or vice versa—have their minds divided between these two hostile methods, and, in consequence, are often obscure in their investigations? 43822

The conclusion will be proved to be false if it can be shown that a philosopher may pass his youth in a country without ever coming under the influence of the national philosophic method.

This was the case with John Hunter; he never did come under the influence of the ordinary Scottish teaching. In Scotland the clergy had the control of all centres of education, both public and private, throughout the country. They directed what should be taught, and how it should be taught, not only by village schoolmasters and masters of grammar schools, but by the professors in the universities, and even by private tutors. Had John Hunter continued at school and proceeded to a Scottish university, he would of course have come under the influence of the deductive method.

But even if his education had been of the usual Scottish type, it does not follow that he would have adopted the Scottish philosophical method. His two brothers, James and William, who did receive such an education, did not adopt it; not even William, who was a resident pupil for three years, and a lifelong friend and correspondent of so thorough-going and so able a deductive reasoner as Cullen.

The courage shown by John Hunter when a boy of 12 years old, in a cottage scene described by his niece, Joanna Baillie, justifies the assertion that he was not imbued with the clerical teaching and superstitions prevalent at the time in Scotland. In the eighteenth century the most popular divines in Scotland, as well as the clergy generally, taught that Satan frequently appears clothed in a corporeal substance, and that he seized persons and carried them away in the air. When the preacher mentioned the name of Satan, the church resounded with sighs and groans, and the congregation were petrified with awe as they listened with gasping breath and hair standing on end. Such impressions were not easily effaced. Images of terror accompanied the ignorant people to their homes. No wonder, therefore, when a ghost in form of the devil appeared, whilst Hunter was chatting in a neighbour's cottage, that the cottagers, educated after this manner, were stricken motionless with fear, whilst young Hunter, brought up differently, attacked and drove away the apparition with the fire-tongs.

The second statement made by Buckle is that the conflict in Hunter's mind between deduction and induction darkened his understanding. I can no more accept Buckle's explanation of the occasional obscurities in Hunter's utterances than Buckle could accept Otteley's, namely, that they resulted "from a deficient education." I agree with Buckle that a deficient education no more makes a man obscure in his statements than a good education makes him lucid. With educated and uneducated alike, the power of clear expression depends on clearness of thought. When Hunter is obscure it is either owing to the complexity of his subject, or to his own mind being in doubt.

The adoption by Hunter of both methods—Deduction and Induction—was, in my judgement, the result of two causes: (1) the natural scope and bent of his mind, and (2) the nature of the subjects to which he devoted his life.

Induction is largely the method required for the profession he chose. Locke and Sydenham had left it on record that in their opinions the medical sciences to be properly pursued, ought to be approached by the Baconian method; and Hunter was one of a family, several members of which showed a great leaning towards and a marked aptitude for these sciences.

James Hunter gave up his profession as a barrister, and William, who was to have been a clergyman, abandoned the Church for Anatomy, Surgery, and Medicine; and John of his own free will, went directly into the medical profession. Their sister's son, Matthew Baillie, became the celebrated London physician and pathologist, whose medallion portrait is stamped upon the cover of the *Transactions of the Pathological Society of London*.

John Hunter was also a disciple of Bacon in that he employed induction in the pursuit of truth with an ulterior regard to utility and the good of mankind.

On the other hand, being a great thinker, he naturally inclined to the deductive method. But the tendency in

this direction was not so strong with him as with the purely deductive philosophers. He had not the deductive force of Descartes which could build up a profound philosophy with mathematical precision and by introspective examination, starting from a single subjective principle, such as "*Cogito, ergo sum*"—"Ego sum res cogitans."

It was not as a logician, but as an observer and experimenter that Hunter excelled; it was not the beauty of his logic, but the industry with which he collected facts, and the ability and honesty with which he reasoned from them, which made Hunter great. He naturally possessed the special requirements for induction—namely, a desire for knowledge, the love of inquiry, acuteness of observation, ingenuity in devising experiments, and the habit of taking nothing for granted which he could verify for himself. Had it been otherwise, John Hunter might have become a deductive pathologist of the Scottish type, like the only other great British pathologist of the eighteenth century—the illustrious Scotsman, William Cullen.

If it be true, and I do not think it is, that in Hunter's mind the two philosophic methods were in rivalry or conflict, and that this conflict led occasionally to confusion of thought and obscurity of language, the perplexity arose from the very comprehensiveness of his mind, and the grandeur and vastness of its conceptions.

If, on the other hand, as I believe was the case, he employed at will both deduction and induction, but did not succeed in fully co-ordinating or completely combining the two methods, that was only because, notwithstanding his wonderful genius, he yet fell short of being an absolute monarch of the whole kingdom of the intellect.

REFERENCES.

¹ *Letters of Charles Bell*, p. 10. ² *Eloges*, vol. i, p. 56. ³ *Hunter's Works*, vol. iv, p. 86. ⁴ *Ibid.*, vol. iv, p. 87. ⁵ *Ibid.*, vol. iv, p. 96; vol. ii, p. 132; vol. ii, p. 34. ⁶ *Ibid.*, vol. ii, p. 285. ⁷ *Ibid.*, vol. i, p. 317. ⁸ *Ibid.*, vol. iii, p. 10. ⁹ *Ibid.*, vol. i, p. 310. ¹⁰ *Ibid.*, Croonian Lectures, vol. iv, p. 204. ¹¹ *Ibid.*, vol. i, p. 18. ¹² *Ibid.*, vol. iv, p. 195.

An Address

ON THE

IMPORTANCE OF EARLY DIAGNOSIS
WITH A VIEW TO SUCCESSFUL
TREATMENT.

DELIVERED BEFORE THE WESTMINSTER DIVISION OF THE
METROPOLITAN COUNTIES BRANCH OF THE
BRITISH MEDICAL ASSOCIATION,

BY A. W. MAYO ROBSON, D.Sc., F.R.C.S.

MR. PRESIDENT,—May I express the pleasure it has given me to be the guest of the Westminster Division of the British Medical Association, and the great honour I feel in being invited to open one of your clinical debates?

The proposition I wish to consider is, Are there not many cases seen by all of us (but especially by those who are acting as the regular medical advisers to their patients) in which the early symptoms, though definite and pronounced enough to enable a diagnosis to be made, are treated by palliative remedies simply for the relief of symptoms, and only at a later stage, when disabling conditions have developed or dangerous complications have ensued, is the importance of radical treatment insisted on? Some of these cases are such as could be easily cured by medical and general treatment carried out thoroughly, and with a set purpose, if the disease were recognized at its onset; in others, after medical treatment had failed to cure, surgical measures adopted at an early stage could be undertaken with hardly any risk, whereas if left until serious complications have supervened, operative treatment, then absolutely necessary, can possibly only be carried out with considerable danger to the patient and great anxiety to the relatives and to the professional attendants.

The blame for procrastination when a diagnosis has been made and absolute rest or rigid diet or other radical treatment advised must often be laid at the door of the patient or the friends, though we cannot always exonerate ourselves from tacitly sanctioning it; for as a rule our patients are prepared to place confidence in our knowledge and

judgement and to be guided by us if we are definite in our opinion, and especially if in consultation we are in agreement.

Much of the blame undoubtedly lies in a reliance on the traditions of the past, when means of making a diagnosis were less exact, when more faith was placed in treatment by drugs, and when operation yielded such results that the physician and the general medical attendant were very properly averse to invoke the aid of surgery, either for purposes of diagnosis or for radical treatment.

Lest we might possibly run the risk of alarming our patients, I fear we are sometimes apt to reserve the many new means of diagnosis, such as an exhaustive pathological examination and examination by instruments of precision, to the later stages of illness, and not to place that reliance on them in the early conditions which daily experience shows they are worthy of being credited with—for instance, the early use of the sigmoidoscope where rectal examination by the fingers is negative, the employment of the *x* rays in obscure abdominal and thoracic conditions, a more thorough examination of the excreta and of the blood by a skilled pathologist, and many other means that involve the consent or even the co-operation of the patient.

It is quite unnecessary to dwell on the dangers of procrastination in the more obvious surgical conditions, such as strangulated bowel, perforative peritonitis and other similar catastrophes, where delay is well recognized to be dangerous, but I wish to draw attention specially to the disadvantages and dangers of procrastination, both in the diagnosis and in the treatment of that large class of diseases on the borderland of medicine and surgery, where a too prolonged medical treatment, quite capable of affording some relief, lulls the patient into a false sense of security.

DUODENAL ULCER.

Among this class let us first consider duodenal ulcer, now recognized to be a common ailment, often attended with the dangerous complications of haemorrhage and perforation, both of which accidents demand surgical treatment under most unfavourable conditions.

I want to ask the question why we should wait for these serious catastrophes before making a diagnosis and radically treating the condition, seeing that the symptoms of duodenal ulcer (pain three to four hours after meals, relief by taking food or by taking alkalis, pain recurring regularly in the night or in the small hours of the morning, flatulency, tenderness over the duodenum, rigidity of the right rectus and frequently the presence of occult blood in the motions), are so characteristic as to enable an early diagnosis to be made with almost absolute precision. Moreover, the disease in the earlier stages is curable in a large percentage of cases by medical and dietetic treatment alone, whereas if left until numerous relapses have occurred or complications have supervened, it can only be treated radically, by operation.

As soon as it is seen that medical treatment has failed to cure, or failed to prevent relapses, why should we wait until haemorrhage or perforation demands surgical treatment, when at an early stage the operation of gastro-enterostomy should prove curative with a modicum of risk—speaking not only from my own but from the experience of several other surgeons—of hardly over 1 per cent.?

CHOLELITHIASIS.

I would next draw attention to cholelithiasis, which until comparatively recent times was considered a painful malady, seldom or never attended by danger, the numerous serious and fatal complications to which gall stones give rise being apparently ignored.

In an experience approaching 1,000 operations on the biliary tracts, in many of which I have had to perform extremely difficult and dangerous operations on patients in the last stages of illness from deep jaundice, infective cholangitis, persistent vomiting, suppuration in the gall bladder, perforation of the bile ducts, or exhaustion from repeated attacks of pain, it has been more and more driven home to my mind how much better it would have been had operation been advised at an earlier stage, when surgical treatment would have been quite simple and the probability of recovery approaching 99 per cent., arguing not only from my own but from the experience of others, both at home and abroad.

Under ordinary circumstances, nothing can be simpler than an operation performed for gall stones on a normal-sized or slightly distended gall bladder, before the concretions have entered the common duct, and before the anatomy of the parts has become completely disarranged by adhesions and contractions, and before serious complications, both local and general, have manifested themselves.

Not least among the dangers, if concretions are allowed to remain, is that of malignant disease. It is well recognized that chronic irritation is one of the most potent causes of cancer, and the constant irritation of gall stones is in this respect a danger that cannot be ignored.

I have operated on many cases of cancer of the gall bladder and bile ducts and in a very large proportion have found gall stones. Zenker found gall stones present in 85 per cent. of cases of cancer of the gall bladder, Musser in 69 per cent., Courvoisier in 74 out of 84, Jaile in 23 out of 30, Bertrand in 14 out of 15, Siegert in 95 per cent., and Brodowski in 100 per cent. of all cases examined. These facts cannot be ignored, and point so strongly to gall-stone irritation producing primary cancer of the gall bladder and liver that I think it ought to have weight with us in advising on the early diagnosis and surgical treatment of cholelithiasis.

Were the recognition of gall stones a difficult matter there would be much to say in favour of delay; but seeing that with comparatively few exceptions cholelithiasis may be recognized, even in the earliest stage (by the digestive symptoms with which it is associated, by attacks of discomfort in the epigastrium even before the characteristic symptoms are felt, by the irregular pain radiating round the right side to the shoulder blade, by the tenderness in the gall-bladder region, and by a careful pathological examination of the excreta, not for gall stones but for signs of disturbance in the upper bowel and the pancreas—which are nearly always associated with early cholelithiasis), there can be little excuse for a failure to diagnose the condition. As soon as the later characteristic pains supervene, there is, of course, no need to wait for jaundice or the more serious manifestations in order to recognize the cause.

Here again medical treatment is capable of affording great relief. This it does not by causing dissolution of gall stones, but by relieving the catarrh and inflammatory conditions that are associated with them; but it does not remove the disease, and sooner or later patients who have been tided over the early manifestations develop complications of one kind or another that demand surgical treatment at a later stage and under much less favourable conditions. I have seen many such cases in which a diagnosis of gall stones had been made years before, but the relief of symptoms had put the patient in a fool's paradise, and only later, when serious complications had supervened or possibly cancer had developed, was the folly of delay made manifest. I proved many years ago—and an extended experience has further confirmed my observations—that the removal of gall stones can be undertaken at an early stage with hardly any risk, if the simple operation of cholecystotomy can be performed, but when the more formidable operations of choledochotomy, cholecystectomy, and other procedures have to be undertaken in the presence of jaundice, infective cholangitis or other serious conditions, the simplicity and safety of operation can no longer be urged.

CARCINOMA OF THE STOMACH.

This is one of the diseases which, if caught in an early stage, can be cured in a considerable proportion of cases. Unfortunately it is difficult of diagnosis in an early condition. No one has done more than Professor Osler to advocate an early diagnosis of cancer of the stomach, if needful by an exploratory operation, in order that radical treatment may be carried out at a time when there is a hope of cure; and if only this truth could be impressed on those who see these cases in an early condition, at a time when the symptoms are merely those of dyspepsia, and if, in such doubtful cases, a consultation were insisted on, so that the matter might be taken seriously at the earliest possible moment, we should find that much could be done for these otherwise hopeless cases.

When so little was possible from either medical or surgical treatment, the early diagnosis was of little moment

from a practical point of view, but now that surgery has proved it possible to remove cancer of the stomach, when seen early, before a tumour or other pathognomonic symptoms have developed, the importance of an early diagnosis cannot be too strongly insisted on. There is ample evidence to show that for some length of time cancer is purely a local disease, and just as in the breast, the tongue, and the uterus we can point to patients living comfortable and happy lives many years after the removal of the disease, so in gastric cancer it is reasonable to estimate, and, in fact, can now be proved by positive evidence, that a like result may be anticipated.

Whenever a patient at or after middle age complains somewhat suddenly of indefinite gastric uneasiness, pain, and possibly vomiting, followed by loss of weight and energy, especially if associated with anaemia, the possibility of cancer of the stomach ought to be entertained, and if no improvement takes place in a few weeks at the most, an exploratory operation is more than justified, and ought to be more frequently advised and carried out. Although a chemical examination of the stomach contents and a general examination of the patient may give strong grounds for suspicion, our diagnosis can often only be rendered certain by a digital examination, which may be effected through a small incision, that can, if needful, be made under local anaesthesia, and that without more risk, if in an early stage, than ordinarily attends the administration of an anaesthetic. I can point to patients living and well from whom I removed cancer of the stomach so long as eight or more years ago, and many other surgeons can give similar experiences.

Even at a later stage, supposing a diagnosis has not been made until a tumour has developed, operation is worth performing, as relief can be given and life prolonged by the operation of gastro-enterostomy. I am, moreover, firmly convinced that many deaths are ascribed to cancer when the disease is inflammatory, and perfectly curable by gastro-enterostomy without removal of the tumour; and did time permit of it I could relate a number of instances in which I have done this operation, because I thought the tumour of the stomach, which I believed to be cancer, was too large and too extensive to remove, in which the patients have made a complete and permanent recovery and are perfectly well now, years after operation.

Although there is no pathognomonic symptom of early cancer, the absence of free HCl in the gastric contents after a test meal is suspicious, as is also the presence of albumose in the urine, of blood in the faeces, and of Salomon's test—the finding of a certain amount of albumen in the stomach contents some hours after it has been thoroughly cleared by lavage.

SIMPLE ULCER OF THE STOMACH.

This is another disease I would specially mention, as if diagnosed early and treated radically at first it is quite curable by medical treatment in a considerable proportion of cases, whereas if merely treated palliatively the disease is almost certain to relapse and to become chronic.

Only last week I operated on a lady who had suffered from stomach symptoms continuously for twenty years, during which time she had had every imaginable form of treatment. At the operation I found, as suspected, a large chronic ulcer along the lesser curvature of the stomach, which had led to a marked hour-glass contraction. This is a good example of many similar cases that I have seen, in which the patients, after suffering and being treated year after year for symptoms, which no amount of medical treatment could possibly cure, have had at last to submit to operation or to lose their lives. Had the disease in this case been diagnosed in an early condition and thoroughly treated by diet and rest, she might have been saved these twenty years of suffering.

Leube has shown that at least one-half to three-quarters of all cases of ulcer will be cured by early medical treatment, but if they are not cured in that time they will not be cured by medical treatment alone.

The more recent observations made at the London Temperance Hospital by Mr. Paterson and Dr. Rhodes on 158 consecutive cases, under the care of Dr. Soltan Fenwick and Dr. Parkinson, are still more striking, showing that the proportion of real cures in cases of confirmed chronic ulcer, even after prolonged treatment by diet and rest in hospital, is under 25 per cent. I have elsewhere

given my views on this subject, and shown how safe and successful surgical treatment is—the risk, for instance, of gastro-enterostomy being very little over 1 per cent. But what I plead for now is an earlier recognition of the condition, so that adequate medical treatment may be applied in time, in order to save the necessity of having to appeal to surgery.

The symptoms of gastric ulcer are so well known as to need no further description now, and the serious complications of perforation, haemorrhage, hour-glass contraction, cicatricial stenosis, gastric dilatation, extensive perigastritis, perigastric abscess, inflammatory tumours, fistula, and others that could be mentioned, only go to prove how serious for the patient the want of early diagnosis and of radical treatment have been. Moreover, it is now clearly and definitely proved that chronic irritation due to long-continued ulcer is an undoubted cause of cancer, which complication might be prevented by an early diagnosis and treatment.

My conclusions are not the vain thoughts of mere imagination, but have come as the result of an experience approaching 1,000 operations of one kind or another on the stomach.

OVARIAN TUMOUR.

To pass to an entirely different subject. I have operated some hundreds of times for large ovarian tumours, and many times with serious complications. The question has often crossed my mind during the operation, Why should these cases have been allowed to go on so long before being submitted to operation, when no amount of medical treatment could have done an atom of good, and they could have been recognized in their infancy by a bimanual examination, and removed with almost absolute certainty of recovery before any complications had supervened? Here an early diagnosis and early treatment would have saved the danger of suppurating cyst, twist of the pedicle, ruptured cyst with general peritonitis, and many other complications that are apt to supervene at all stages of this disease.

CANCER OF THE UTERUS.

So much has been written recently on the importance of the early diagnosis and treatment of cancer of the uterus by an examination of all cases of irregular intermenstrual bleeding or post-climacteric haemorrhage that the subject need not be further dwelt on; nor is it necessary to labour the question of a careful examination of the rectum, if needful by the sigmoidoscope, in cases of rectal discomfort or haemorrhage in middle or advanced life in order to recognize and treat cancer in that region at the earliest possible moment.

DIAGNOSIS OF THE CAUSE OF JAUNDICE.

Although I should have liked to insist on the importance of an early diagnosis in appendix trouble and the desirability of absolute rest, of absolute starvation, and of the avoidance of the routine aperient in all cases of abdominal colic until a diagnosis of the cause has been established, by which many operations in the acute and dangerous stages might be avoided, and although I should have liked to dwell on the early diagnosis of cancer in various positions in order that a timely radical operation might be done, I must omit them for want of time, and I will only give one more example, and that is the symptom of jaundice and the early diagnosis of the cause with a view to successful treatment.

The onset of jaundice after 35 to 40 years of age is an important event that may herald a condition which will slowly yield to general treatment, which may demand operative treatment for its cure, or which may prove to be incurable. To treat such cases simply as catarrhal jaundice after medical treatment has been pursued for two or three weeks without relief, is to my mind unjustifiable procrastination.

Careful clinical and pathological investigation is therefore, from my point of view, incumbent on the medical attendant at a much earlier stage than is often considered necessary, as on the diagnosis will depend the treatment.

As I have recently given my views on the subject at some length before the North London Medico-Chirurgical

Society in a paper which has been accepted for publication, I need not enter at length into the various causes.

Gall stones in the common duct should be readily diagnosed, with few exceptions, by the previous history and by the attacks of pain, followed by an increase of jaundice, frequently associated with symptoms of infective cholangitis, and, as soon as diagnosed, I think they ought to be removed by choledochotomy before more serious complications supervene.

Jaundice of painless origin is seldom due to cholelithiasis, but, if due to interstitial pancreatitis, it may be diagnosed by a careful examination of the excreta, and by the discovery of the pancreatic reaction in the urine and the presence of urobilin, and by the discovery of an excess of neutral fat in the motions, and the evidence of an incomplete obstruction of the common duct as shown by the presence of stercobilin in the faeces. In many such cases, medical and general treatment, thoroughly carried out, will bring about relief or cure; but if the obstruction is persisting after a month, or at most six weeks, of treatment, the question of exploratory operation ought to be considered with a view to removing the cause, if that be possible, or of short-circuiting the obstruction where the cause cannot be taken away, for it is to be borne in mind that the circulation of bile in the blood tends to its deterioration, and to the production of a hæmorrhagic tendency, which makes later operations more dangerous, whereas an early operation can be done with very little risk and a probability of recovery in 97 or 98 per cent. of cases.

If the clinical and pathological examinations give rise to a strong suspicion of cancer of the pancreas or of the common bile duct I would still advise exploration before the more advanced blood changes and changes in the liver owing to biliary congestion render even an exploratory procedure a matter of some anxiety and danger; moreover, it is a fact that a short-circuiting of the gall bladder into the duodenum has been followed by cure in quite a number of cases in which both my medical friends and I thought the disease to be undoubtedly malignant; but in any case, even if really malignant, relief to the distressing symptoms of jaundice may be given by a cholecyst-enterostomy and will be gratefully appreciated by the patient.

Were it necessary further to illustrate my proposition, it would be easy to give further examples of diseases in which an early diagnosis is of vital importance to successful treatment both medical and surgical, but where the mere treating of symptoms and a delay in making an exact diagnosis necessarily postpones rational treatment until the disease may be too advanced to yield to general and medical measures or possibly even too serious for relief by surgical treatment except at a greatly increased risk.

It was announced in the JOURNAL of January 23rd that an anonymous benefactor had given £20,000 to the London Hospital Medical School, with the express stipulation that the interest accruing therefrom should be applied solely in furtherance of medical research. We learn from the *London Hospital Gazette* that the fund has been placed in the hands of the London Hospital Medical College Endowment Fund, Mr. Douro Hoare, the Hon. H. L. W. Lawson and Sir Frederick Treves, whilst the administrators are the Honourable Sydney Holland, Dr. Bertrand Dawson, and Dr. Henry Head. Although the administrators will be responsible for the manner in which the income of the fund is to be disbursed, they will invite the heads of departments to express their views, and will be ready to consider the claims and suggestions of individuals. The donation will form the nucleus of an endowment fund which, according to the scheme set forth in the prospectus, will be applied for the following purposes: (1) To secure the maintenance of the London Hospital Medical College in full efficiency and equipment, so far as buildings, laboratories, and apparatus are concerned, for the investigation of disease and its treatment, with a view to the lessening of human suffering; (2) to secure for the college the services of teachers and investigators of the highest standard; (3) to improve medical education generally; (4) the liberation of the college from its existing debt, which has been contracted in attempting to carry out these objects. The sum required for these purposes will be at least £150,000.

The Morison Lectures

ON THE

PATHOLOGY OF SYPHILIS OF THE NERVOUS SYSTEM IN THE LIGHT OF MODERN RESEARCH.

[With Special Plate.]

DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS,
EDINBURGH, JAN. 25TH, 27TH, AND 29TH, 1909.

By F. W. MOTT, M.D., F.R.S., F.R.C.P.,

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LECTURE I.

MR. PRESIDENT AND FELLOWS OF THE COLLEGE.—Allow me to thank you for the great honour of having been invited to give the Morison Lectures in this ancient College of a city so long renowned as a great seat of medical science and learning.

In considering the general pathology of syphilis of the nervous system, it is not necessary to refer to the different bacterial and other organisms which have been described by various authorities as being the specific agent in the production of the lesions characteristic of this disease before the discovery of the *Spirochaeta pallida* by Schaudinn. This organism, whether it be, as its discoverer believed, a protozoon or a bacterium or micro-organism between a protozoon and a bacterium, is regarded as the specific organism of syphilis by those best competent to judge—namely, Metchnikoff, Hoffmann, Neisser, Levaditi, Bertarelli, Shennan, and many others. Metchnikoff and Roux were the first to demonstrate experimentally the communicability of syphilis to animals, and to show that the nearer the animal approached to man the more the disease approached in its characters and virulence the human form of the malady. Thus, although other animals, especially apes and anthropoid apes, have been successfully inoculated, the chimpanzee alone reproduces with absolute certainty the human symptomatology. This is as we should expect, for the blood precipitin reaction of this anthropoid approaches most nearly that of man. The experiments of Neisser, Hoffmann, Bertarelli, Levaditi, and numbers of others have confirmed this important discovery, and many new facts have been added to our knowledge of the general pathology of syphilis by experiments on apes and other animals, and I would mention in particular the important discovery by Bertarelli that he was able to inoculate the spirochaete into the cornea of the rabbit and transmit it through a series of such animals. Levaditi has experimented successfully with the cornea from one of these animals, and not only transmitted it through a series of rabbits, but used the cornea infected with spirochaetes to produce an infection of the eyelid of an anthropoid ape. Lastly may be mentioned the important observations upon the bio-chemical changes in the fluids of the body by the Wassermann-Neisser-Brück method of serum diagnosis. Upon this tripod, of the discovery of the specific spirochaete, the communication of the disease to apes, and the serum diagnosis, a vast amount of most valuable work rests; the tripod is mutually supporting, and every day fresh evidence is forthcoming to strengthen the opinion that the true cause of syphilis has been discovered; that, although as yet no vaccine has been successful, this is no longer a hopeless outlook; and, lastly, a most valuable means of diagnosis of syphilis and parasyphilis has been obtained.

THE MICROBIOLOGY OF SYPHILIS.

The *Spirochaeta pallida* examined in fresh preparations is seen with much greater difficulty than other coarser spirochaetes which may exist in the primary sores on the genitals or secondary papules of mucous surfaces. Hoffmann states, in order to find them, seek the edges of red blood corpuscles, to which they often are seen to be attached by one end (a process of chemiotropism). It is barely $\frac{1}{2}\mu$ thick, and possesses on an average 8 to 12 very regular, narrow, and very steep coils, the height of which at the ends diminishes somewhat (vide Figs. 1, 2, 3, 4 in Plate). The length of this corkscrew-like organism varies within wide limits, from a few up to