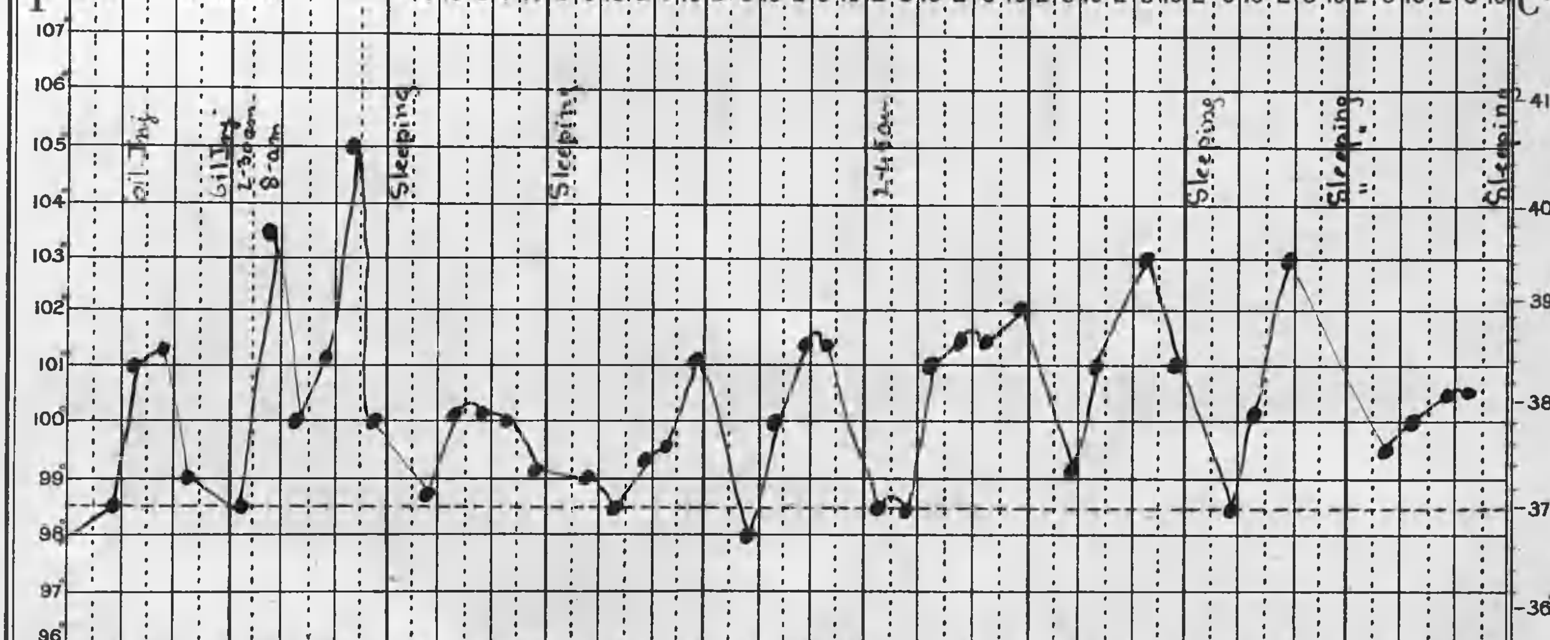
	31	1	2	3	4	5	6	7	8
PULSE	120, 120, 108, 108	100, 108, 110, 110, 84	88, 102, 88	116, 112, 108, 100, 120	116, 112	84, 80	80, 84, 86	84	100, 120
RESP.	22, 20, 20, 22	22, 24, 24, 24, 20	20, 20, 20	22, 24, 22, 24, 24	22, 24	24, 24	20		
B.O.	1		E		E1, 1		E1		E1, 1
9 A.M. URINE AMT		℥ xL	℥ xx	℥ xxi	℥ xvi	℥ xvi	℥ xv	℥ xxi	Passed Thro' wound
BODY WEIGHT									
DAY OF DISEASE									

URINE									
DATE									
COLOUR & REACTION									
S^T. G^R. DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME Mollie Manville | WARD & No. OF BED Ward 2. No 4

PHYSICIAN OR SURGEON Jm Ware | CLINICAL CLERK ✓

MONTH	Feb 1911									MONTH
DAY	9	10	11	12	13	14	15	16	17	DAY
	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	
F°	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	C°



	9	10	11	12	13	14	15	16	17	
PULSE	104, 104, 100	120, 134, 130	98, 110, 100	90	88, 90, 90	80, 80		92	104	PULSE
RESP.	28				20	20, 20				RESP.
B.O.	E, 1, E	E, E, E, 1	E	E	1	1		E	1	B.O.
9 A.M. URINE AMT.	Passed by wound freely	Passed thro wound freely	Passed thro wound freely		℥xxi	℥xxv		℥xxvi		9 A.M. URINE AMT.
BODY WEIGHT										BODY WEIGHT
DAY OF DISEASE										DAY OF DISEASE

URINE

DATE									
COLOUR & REACTION									
SP. GR. DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME: Mollie Manville

WARD & No. OF BED: Ward 2 No 4

PHYSICIAN OR SURGEON: Jm Ware

CLINICAL CLERK:

MONTH: Oct

DAY	18	19	20	21	22	23	24	25	26
A M | P M	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10
F°	Sleeping Sl	Sleeping	Sl-30	Sleeping	Sleeping	Sleeping	Sleeping		
PULSE	100 104		124 120 100	116 120 100	102 120 104	84 112 104 112	114 116 116		
RESP.									
B.O.	1	1		1		1	1		
9 A.M. URINE AMT									
BODY WEIGHT				Faecal fistulae					
DAY OF DISEASE									

C° 41° 40° 39° 38° 37° 36°

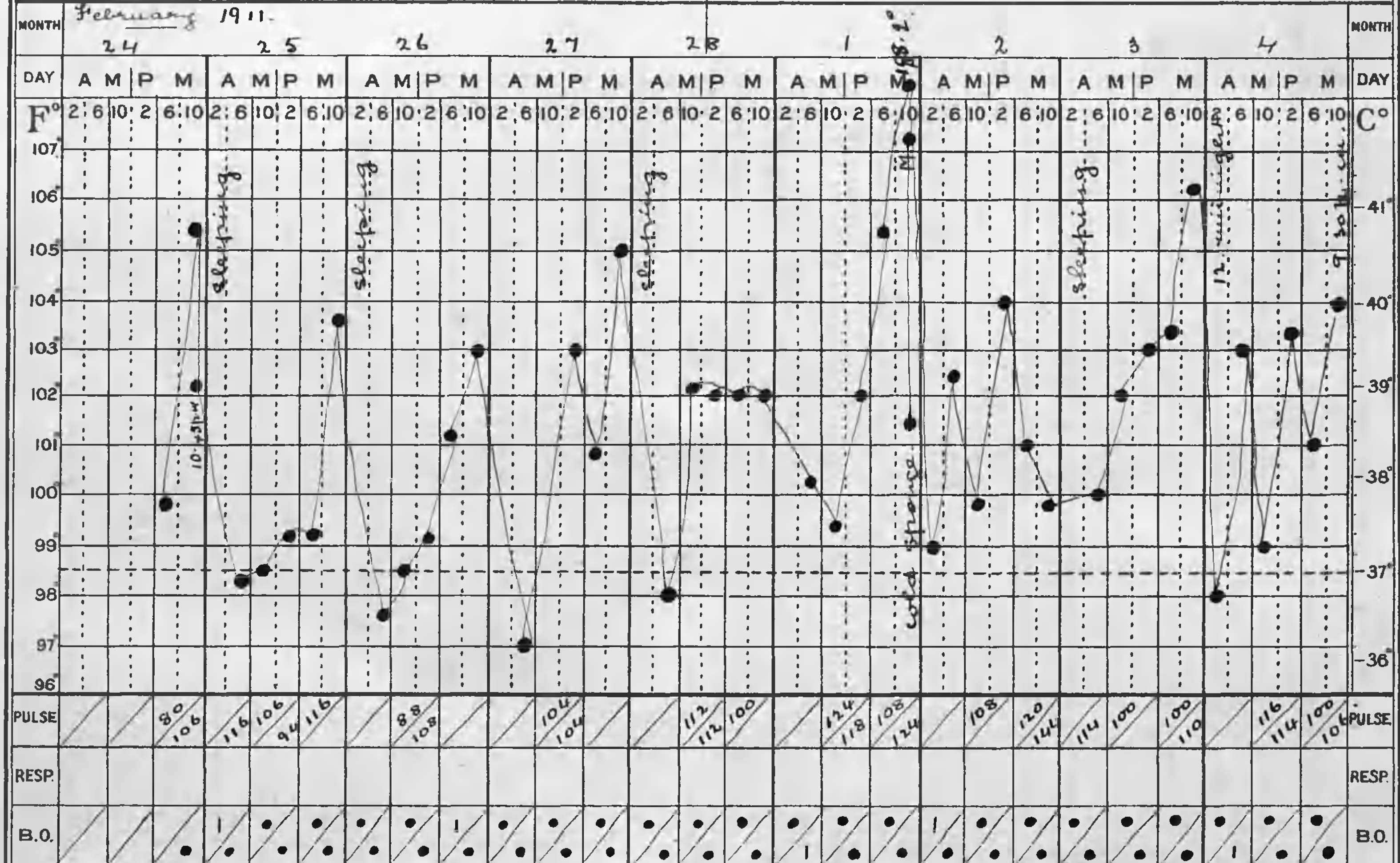
URINE										
DATE										
COLOUR & REACTION										
Sp Gr DEPOSIT										
ALBUMEN										
SUGAR										

PATIENT'S NAME Marion Mauville

WARD & No. OF BED No. 4 Ward 2

PHYSICIAN OR SURGEON Mr. Ware

CLINICAL CLERK ✓



9 A.M. URINE AMT.

BODY WEIGHT

DAY OF DISEASE

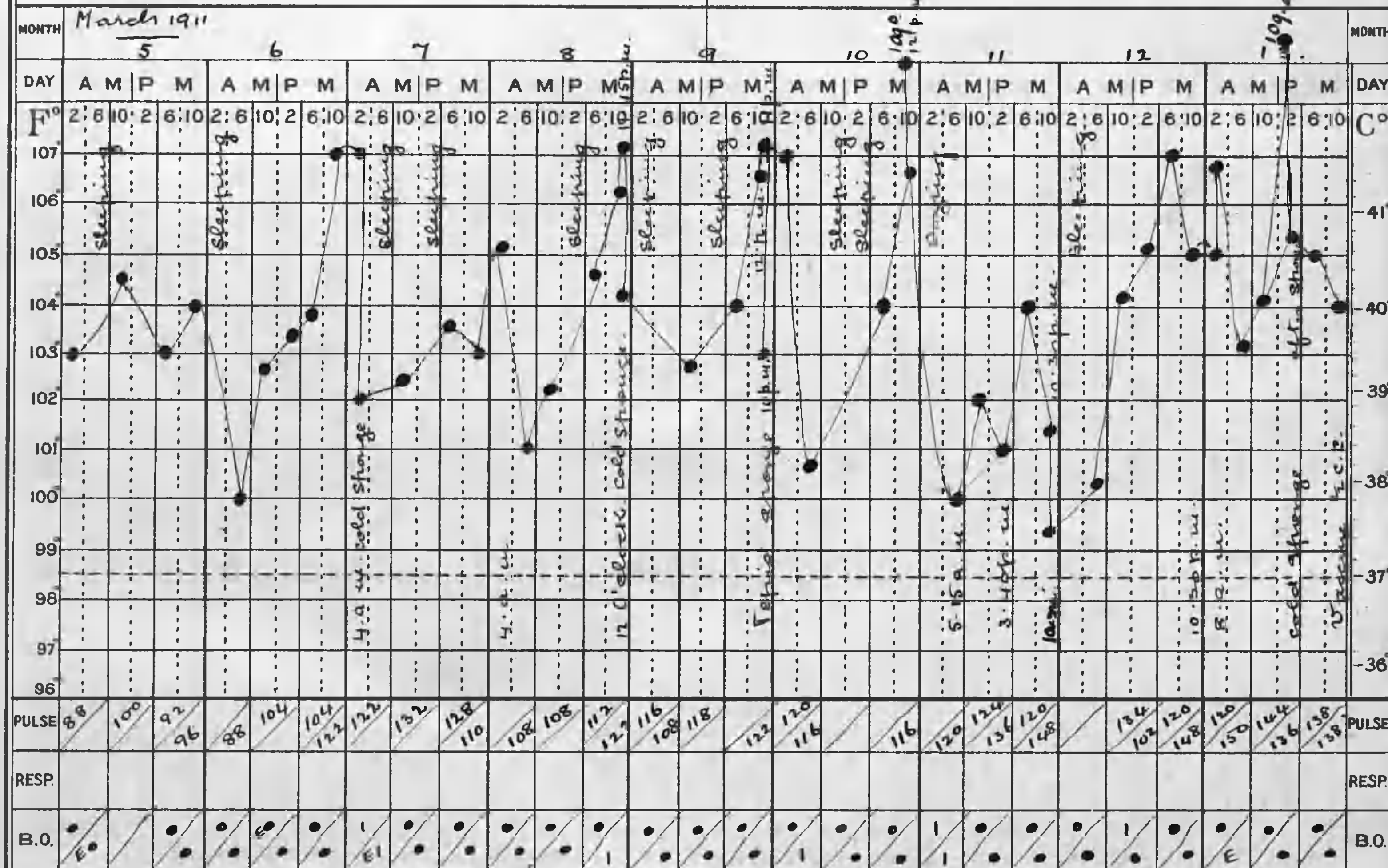
URINE								
DATE								
COLOUR & REACTION								
S.G. DEPOSIT								
ALBUMEN								
SUGAR								

PATIENT'S NAME *Marion Mauville*

WARD & Nº OF BED *No 4 Ward 2*

PHYSICIAN OR SURGEON *Mr Ware*

CLINICAL CLERK *✓*



9 A.M. URINE AMT

BODY WEIGHT

DAY OF DISEASE

Faecal fistula healing. General condition very bad + Repeated sponging at night

URINE									
DATE									
COLOUR & REACTION									
SP. GR. DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME *Marion Manville*

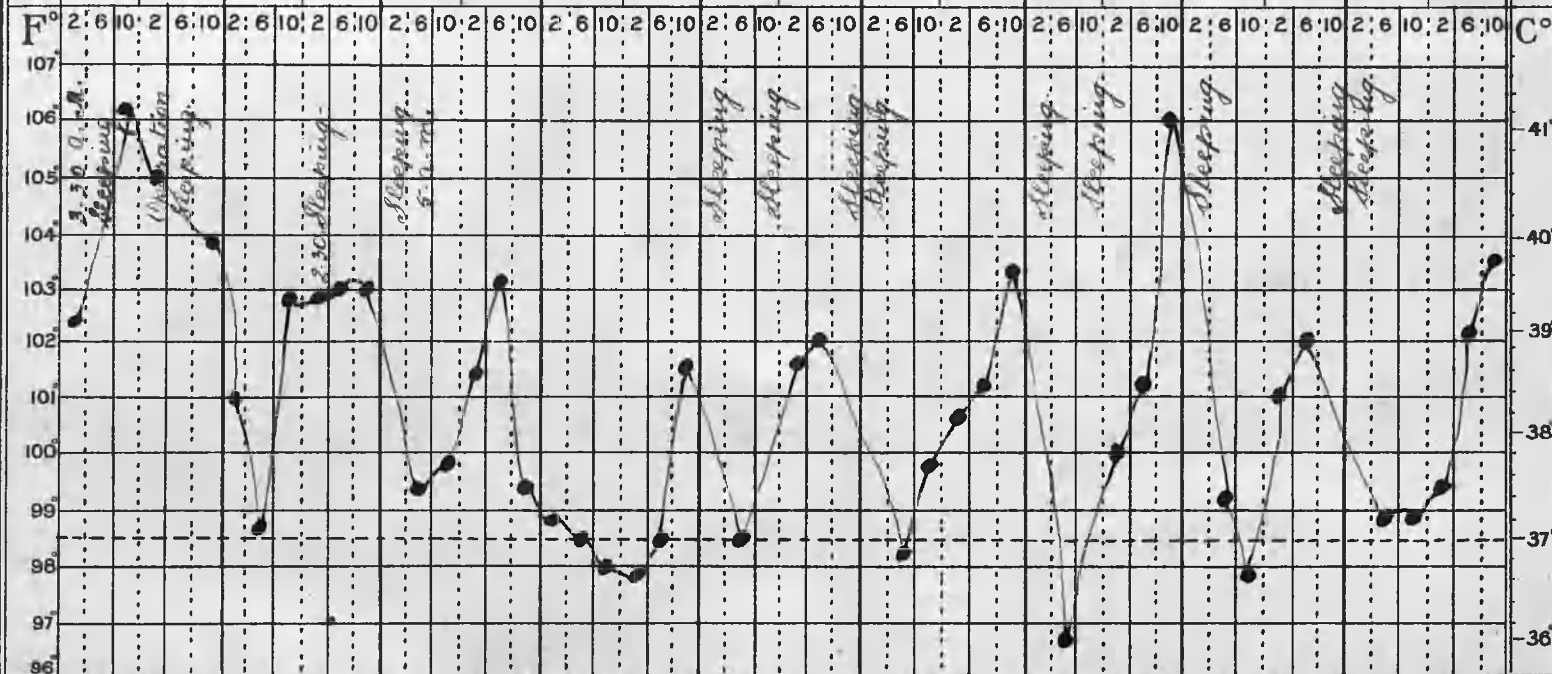
WARD & No. OF BED *Ward 2 Bed 4*

PHYSICIAN OR SURGEON *Mr Ware*

CLINICAL CLERK —

MONTH *March 1911*

DAY	14	15	16	17	18	19	20	21	22
	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M	A M / P M
	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10



	14			15			16			17			18			19			20			21			22		
PULSE	148	140/120	128	108/98	108/108	110/108	108	120/112	100/120	94/108	108/108	104/100	98	108	112		120			106	116/108	100	124/108		98	104	106/100
RESP.																											22
B.O.	1/E	•/1	•/•	•/•	•/•	•/•	•/•	•/•	•/•	1/1	•/•	•/•	•/1	•/•	1/•	•/•	•/•	•/•	1/2		•/•	•/•	•/•	1/•	•/•	/1	/•
9 A.M. URINE AMT.										P. U. through wound			P. U. through wound			P. U. through wound			—			—			P. U. through wound		
BODY WEIGHT	•/•			2			1/2			2/2			1/1			1			1			1/1			1/•		
DAY OF DISEASE				Large F.F. + ur. F. Patient much relieved.																							

B.O. through wound.

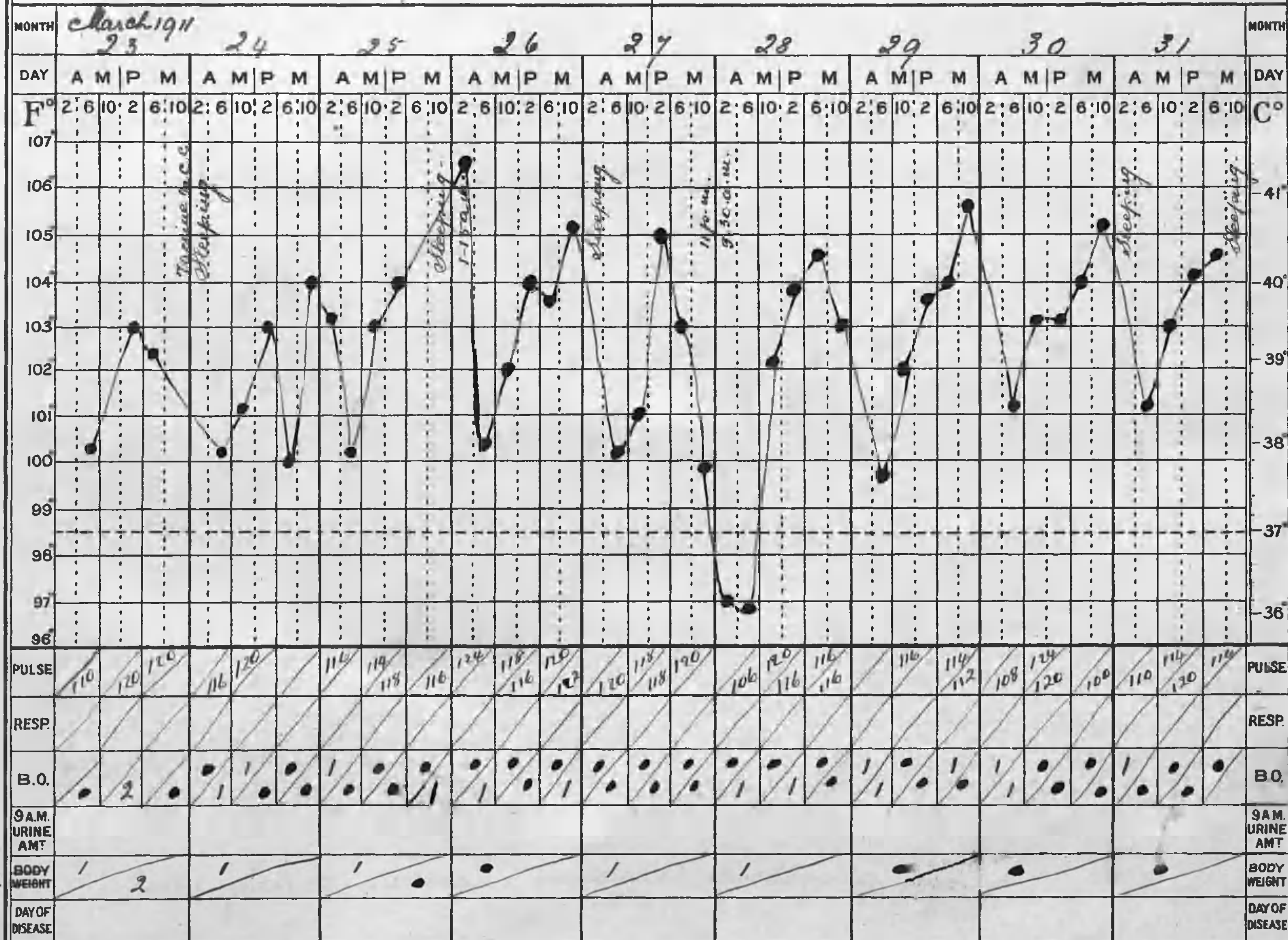
URINE		
DATE	Laparotomy.	
COLOUR & REACTION	Inflamatory mass	General condition much improved.
SP. GR. DEPOSIT	found in pelvis.	Bowels well open.
ALBUMEN		Patent faecal fistula.
SUGAR		

PATIENT'S NAME Marion Mauville

WARD & No. OF BED Ward 2 Bed 4

PHYSICIAN OR SURGEON Mr Ware.

CLINICAL CLERK



B.O. through wound.

URINE									
DATE									
COLOUR & REACTION									
SP. GR. DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME *Marion Mauville.*

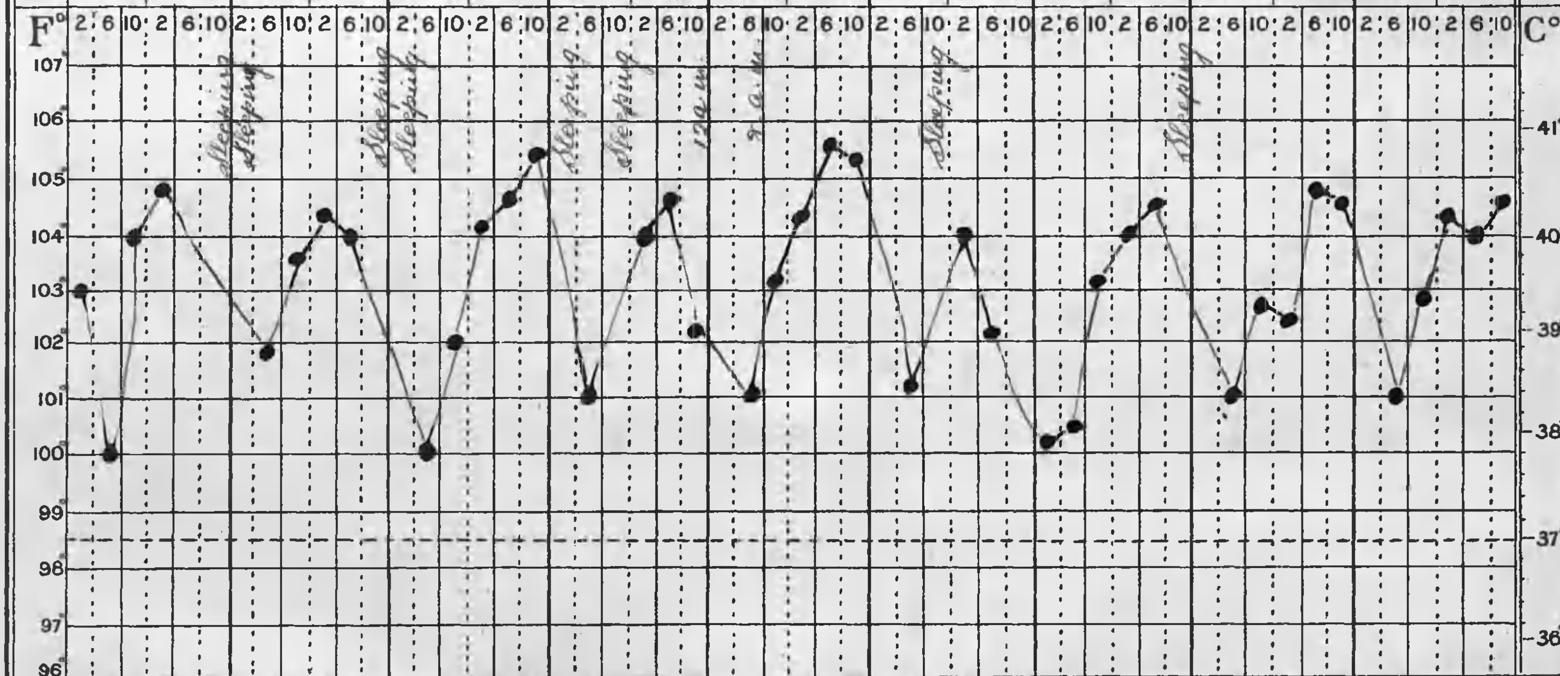
WARD & Nº OF BED *Ward 2 Bed 4*

PHYSICIAN OR SURGEON *Mr Ware*

CLINICAL CLERK —

MONTH *April 1911*

DAY	1	2	3	4	5	6	7	8	9
	A M P M	A M P M	A M P M	A M P M	A M P M	A M P M	A M P M	A M P M	A M P M
	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10	2 6 10 2 6 10



	Day 1			Day 2			Day 3			Day 4			Day 5			Day 6			Day 7			Day 8			Day 9		
PULSE	/	124/116	128/	/	116/110	104/	/	112/104	112/	/	112/	120/	/112	/120	102/	/96	/102	102/	/100	120/120	/	/98	116/118	107/	/100	120/100	124/
RESP.																											
B.O.	•/•	1/•	•/•	•/•	•/1	•/•	•/2	•/•	•/•	•/1	1/•	•/•	•/•	•/•	•/1	•/1	•/•	•/•	1/1	•/•	•/•	1/1	•/•	•/•	•/2	•/•	•/1
9 A.M. URINE AMT.																											
BODY WEIGHT	*Faecal fistula closing. occasional discharge of pus.*																										
DAY OF DISEASE																											

O. through wound.

URINE									
DATE									
COLOUR & REACTION									
S^T G^R									
DEPOSIT									
ALBUMEN									
SUGAR									

PATIENT'S NAME Marion Manville — WARD & No. OF BED Ward 2 Bed 4

PHYSICIAN OR SURGEON Mr Wase — CLINICAL CLERK /

MONTH April 1911

DAY	10	11	12	13	14	15	16	17	18
A M | P M	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10	2 6 10 | 2 6 10
PULSE	116 / 124 128 /	116 / 124 108 / 116	120 / 120 130 / 116	92 / 120 116 / 120	100 / 120 130 / 108	/ 120 / 120	108 / 116 /	114 / 110 /	106 / 120 120 /
RESP.									
B.O.	1 / • • / • 1	• / 1 1 / • •	• / 1 • / • 1	• / • • / • •	• / • /	/ /	/ /	/ /	1 / 1 /
9 A.M. URINE AMT									
BODY WEIGHT					1	1 / 1	2 / 1	2 / 1	1
DAY OF DISEASE									

Sleeping

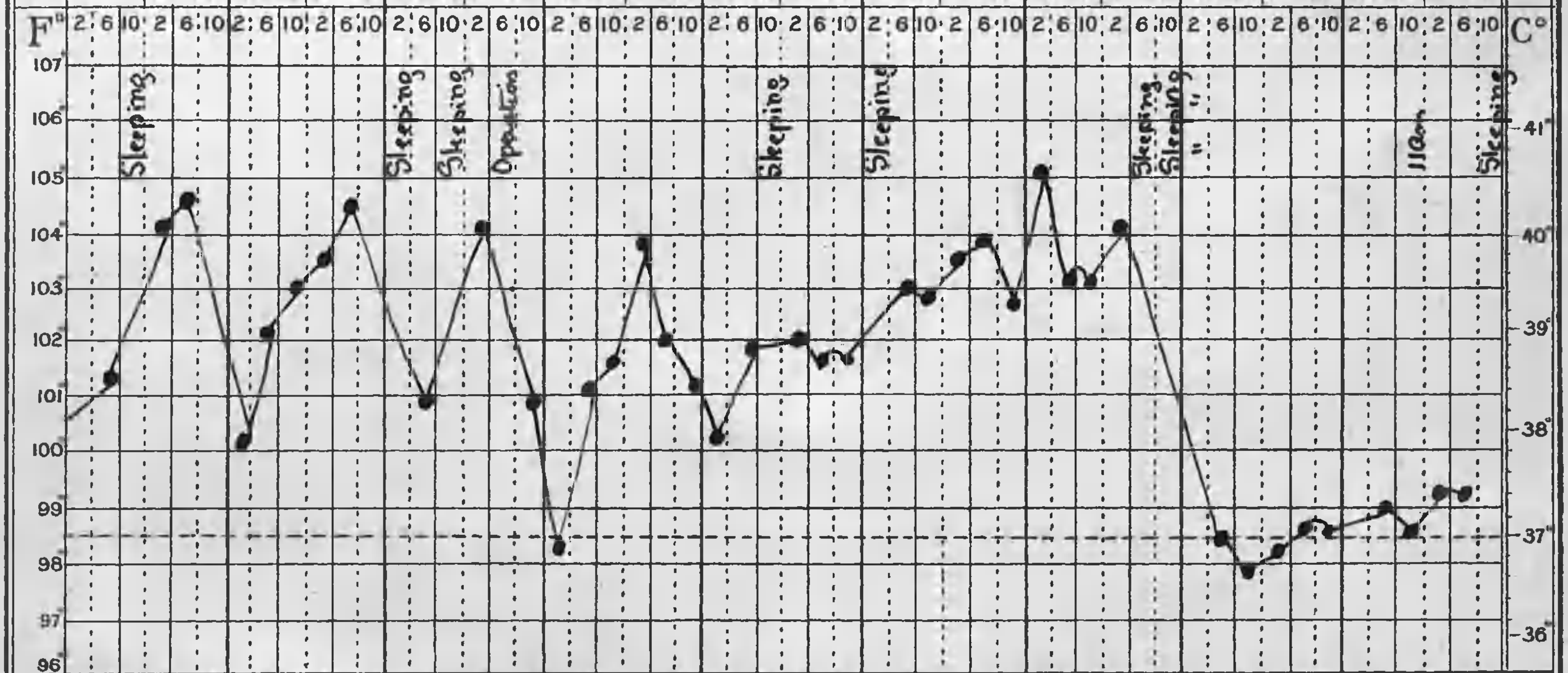
B.O. through wound.

URINE										
DATE										
COLOUR & REACTION										
SP. GR. DEPOSIT										
ALBUMEN										
SUGAR										

PATIENT'S NAME Molly Manville	WARD & No. OF BED Ward 2. No 4
PHYSICIAN OR SURGEON Mr Ware	CLINICAL CLERK

MONTH: April

DAY	19			20			21			22			23			24			25			26			27		
PULSE	104	100		98	116/124	120	118	120	108	100/104	120/132	126/124	118/108	120/124	128/110	118	120/130	120/116	110/116	116/120		102	124/116	116/110	102	116/124	116
RESP.									18	20/18	20/30	20/20	18/22	22/28	28/32		30/30	28/20	20/12	20/30		20	20/16	18/16	18	34	28
B.O.																											



9 AM. URINE AMT.: P.U. Thro' wound (23); P.U. Thro wound (24)

BODY WEIGHT: 1 / 1 (19)

B.O. Thro' wound

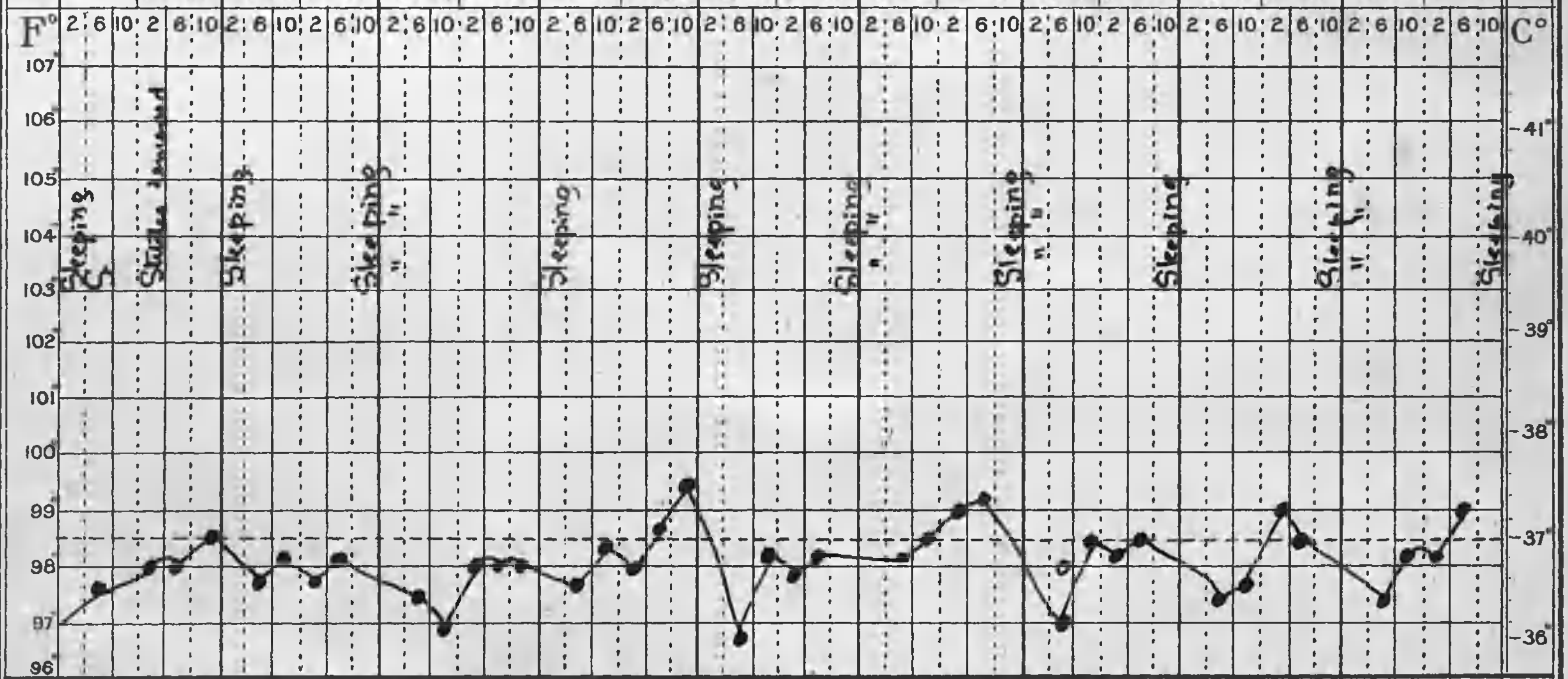
B.O. 1.??
very slight action

DAY OF DISEASE

URINE										
DATE										
COLOUR & REACTION										
S.G. DEPOSIT										
ALBUMEN										
SUGAR										

PATIENT'S NAME Mollie Manville	WARD & No. OF BED S. Joseph's No 4
PHYSICIAN OR SURGEON Mr Ware.	CLINICAL CLERK

MONTH	April		May							MONTH
DAY	28	29	30	1	2	3	4	5	6	DAY



	April 28			29			30			May 1			2			3			4			5			6			
PULSE	116	120	120/112	112	116/104	108	96	112/98	92	108	112/114	120	92	112/112	112	108	108/116	116	106	108/104	108	88	107/100	108	100	112/112	118	PULSE
RESP.	20	24	20/20	26	24/20	20	24	20/24	22	24	20/.	20	20	24/20	28	24	28/28	28	24	24/20	20	20	20/20	20		20/20	24	RESP.
B.O.	·	·/·	1/·	·/·	·/1	·/·	·/·	E!/·	·/·	·/1	1/·	·/2	·/·	1/·	·/·	·/·	·/·	·/·	·/1	·/·	·/·	·/2	·/·	·/·	·/·	·/·	·/·	B.O.
9 A.M. URINE AMT.																												9 A.M. URINE AMT.
BODY WEIGHT																												BODY WEIGHT
DAY OF DISEASE																												DAY OF DISEASE

URINE										
	DATE									
	COLOUR & REACTION									
	Sp. Gr. DEPOSIT									
	ALBUMEN									
	SUGAR									