The head of this parochial school, Father John J. Farrell, was approached and at once approved of the plan, saying that he would be glad to favor it in every way he could, provided we would also inspect the parochial school. This was, of course, exactly what we wished, and it insured that all of the children of the town would be under trained supervision.

At the town meeting in 1908 this plan was presented to the voters of the town with a request for an appropriation of \$500, which sum was appropriated without a dissenting voice.

A trained nurse interested in this sort of work was engaged, to begin her labors at the commencement of the next school year, and the manner in which she carried out the plan was so satisfactory that at the next town meeting the sum of \$950 was appropriated to cover the work of the next school year.

This plan has now been in operation for two years, and it is the opinion of those who have watched the work that we have a thoroughly efficient system of inspection and supervision.

The nurse looks after nine hundred children, examines them at the beginning of the year and records the results in a card catalogue.

She afterwards keeps a record of any illness they may have and seeks in this way to have a complete medical history of all of the children in town.

Such children as show any infirmity of eyes, ears, throat or general condition are referred to their physicians and are afterwards followed up to see that they get advice and follow it. Such children as need attention of a specialist and are unable to pay for it are taken by her to a public clinic in Boston.

In addition to this care of the children's health, she has also given talks on matters of hygiene in the schools, and her visits to the homes give her opportunities to illustrate and enforce this teaching. Many of the children were found to have bad teeth. A public lecture was given in the town upon the proper care of the mouth, and the nurse followed this up by talks to the children in the schools.

Arrangements have been made with the dentists in the town that on certain afternoons of the week they give dental treatment to poor children needing it at half price.

In the first year we had almost no contagious disease to contend with. One case of diphtheria was found and quickly isolated. No further cases appeared. At the beginning of this school year there were five cases of diphtheria in town, which had appeared during vacation, all confined to one locality. After the opening of school seven more cases appeared, all coming from the same part of the town and pupils in the two schools which cared for that section. As each child fell sick the schoolroom in which it had been was fumigated and the children having adjoining desks were given prophylactic treatment with antitoxin. There has been no evidence that the disease has been given by one child to another in the school and there has been no

spread of the disease to other sections of the town.

The co-operation of the board of health which achieved this control of what threatened to be an epidemic was most satisfactory and the school attendance served as a means of keeping a close watch of the children and worked to bring about a limitation of the disease rather than to spread it.

Carried out in practice, then, we have found the work of the school nurse thoroughly satisfactory in giving the town what seems adequate inspection and control of contagious disease. The nurse has also had time to follow up such cases of tuberculosis as were known to the Anti-Tuberculosis Committee of the Nursing Association. The nurse has found in the schools ten cases of children already tuberculous and eighteen cases of ill-nourished and anemic children who seem liable to be affected with tuberculosis. Plans are being discussed for providing an outdoor room for the use of such children.

I have given this somewhat detailed account of how this plan was accepted by the town of Canton in order to show the attitude of the townspeople toward school inspection. They showed themselves ready and eager to accept it the moment it was presented to them in a serviceable and inexpensive form. This result was largely due to their confidence in their school committee and their local board of health, both of which bodies favored the project.

Within the first year of this experiment I was consulted by the superintendent of schools in the neighboring town of Norwood and they soon after installed a school nurse. The town of Milton, on the other side of us, are now planning a similar arrangement.

It seems, then, that the people in the country districts are ready for this important step in prevention of disease, and it only needs a little encouragement on the part of influential people interested in public health to bring about the adoption of a method of school inspection which our experience shows to be effective and economical.

THE DIFFICULTIES AND LIMITATIONS OF DIAGNOSIS IN ADVANCED CASES OF RENAL TUBERCULOSIS.*

BY HUGH CABOT, M.D., BOSTON, MASS.

To any one familiar with the progress made in the diagnosis and treatment of renal tuberculosis during the last ten years, the advancement of our knowledge must be eminently satisfactory. There is perhaps no department of genito-urinary surgery in which the application of new methods has been crowned with more success and consequent benefit to our patients. We have reached the position where it is generally possible to lay down the facts with regard to the conditions in the urinary tract before operation with an accuracy which is nearly absolute. It is, therefore, well that we should, so to speak, take account of

* Read at the meeting of the North Central Section of the American Urological Association, Chicago, Jan. 5, 1911.

stock and see in what directions our diagnosis is still faulty and to what extent our conclusions must, therefore, be based upon an insecure foundation.

By all odds the most important result of ten years of work has been the proof that renal tuberculosis is, in its earlier stages, almost invariably unilateral, and if we except the cases of the diffuse miliary type, the statement might be even more absolute. This knowledge has come as a result of the intelligent use of the cystoscope, ureter catheter, functional tests of the renal activity, bacteriological examination, guinea-pig inoculation and finally, demonstration of the facts at operation. So accurate has become our knowledge as a result of these investigations that we have come to insist upon a detailed knowledge of the condition of the sound kidney before advising operation. But even with all these methods intelligently applied, there are certain types of genito-urinary tuberculosis in which error is difficult to avoid. This is particularly true of two classes of cases.

First, cases occurring in the male with undoubted tuberculosis of the genital tract, primary in the epididymis or prostate with bladder involvement in which the determination of the conditions in the kidney is often difficult.

Second, cases occurring in the female in which the disease is primary in the Fallopian tubes, with bladder involvement, obscuring the renal condition. One might add the reported cases of primary bladder tuberculosis, though of these I have no experience. It may be held that the experienced observer employing all known methods of diagnosis will not fall into these traps, but it must, of course, be admitted that all observers are not of equal experience and that in some cases at least the pitfalls are well devised to ensnare the unwary. I will briefly note a few cases in which difficulties of this kind have resulted in error or delay of diagnosis.

CASE I. An unusually vigorous, well-developed young man of twenty-two living in good hygienic conditions developed frequency of urination and pain on micturition without obvious cause. Accompanying this there was slight urethral discharge, which was for a time believed to be a gonococcus infection, though the gonococcus was never found. The surgeon under whose care he was at that time discovered the presence of an enlarged prostate and regarded the case as one of acute prostatitis. Under simple remedies the condition quieted down, though pus never entirely disappeared from the urine. A year later he had a sharp hematuria accompanied by exacerbation of symptoms. This ceased spontaneously and he was again comfortable. A year later, two years after the onset, another attack of hematuria. Careful examination at this time showed the prostate considerably enlarged and moderately tender; there was no involvement of the epididymis on either side. Cystoscopy showed considerable inflammation of the base of the bladder, not involving either ureter orifice. Ureter catheterization showed marked kidney damage on the left, a normal kidney on the right. Inoculation experiments showed tubercle bacilli from the bladder urine, from the left kidney and a few from the right kidney. Catheteriza-

tion of the right ureter was again done, no tubercle bacilli found and repeated tests showed that kidney to be sound. Left nephrectomy was followed by recovery.

CASE II. A man of twenty-five seen at the hospital with frequency of micturition which had existed for five years. The bladder was much contracted and the urine always contained pus in large quantities. By rectum the prostate showed no enlargement, but marked tenderness, the whole region was much infiltrated and the separate structures could not be made out. Inoculation experiments from the bladder urine showed tuberculosis. Under rest in bed and careful treatment the bladder capacity was increased to four ounces. Cystoscopy then showed a much ulcerated bladder in which the ureter orifices could be seen only with difficulty and the left only could be catheterized. The urine from this kidney showed tubercle bacilli by inoculation. Functional tests showed poor function of both kidneys and the process was therefore regarded as bilateral. A year later his condition had improved somewhat. His general health was good, he had gained weight and was better in all respects except in regard to frequency of micturition. Functional tests with indigo carmine showed practically normal function of the right kidney, very little work done by the left. Proceeding on the basis of the previous experiments it seemed probable that the left kidney, which was still the source of pain, was the most important factor in his discomfort and it was therefore removed. Upon section this kidney showed no tuberculosis, extensive hydronephrosis with comparatively little kidney substance remaining and a few small calculi in one of the sacs. The error in this case occurred for two reasons. First, because the observations of the previous year were relied upon, and second, because the findings of one ureteral catheterization were too implicitly followed.

CASE III. A girl of eighteen, after a severe illness thought to be typhoid, complained of pain in the region of the right kidney, accompanied by fever, tenderness and tumor. The attack quieted down without careful study, though it was discovered that there was pus in the urine. These attacks continued to occur at intervals during the next four years, at the end of which time she first came under observation. Her general condition was even then good. There was marked tenderness in the region of the right kidney and exquisite tenderness in the right lower quadrant of the abdomen, with considerable muscular spasm. Frequency of micturition was troublesome, but not excessive. The urine contained much pus. More extended examination was advised but neglected. Six months later her condition was much less satisfactory. She had lost weight and was having more or less continuous fever. The attacks of pain in the right side had continued. Cystoscopy showed considerable ulceration of the base of the bladder, most marked on the left, but without involvement of either ureteral orifice. Kidney function was good upon both sides and the urine from the kidneys was normal. Operation showed the case to be one of bilateral tubercular salpingitis. Patient did not survive.

CASE IV. A woman of thirty-five, fifteen years ago had pulmonary tuberculosis for which she was sent to a sanatorium and has since lived an out-of-door life. Eight years ago had pain in the region of the left kidney. At that time cystoscopy and ureteral catheterization showed left renal tuberculosis and a sound right kidney. No bladder involvement. For reasons which do not appear, probably because of the lung process, no operation was advised. Since that time the improvement in her general condition has been marked and maintained; the lung process has

remained quiescent. Eight months ago cystoscopy and ureteral catheterization showed that the left kidney was still actively tuberculous but was secreting little urine. At this time tubercle bacilli were found in a catheter specimen from the right kidney, though the urine was in other respects normal. Bilateral tuberculosis was believed to exist and no operation advised. One month ago was first seen by me. Her condition is essentially the same as eight months ago, except that there is now marked and progressive bladder involvement. Cystoscopy is difficult. There is ulceration of the base of the bladder. Left ureteral orifice is stiff, dilated and retracted, only pus comes from that side. The right ureteral orifice is apparently normal, urine collected from that kidney apparently normal in all respects, though the results of guinea pig inoculations are still pending.

These cases show various of the difficult situations and some of the reasons for error. Case IV seems to me to show the danger of depending too much upon laboratory reports and too little upon the general appearances and probabilities. I am inclined to think that the tubercle bacilli found eight months ago were either a contamination, a faulty observation or a confusion with the smegma bacillus. That bladder contamination of the specimen collected by ureter catheter may occur is illustrated by Case I, if further proof of the assertion is demanded. I am firmly of the opinion that more stress should be laid upon the absence of inflammatory products in the urine collected from the kidney than on the discovery of a few tubercle bacilli. Where the urine is apparently normal, further evidence is required before condemning that kidney. The importance to be attached to the absence of findings of inflammation in the kidney has been ably pointed out by Chute.

MANAGEMENT OF DIFFICULT CASES.

I now want especially to invite your attention to that class of cases in which our methods of study are handicapped and, therefore, unreliable, owing to the advanced stage of the disease and the contraction of the bladder. Our security in diagnosis depends almost completely upon the ability to catheterize both ureters. Where the bladder is contracted and irritable, holding from one and a half to three ounces, the investigation becomes difficult and at times hazardous. The ureter orifices can sometimes not be seen or, if seen, cannot be catheterized. The presence of tuberculosis can be proved by examination of the bladder urine.

The first problem to be solved is whether the case belongs to the so-called upper or lower type; in other words, whether the tuberculosis is primarily genital or urinary. Careful physical examination will sometimes throw much light upon this question, but in a certain number of cases both types exist simultaneously. I do not wish here to discuss cases belonging to the lower type, though they present numerous and interesting problems. Assuming for the sake of argument that the cases under discussion are primarily renal, what is our duty?

THE OUTLOOK WITHOUT OPERATION.

There are few ills in the domain of medicine which have more variegated possibilities of suffering than genito-urinary tuberculosis. I need not describe to you the horrors of such an existence and I have no fear of contradiction in the assertion that unless surgery offers some relief, medicine will afford none.

THE OUTLOOK WITH OPERATION.

If our attempts to relieve these patients by surgery are fortified at every turn by the greatest accuracy attainable under the circumstances it is scarcely possible to make them worse and I can hardly regard an operative death as a worse alternative to continued existence. Now assuming that the massive focus of infection is renal and that the involvement of the bladder, or in the male the prostate, is secondary, what has surgery to offer?

First, If one kidney is sound, the outlook may be said to be fair and considerable improvement extremely probable. We know that the lesions of the bladder and even of the prostate improve in some cases enormously, in others considerably, after the removal of the primary focus alone. We know that still further improvement of the bladder conditions may be brought about by the wise, cautious and systematic use of tuberculin. I believe that in many cases still further improvement may be obtained by the use of autogenous vaccines of the colon bacillus, which is a common successor of the tubercle bacillus in these cases.

Second, Operative and post-mortem records have shown that even in these severe and advanced cases there is large possibility that one kidney is thoroughly sound. In support of this I may cite the two following cases.

CASE I. A girl of twenty-two with a long history of bladder disturbance. When first seen she was much emaciated, with fairly constant pyrexia, great frequency of micturition and considerable pain in the region of the left kidney. Cystoscopy was extremely difficult. The left ureteral orifice was finally made out and catheterized, the urine showing much pus and many tubercle bacilli. The total kidney function was poor. It seemed eminently probable that both kidneys were involved, and no operation was advised. She lived for months in torture and died of a left-sided perinephritic abscess, with a normal and apparently competent right kidney. This case could, I believe, have been saved by operation.

CASE II. A girl of twenty with a history of increasing bladder disturbance for five years. When first seen she was in good general condition, with some pain in the region of the left kidney. The bladder was much contracted, never holding three ounces. Cystoscopy was extremely difficult. Neither ureter orifice could be seen. Indigo carmine was excreted in fair amount by the left side, apparently not at all by the right, though the observation could not be long prolonged. Under the belief that in her good general condition one kidney must be sound, the left side was explored. A large kidney apparently normal though with a much dilated ureter was found. On the strength of this the right kidney which was converted into a caseous suppurating mass was removed. At the present time, two years after operation, she is in an apparently

normal condition. The urine is free from tubercle bacilli and the bladder holds ten ounces. There is some frequency of micturition due to a polyuria which has the appearance of that due to interstitial nephritis.

These cases are of course only suggestive but the suggestion is strong.

MORTALITY.

Much stress has been laid upon the question of mortality, and we have rightly prided ourselves upon having reduced the operative risk from one which was almost prohibitive to one which is almost negligible. The most recent cases will, I believe, show a mortality below 2%. Admirable as this reduced mortality is, our desire to achieve it must not blind us to the fact that it is not the final goal. He who allows his fear of mortality to prevent him from attempting cure in desperate cases is not fulfilling his whole duty. In these advanced cases where the outlook without operation is almost absolutely bad, mortality should be a minor consideration. Even if the death-rate should be one in three, the restoration of the other two cases to a life of comparative comfort would be a notable achievement well worth the risk. Therefore I believe that in this connection the discussion of mortality should have a minor place.

In dealing with these difficult cases our attitude should, I think, be different and we should apply standards different from those applicable in the earlier cases. If we cannot catheterize the ureters, cannot state with accuracy the comparative function of both kidneys, our boasted accuracy is gone, but we can still marshal a considerable array of data to further our conclusions and furnishing at least presumptive evidence.

DATA WHICH CAN BE OBTAINED.

First, The general condition of the patient. It is of much importance to know how a given patient has withstood the inroads of the disease. Where general condition has been well maintained, weight, strength and appetite are good, we may presume that the patient is still master of his condition. The general physical examination gives data of much importance. Absence of any demonstrable foci in the lung is evidence of good resistance. Evidence of healed lesions elsewhere, as in the bone, is of value. A careful examination of the kidney regions may enable us to guess which side is involved. Pain, though valuable, is misleading, as it may be due to the dilatation of the ureter on the sound side, which, I believe, frequently occurs in these contracted bladders. I will not pursue this topic further except to point out that the general estimate of the patient's condition is not without value.

Second, Data to be obtained from the urinary tract. Though our investigation in detail is much handicapped, we are by no means deprived of all evidence. It is important to study the twenty-four-hour amount of urine, the total solids and ability of the remaining kidney tissue whether on one or both sides to respond to the stimulation of artificial polyuria. These observa-

tions are particularly of value if it can later be demonstrated that one kidney is doing the bulk of the work and are presumptive evidence of the adequacy of that kidney.

Cystoscopy though much handicapped gives valuable evidence. In a proportion of cases, in my experience small, it can be satisfactorily carried out by ordinary methods under local anesthesia. In a larger proportion such an examination cannot be made, as the length of time required to gather facts is an unnecessary torture to the patient, and general anesthesia, or spinal anesthesia, should be resorted to. It has seemed to me that spinal anesthesia was particularly suited to this work and was less dangerous than general anesthesia. The danger in these cases from general anesthesia comes chiefly from the undesirable effect upon the kidneys, which are here always handicapped, dangerously so when we are dealing with bilateral disease. I am perhaps more impressed by this danger because several years ago I lost a patient from uremia following a simple anesthesia at which only a short cystoscopy was done. During the last year we have employed spinal anesthesia on several of these cases and it has worked to our satisfaction. Pain has been entirely obliterated, an ounce, sometimes more, has been added to bladder capacity for the time being, and anesthesia has lasted in satisfactory degree from an hour to an hour and a half. I believe it to be the anesthetic of election in the present state of our knowledge, for these conditions.

By means of the cystoscope we can get certain general information.

First, The general character of the bladder process with suggested localization on one side. We can study the work of the ureter orifices in some cases, though often only by the swirl of urine without seeing the orifice itself.

Second, The excretion of indigo carmine has seemed to me of considerable value in these cases, though I admit its limitations. It will often enable the observer to locate the position of the ureter among the bladder folds, thereby demonstrating retraction of the ureter orifice due to ureteritis and peri-ureteritis. The promptness of the excretion is of importance; the character of the jet will throw light upon the condition of the ureter, whether normal or dilated. When indigo carmine is excreted promptly and in good amount from one side, and little or not at all from the other, it is strong evidence of the soundness of the one kidney. It is as far as I know the only functional test applicable to these cases.

Third, In a considerable number of cases radiographs are of value by showing increased density of the affected kidney, and if caseation and phosphatic deposits have occurred, the complete outline of the kidney and ureter may be very clearly shown. This gives nothing more than contributory evidence, but is of value in making up the complete picture.

An examination thus conducted will enable us to group the cases into two classes.

First, Patients in good general condition secret-

ing a urine good in amount and total solids, in whom indigo carmine is excreted almost entirely from one side. The presumption in these cases is strong that one kidney is sound, the other extensively diseased and operation may be advised with a considerable chance of success.

Second, This group will contain the larger number of cases, the doubtful ones. Their general condition will be fairly good, the general kidney function fair. Indigo carmine may be excreted from both sides, neither showing much advantage over the other. These are the really hard cases and those in which error is most likely to occur.

For cases belonging to this second group I am inclined to advise exploratory operation. I am quite aware that this is adopting a method discarded and repugnant to modern methods of diagnosis. On the other hand, there is a point at which these methods fail us, and yet we are not justified in refusing to give a patient the benefit of any doubt that exists. If exploration is allowed to take the place in any degree of careful systematic study, then it is a reversion to discarded methods and not to be advised, but when other methods fail it may become the method of election. There are certain cases with marked involvement of the bladder in which by no other method at our disposal can it be asserted with absolute certainty that there is kidney involvement. On the other hand, if the bladder process is secondary to that in the kidney, and if one kidney is sound, the sick kidney should be dealt with. It is less dangerous to explore efficiently than to leave a patient with one bad and one good kidney. It is less dangerous to explore and get the facts than it is to guess at which kidney is involved and run the risk of removing the worse of two seriously damaged organs.

METHOD OF EXPLORATION.

In planning an exploration, certain facts must be recognized at the outset. To cut down upon one side and trust to the examination of the other side with the hand passed across the peritoneal cavity is to run a grave risk of error. It is not safe to trust to the examination of the surface of the kidney even if well exposed to reveal the extent and character of the process, and it is nothing short of flying in the face of providence to trust to an exploration at arm's length and in a cramped position. Any exploration to be efficient must be bilateral and must involve a knowledge not only of the kidney and upper portion of the ureter as felt by palpation, but some knowledge of the urine excreted by that kidney. These propositions have been laid down by as good authorities as Israël, Caspar and Rovsing, though comparatively little has been written bearing upon this particular question. Most writers who mention it advise a bilateral lumbar incision. It has seemed to me that the anterior muscle-splitting incision was more satisfactory. It gives ready access to the kidney and the upper half of the ureter. It is quickly made and quickly closed, giving a strong and remarkably painless wound. Particular stress must be laid on always

exploring both kidneys. Israël has pointed out the importance of opening the ureter on both sides and collecting the urine directly from both kidneys. To this Caspar has added the value of injecting indigo carmine and observing the secretion. The apparent condition of the kidney and the ureter is an unsafe guide. In a considerable number of the cases the ureter on the sound side is dilated, though it is rarely, I believe, thickened in a way to deceive those familiar with tubercular ureteritis and peri-ureteritis. A kidney completely converted into a caseous mass may feel surprisingly normal. With the catheters in both ureters, from which urine should be allowed to drain for ten or fifteen minutes, much knowledge may be gained. This coupled with information gained by examination and palpation should enable the expert to arrive at an opinion. Nephrotomy done for exploratory purposes seems to me objectionable. It will fail to show the exact condition of the kidney unless a very free incision is made. Large incisions carry notable risk of secondary hemorrhage and result in wound contamination which may be serious. That nephrotomy as a palliative operation for drainage may occasionally be justifiable I am prepared to admit. The examination of the kidneys being completed, the wounds may be closed if both kidneys are diseased or normal, or one wound may be closed and nephrectomy done upon the diseased side.

In light of recent experience with spinal anesthesia in cases of damaged kidneys, I am inclined to regard this as the anesthesia of election, at least for the exploratory part of the operation. Anesthesia extending well up to the costal margin is readily obtained and is entirely satisfactory for the exposure and opening of the ureters. The urine can then be collected and conclusions drawn without subjecting the patient to the strain of general anesthesia. Should nephrectomy be decided upon, it may either be done at once under a general anesthetic, or postponed to a future occasion. We have not found spinal anesthesia satisfactory for nephrectomy and do not advise its use, but for the preliminary determination of the kidney function, I believe it will lower the mortality in properly selected cases.

Obviously these methods are not to be recommended to the inexpert or to the occasional operator, and he will probably do well to avoid what must always be an unprofitable field from a point of view of permanent cure. On the other hand, when done by those with experience and sound judgment, I feel sure it will save much discomfort and many lives at a cost not high considering the outlook without operation.

THE Milwaukee County Medical Society appointed a committee at a special meeting, April 16, "to investigate the attitude of the Christian Science church toward the practice of medicine with especial reference to the treatment of contagious diseases." It was reported that there were, on that day, fifty-three cases of scarlet fever in one ward of the city being treated by Eddyist healers.—*Jour. Am. Med. Asso.*