Address.

ADDRESS AT DEDICATORY EXERCISES OF THE FREE HOSPITAL FOR WOMEN.

BOSTON, JANUARY 1, 1895.

BY W. H. BAKER, M.D.

It seems appropriate on this occasion, which marks an era in our hospital life, to review the work of the past nineteen years, with a view to establish in our minds what has been accomplished by our efforts, as well as to serve as a guide to direct us in the larger field of work upon which we have now entered. We began in the small house No. 16 East Springfield Street, with a capacity for the treatment of five patients. We were able within two years to increase the number of patients to fifteen, because the financial aid of our early friends supplied us with the necessary means.

But in 1877 we had outgrown these accommodations and moved to the larger house No. 60 East Springfield Street, where we very soon increased our number of resident patients to twenty. Two years later the Out-Patient Department was established, and we became again crowded for room, when the adjoining house was added to the hospital. The growth of the work during these years is well shown by the fact that during the first two or three of them, one surgeon was able to attend to all the active work of the hospital. Of late, fourteen surgeons and physicians have been in constant attendance throughout the hospital year.

The adaptation of the principles of asepsis to gynecological surgery wrought a great change in the work of our hospital. It became more essentially a surgical institution; and under the influence of this method of treatment, we find that the number of operations quadrupled. The safety in the performance of this work offered the patient a more speedy relief with less risk than by the older methods. This fact is conclusively shown, when we consider that our capacity of twenty beds has not changed in the past fifteen years, yet the number of patients admitted and treated during that time doubled, and this without the death-rate increasing. The whole number of patients treated in the wards of our institution since its organization has been 2,309, while in the out-patient department in fifteen years there has been 46,655.

Although these figures would seem to justly indicate a cause for encouragement in our work for the relief of suffering, yet it is really but a small part of the work accomplished. I refer to the extension of knowledge in the special class of disease treated which has resulted from it. Take, for instance, the young men who have served us in the capacity of house-surgeons. Of these, two are acknowledged leaders in the department of diseases of women in New York City, having services in the Woman's Hospital, the Cancer Hospital and the Maternity Hospital. One is at the head of a hospital for women in Denver, Colo. One organized and presides over the department of gynecology in the hospital at Grand Rapids, Mich. Another established and is doing an excellent work in a hospital for women in Detroit, Mich. Still another has lately started a hospital for the treatment of women in Providence, and is attached to the staff of the Rhode Island Hospital. Three others have services in the department

for women in general hospitals in this city. Thus, when we think of the hundreds of women who are being relieved at their hands and add to these the thousands that are relieved by the great number of physicians who have been instructed in this department in this institution, we can begin to realize the amount of good accomplished by the hospital as an educational organization.

The hospital, born in 1875, has already passed through the trying ordeal of youthful existence, and will obtain its majority this coming year. May we not expect that in the next decade the full strength of its manhood will be established, and the success which has crowned our labors in the past not only be continued but increased in a manifold degree? We cannot, however, imagine our work ever passing into a worthless dotage, for the ever-present call to relieve poor suffering women is constantly before us. Our best and most zealous effort will ever be demanded to meet this necessity.

As we look about us to-day and see the faces of those who have grown familiar in the unity of our work, we miss from our number some that we had hoped would be with us on this occasion. We mourn the wise counsel of Dr. Storer and the skilled touch of Dr. Strong in the active work of the hospital. But even this sorrow is turned to joy as we recall the good work for which they labored, for which we still labor, and for which others will continue to labor who succeed us. For we are united with them in carrying on this great work of relieving the suffering of the sick, of extending hope and courage to the poor, and giving of our abundance to the needy, and so fulfilling this great and noble purpose of life.

Original Articles.

ON SOME OF THE CLINICAL FEATURES OF PRIMARY TUBERCULOSIS OF THE GENITO- URINARY ORGANS.¹

BY FRANCIS S. WATSON, M.D., BOSTON.

THIS communication does not aim at treating the subject at all completely, but is intended merely to call attention to some of the more suggestive symptoms of this disease as it occurs in the urinary organs, and especially as it affects the bladder and kidneys, and is prompted by the belief that the disease is frequently overlooked. I have recently asked six or eight general practitioners of fifteen or twenty years' standing, with opportunities for wide observation, how often they had seen cases of primary tuberculosis of the urinary organs. The answers varied from "four or five times," to "practically never." In some cases I have been asked to see, in consultation, patients with "obstinate cystitis," which have proved to be examples of tuberculosis, generally renal, which had not been suspected.

Since reporting a case of tuberculosis of the kidneys and bladder, and showing the specimens obtained at the autopsy, at a meeting of this Society six years ago, I have had twenty others, in which the nature of the disease was demonstrated by autopsies, or by the discovery during life of the characteristic bacilli, and four or five more which although such proof was

¹ Read before the Suffolk District Medical Society, April 28, 1894.

lacking, I am convinced were also examples of tuberculosis. In all but two of these cases the disease, so far as could be determined, originated in some part of the genito-urinary tract, as follows: in seven cases the disease originated in the epididymis; in four in the prostate or seminal vesicles; in three in the kidney; in the remainder the origin was undetermined. In two cases the autopsies showed apparently that the disease was confined to the genito-urinary tract. In two it was doubtful whether the disease had not originated in other organs, with this exception the evidence was wholly in favor of its being primary in the genito-urinary organs. One case of tuberculous epididymitis, and one of prostatitis started in gonorrheal inflammation.

Fifteen of the cases were males; six were females. The oldest patient was a man fifty years of age at the time of his death, in whom symptoms referable to the prostate and bladder, were first noticed two years' before. The youngest patient was a girl six years of age, in whom the disease was primary in the kidney, probably the first symptoms (irritable bladder and pyuria) being noted two years ago; this patient has been subjected to a right-sided nephrotomy, and is still alive.

The average duration of life after the appearance of the first symptoms which indicated that the kidneys or bladder were involved, was a little more than three years. There are two patients, one a man and one a woman, in whom the disease seems to have been arrested, one having been almost free from symptoms for two years, and the other for nearly four years. The urine of both, however, still contains a few blood-globules and from time to time a small quantity of pus. Tubercle bacilli were found in the urine of both patients; no examinations have been made for them recently. Both patients appear to be in excellent health, and are free from all subjective symptoms.

It is not probable that this series of cases represents more than a small proportion of those occurring in this neighborhood.

Perhaps the reason, that more than any other leads genito-urinary tuberculosis to be overlooked, is the readiness to rest content with a diagnosis of "idiopathic cystitis" in cases in which pyuria and irritable bladder are the conspicuous symptoms, and in which a few microscopic examinations of the urinary sediment fail to show casts, renal epithelium, or crystals, the latter fact being often assumed, under these circumstances, to free the kidneys from suspicion of being involved. "Idiopathic cystitis" in the sense of a spontaneously occurring inflammation of the mucous membrane of the bladder — an inflammation without a well-defined cause, that is to say — I do not believe exists. If inquiry is pushed far enough, some conditions of which such as the following are the most familiar examples, will be found to have originated the trouble: gonorrhea; stone; lithiasis; stricture; prostatic hypertrophy, and its consequences; the use of instruments; acute overdistention of the bladder, such as occurs sometimes in childbirth, or by voluntary effort, as with the insane; profound narcosis from opium or alcohol; the injection of certain irritating drugs, for example, cantharides; in connection with certain diseases of the spinal cord, etc.

If, in the absence of these or other well-defined causes, a patient has symptoms of cystitis, it is strongly suggestive of tuberculous disease in the genito-urinary

tract, probably located in the kidneys, the prostate, the seminal vesicles, or possibly in the bladder itself; but this is thought to be rarely the starting-point of the disease.

It should be borne in mind that bladder irritability is sometimes the most conspicuous sign of certain conditions in the kidney, the bladder itself being at the time free from disease. This is notably true of calculous pyelitis, of malignant and of tuberculous disease of the kidney. It is also seen in connection with simple, and more markedly with tuberculous, inflammation of the seminal vesicles and the prostate.

With regard to the method of entrance of tubercle bacilli and their lodgement in the genito-urinary tract, I will not speak, but merely note that the disease may take any of its organs as a starting-point, and that in the majority of cases in the male it begins in the epididymis, testis or prostate, and ascends more or less rapidly to the other organs. It rarely begins in the bladder; more frequently than in the latter in the kidneys, and descends.

The disease may remain localized in the epididymis or testis for a long time (several years), but it is more usual for the extension to take place more rapidly; and in some cases its progress is very rapid.

To return to symptoms. The presence of a hard lump in one epididymis, especially if the patient has never had gonorrhea or received an injury, is suggestive of its being of tuberculous nature,² this suspicion is heightened if the urinary sediment contains, pretty constantly, blood-globules, and is further increased if there is irritability of the bladder.

An outline of the following case will serve as an example. Four years ago a young man consulted me for a slightly increased frequency of urination and a "teasing" desire to urinate often. This had begun two months before, and had very gradually increased. The physical examination showed nothing except a hard lump in the right epididymis — this the patient had never noticed. The urine contained a very faint trace of albumin constantly, and there were always a few blood-globules in the sediment. I think the patient's statement that he had never had any venereal disease or received any injury to the parts, was true. He subsequently developed tuberculosis of the prostate, bladder and kidneys, and died.

Bryson has called attention to the existence of small, shot-like bodies to be felt in the hilus of the testis as the first evidence of tuberculous deposit in these organs. They pass unnoticed by the patient, and often by the physician.

Induration of the seminal vesicles and an uneven, furrowed prostate, or small areas of softening and indistinct fluctuation in the prostate, can often be felt by rectal examination when the disease occupies these organs. Cabot calls attention to the presence of hard, pea-like bodies to be felt in the prostate by rectal examination, in some cases as being suggestive of tuberculosis in that organ.

These features are dwelt on in order to emphasize the importance of systematic examination of the epididymes, testes, seminal vesicles and prostate in every case.

Blood in the urine is often the first sign of the disease. It is generally seen in the form of small

² As has been noted by Guyon and others, tuberculous disease seems not infrequently to grow out of an attack of gonorrhea. An induration in the epididymis is, however, less significant after a clap, than where there has been none.

clots. It is most noticeable in the early stages of the disease, as a rule. It is rarely profuse, as it generally is with tumors of the bladder and in some cases of malignant disease of the kidney. It is not increased by exercise, as it is apt to be in cases of stone, nor by instrumental examination of the bladder, as it often is in cases of bladder tumors. I have never seen blood-globules absent from the urine on microscopic examination at any time. In one of my cases blood never appeared except microscopically. Exceptionally there are profuse hemorrhages; this I saw in one case. Tuffier has reported a case in which there were attacks closely resembling paroxysmal hemoglobinuria.

Pus in the urine is more rarely the first symptom, but it is often coincident with blood when the latter is first noticed. When it arises from the bladder, it is continuously present; when from the kidney, it is often variable in quantity; and if only one kidney be involved and its ureter becomes plugged, pus may disappear for a time, the freeing of the ureter being followed by its reappearance in the urine in large quantity. Occasionally small masses of caseous matter are seen in the urine; and it is to the lodgement of these or of a blood-clot in the ureter that its temporary plugging is due. As a rule, these plugs are dissolved or pressed onward into the bladder too soon to allow of the formation of a very marked pyonephrosis, but sometimes they are too large and firm to be so readily pushed down, and an extensive pyonephrosis is produced, advancing sometimes to the point of threatening rupture of the pelvis of the kidney. Such a threatening occurred in one of my cases on three separate occasions, producing the following phenomena: the sudden disappearance of pus from the urine, a diminution in the quantity of urine, pain in the left side, the appearance of a large tumor in the left loin, extending forward to the abdomen, and evidently connected with the kidney, and a marked rise of temperature. Twenty-four hours later there was a sudden reappearance of pus in great quantity in the urine, a disappearance of the tumor and of the pain in the side, and a dropping of the temperature. In the first flow of urine, following the reappearance of pus, there were numerous cheesy masses, of various shapes and sizes, one or two being quite large enough to have blocked the ureter. Occasionally such stoppage of the ureters will produce attacks of renal colic simulating those produced by renal calculus.

There are two points in connection with the pyuria of renal and bladder tuberculosis that I do not remember to have seen noted by writers on the subject, which I have observed in several of my cases, namely, that the pus has a peculiar dirty-gray color, and that these tuberculous urines even when loaded with pus, do not, in many cases, have the exceedingly foul smell that is often noticed in the urines of some cases of chronic cystitis in connection with prostatic hypertrophy, and more especially of malignant disease of the kidney and bladder.

Unlike blood the pus generally increases in quantity as the disease progresses, although in some instances it undergoes marked temporary diminution.

Painful and frequent urination are also early symptoms. Very often the first thing that attracts the patient's notice is a slight increase in frequency of, and a teasing desire for, urination; this may precede the appearance of pus or blood in the urine by several weeks or months, and be the only symptom. There is nothing

especially characteristic with regard to the pain in the earlier stages; later, however, the occurrence of very marked remissions, when they take place, as they do in some cases without any apparent cause, is a very suggestive feature. These remissions of pain are usually associated with a diminution of pus in the urine. Unlike the pain in cases of stone, that of tuberculosis, when the bladder is involved, is worst when the bladder is full; and it is not so markedly increased by exercise as it is in stone.

Bladder irritability is often very marked when the disease is still confined to the kidney; and it is this, as I have said, which sometimes causes the mistakes in diagnosis, through considering the trouble to be an ordinary cystitis.

Before leaving the symptom of pain, let me say that as the disease advances it becomes almost intolerable; it is worse than that of stone because almost incessant. I think I have never seen greater suffering, except in cases of cancer of the bladder or prostate; and yet, even up to the last, there continue to be unexcepted periods of relief in some cases.

Two strikingly characteristic features of renal and bladder tuberculosis are (1) the extraordinary remissions in the severity of many or all the symptoms, and (2) the entire failure of the ordinary medicinal remedies to relieve the bladder symptoms, and the positive aggravation of the latter by local treatment, such as bladder washes, deep urethral injections, or the passage of instruments. The remissions are very deceptive, and often raise false hopes.

There is one other thing that I have observed in this series of cases, and that is, the comparatively rare occurrence of chills and profuse sweats that are so frequently seen in connection with cases of suppurative nephritis, of the so-called surgical kidney. In concluding these notes on some of the especially suggestive symptoms of this disease, let me repeat what I said at first, that the appearance in the manner described of bladder irritability, of blood in the urine, and of pus, is, in the absence of any of the special causes mentioned, particularly if occurring in a male under fifty years of age, highly suggestive of renal or bladder tuberculosis. To establish the diagnosis, there remain the discovery of the tubercle bacilli, and the cystoscopic examination of the bladder.

SURGICAL TREATMENT.

Of this I shall only give a very brief outline. The outlook is not hopeful for surgical interference, but it can often avert immediate danger, and relieve pain sometimes. If I should judge from my own experience, I should say that local treatment of the bladder when it is the seat of the tuberculous process is for the most part unavailing. I have had no success with applications to the bladder, and have tried thoroughly emulsions of iodoform, solutions of nitrate of silver, boracic acid, permanganate of potash, and so on through the whole list. Dilatation of the female urethra sometimes gives short periods of relief, but often fails to do so. Deep urethral injections are, so far as I have seen, injurious. Long-continued drainage of the bladder through the perineum has failed to relieve, in my hands. In two cases in which suprapubic cystotomy was done for the relief of most distressing vesical tenesmus, the operations were partially successful, especially when supplemented by applications. Iodoform applications after curetting

the ulcerated surfaces of the mucous membrane of the bladder, afforded very considerable relief in both cases. Guyon has reported two cases of what he considered to be primary tuberculosis of the bladder, which he treated by suprapubic cystotomy, and by burning the ulcerated surfaces with the actual cautery; one of these he reports as cured, the bacilli having disappeared from the urine, and the patient being freed from all symptoms one year later. The second patient did well, but the bacilli did not disappear.

With regard to the prospect of success attending operations on the kidney, the statistics published by Newman and others are of interest. Facklam³ reports as follows:

He collected 108 cases of tuberculosis of the kidney, in 20 of which nephrotomy and in the remainder nephrectomy was performed.

Two-thirds of the patients were women. The percentage of cases with reference to age is shown below:

1 to 10 years	7 per cent.
11 to 20 years	9.4 "
21 to 30 years	37.6 "
31 to 40 years	37.6 "
41 to 50 years	7 "
Over 50 years	1.2 "

In 38 cases out of 72 the diagnosis was correctly made before operation.

The following conclusions are drawn from a study of the operations and their results:

The mortality attending the operations in the 20 nephrotomies was about 60 per cent.

Of the eight patients who recovered, four only are claimed as cures; and of these but one resulted in a well established cure.

Of the patients who died within a short time after the operation, five had had the disease for several years previously; two of them developed acute miliary tuberculosis immediately after the operation; one died of uremia (the other kidney was seriously involved by the disease); one died of acute septicemia; and in the remainder the disease was far advanced, or had involved other organs beside the kidney.

From this evidence the author concludes: "Thus far the results of nephrotomies in cases of renal tuberculosis are not favorable."

In 16 additional cases in which nephrotomy had been performed without improving the patient's condition, nephrectomy was done—resulting, in 10 of them, in very marked improvement.

Nephrectomy was performed in 88 cases, with a mortality of 28 per cent. In 13, the operation was performed through an abdominal incision, with four deaths (about 30 per cent. mortality). In 75, the operation was extraperitoneal, 21 deaths resulting (or about 28 per cent. mortality); but of these latter 16 can be said not to have died as a direct result of the operation, whereas the four deaths resulting from the abdominal operation were all due to shock, and followed immediately upon the operation.

Of the cases which recovered from the operation 62, or 70 per cent., are reported as wholly cured or greatly relieved, but of these only 14 had been under observation for over one year after the operation. Of these 14 cases, five are entirely cured, so far as can be seen; the rest are not wholly free from evidences of the disease.

As Vigneron⁴ has pointed out, the success of nephrot-

omy in these cases depends on the thoroughness with which the pus cavities are opened into each other and cleansed, and freely drained. It should be remembered that hemorrhage is very profuse in resections or cutting of the kidney substance, but it is usually readily controlled by firm packing. A summary of the article of Vigneron above referred to, relative to these operations on the kidney in cases of tuberculosis is here submitted.

Dr. Vigneron points out that surgical interference in cases of renal tuberculosis dates back only twenty-five years, and that the subject has been exhaustively treated only since 1890. He refers to the articles of Tuffier, Facklam and Heydenreich as the most recent and important contributions to the subject; and he compares his own conclusions—arrived at independently—with those of the other surgeons just named, as follows:

NEPHROTOMY IN RENAL TUBERCULOSIS.

Facklam: 36 cases, general mortality 33.33%, operative mortality, 13.88%.
Vigneron: 64 cases, general mortality 38.18%, operative mortality, 12.72%.

Vigneron advises against early surgical interference in renal tuberculosis, following in this respect the teachings of Professor Guyon.

His conclusions in regard to nephrotomy are, that the operation affords relief in many cases, and that radical cure may follow its performance in some rare instances. In this connection, he cites the case of a child upon whom Guyon performed a nephrotomy six months before, and whose general and local conditions showed such remarkable improvement that a permanent cure is looked for.

He considers nephrotomy indicated when the patient is suffering, is losing ground, and when both kidneys are affected.

The success of the operation depends upon the manner of its performance. It is essential to open freely all pus cavities, and to remove, so far as possible, all cheesy masses; to drain freely; and to suture the edges of the renal wound to the lumbar incision, so as to allow the interior of the kidney to be easily cleansed and dressed. If these steps are not taken, the operation is useless.

The following figures are given in regard to nephrectomies:

(1) ABDOMINAL.

Tuffier	11 cases,	mortality, 26.36%
Facklam	13 "	" 30.0%
Vigneron	19 "	" 26.84%

(2) LUMBAR.

Tuffier	45 cases,	mortality, 28.2%
Facklam	75 "	" 24%
Vigneron (primary)	65 "	" 40%
Vigneron (secondary)	20 "	" 35%

Vigneron accounts for the higher rate of mortality in the series of cases which he has collected by the fact that it includes a larger number of cases operated on in the earlier days of nephrectomy, when the technique of the operation was less perfect.

The author urges secondary nephrectomy rather than primary, and considers that if it is so done the mortality is much less than with primary nephrectomy. The best time to choose is a few weeks after a nephrotomy, as soon as the general condition of the patient has improved.

Nephrectomy should be considered only in those cases in which the disease is unilateral. Vigneron considers that renal palpation and the endoscope will,

³ Arch. für klin. Chir., 1893, B. 45, H. IV.

⁴ Annales des Maladies des Organes Génito-Urinaires, September, 1894.

in most cases, make a decision in this respect perfectly possible.

Nephrectomy should not, of course, be undertaken unless there is satisfactory evidence that the other kidney is not involved, which is not always an easy matter to determine. It is impossible to lay down any general rule that shall be applicable to all cases, that is to say, it cannot be asserted that nephrectomy should always be done in preference to nephrotomy, or *vice versa*. The rational plan would seem to be to make an exploratory nephrotomy, and to act according to the conditions found; for example, if the disease should be confined to a well-defined area of the kidney, not too extensive, a resection of that portion of the organ may be the best thing to be done, as recommended and practised by Czerny, Kummel, Bryson, and others. The patient's strength and the usual considerations that govern the surgeon in deciding whether it is safe to proceed to a grave operation after an exploratory one, will determine his course. It is thought by many surgeons that it is much safer to do a secondary nephrectomy in all cases; and the records of that operation so performed seem to point to that conclusion.

THE HISTOGENESIS OF THE PLASMODIUM MALARIAE.¹

By F. A. ROGERS, M.D., CHATHAM, MASS.

THE only break in the chain of evidence which would establish beyond a doubt the fact that malaria is caused by a specific micro-organism is the one criterion that the parasite has not as yet been successfully cultivated upon artificial media. But the observations of many trustworthy investigators conclusively prove that such is the case, although we cannot as yet successfully watch the wonderful changes which occur in the plasmodium when in its natural element, the blood, in the test-tube.

The parasites belong to the sporozoa, and have the definite name of plasmodia malariae. They are always found in the blood of persons who are suffering from malaria and are not found in the blood in other conditions.

Malaria is perhaps the best example we have of a purely miasmatic affection, never appearing as an infectious disease, and cannot be communicated directly from one person to another except by inoculating a healthy individual with the blood of one sick with the disease. This fact, which has been successfully demonstrated by experimenters, proves that the infectious matter exists only in the blood.

The forms which have been discovered in this disease are peculiar to it alone, yet one point remains undecided, namely, whether there is only one kind of a micro-organism or whether several kinds give rise to the varying conditions known as tertian or quartan fever.

Laveran maintains that a single parasite causes malaria, and that the various forms met with have no connection with the various clinical phenomena found in this disease.

Golgi, on the other hand, is of the opinion that the diverse forms of malaria are caused by several different morphologically distinct species of plasmodium. He further maintains that upon the cycle of develop-

ment of each parasite the various clinical manifestations of malaria depend.

Meade Bolton, in a short article upon plasmodia malariae, has carefully compared the different views of these observers, and, according to him, Golgi regards the ameba or plasmodium of Marchiafava and Celli as the fundamental form of the organism. It is described as a more or less round mass of protoplasm, an irregularly formed structure, containing no pigment granules, and endowed with ameboid movement. He further maintains that the parasite occupies a position inside of the red blood-corpuscles, where it has been found by Councilman in sixteen cases, deriving its nutrition from the hemoglobin, and that it goes through many or all of its phases of development, even to reproduction, therein.

On the other hand, Laveran holds that the plasmodia are not found inside of the blood-corpuscles at all, that at most they are simply attached to them, whereas many forms are found floating around free in the blood plasma. He further maintains that the fully developed organism is represented by moving filaments which are developed within small cystic bodies; afterward becoming detached from these they move about freely in the blood.

To Laveran, in 1880, belongs the credit of first discovering the parasitic nature of malaria, but a different interpretation of the phenomena observed has given rise to the different views as outlined above.

The ease and certainty with which an examination can be made when one possesses a microscope is indeed novel. No elaborate apparatus or expense is entailed except a slip of glass, a thin cover-glass and a sterilized needle which complete the outfit. Different observers select different parts of the body from which to obtain a drop of blood for examination. Sometimes it may be the lobe of the ear, finger-tip, wrist, or even an organ like the spleen. With a view of obtaining blood as free from pain as possible I know of no method better than the following: after cleansing the left forefinger apply a handkerchief like a tourniquet tightly around the finger between the second and third joints, then directing the patient to strongly flex the finger it becomes so filled with blood that a very light prick with a sharp needle made at the junction of the palmar and dorsal surfaces of the finger will without pain give a plentiful supply of blood.

Two methods of procedure are now before us: the immediate, or examination of the fresh blood; and the mediate, or examination of a properly prepared, stained, and mounted cover-glass of blood. Both methods are very easily practised, and both should be tried in a given case. For the immediate examination, after wiping away the first drop of blood which appears, simply touch the centre of a clean cover-glass to the drop of blood and apply it to the glass slip, when it is ready for examination. If an appliance for warming the stage of the microscope be at hand the ameboid movements will be more apparent.

For the other method a different procedure, though one nearly as simple, is needed. It is necessary to have a thin, even layer of blood spread upon the cover-glass and properly fixed in this condition. Nothing in my hands has worked so well for a blood-spreader as a square cover-glass mounted in the handle. The split end of a match answers well for a handle. The free edge of this cover-glass is dipped in the blood and then drawn across the face of a clean cover-glass when,

¹ Read before the Barnstable District Medical Society, November 20, 1894.