In considering how these various facts bear upon the connection between chemical constitution and physiological action, it is no doubt essential to remember that a change of composition as well as of constitution has been produced by the conversion of the nitrile into the ammonium bases. In the substances examined by Dr. Brown and myself, the composition of the original alkaloids was changed by adding to them a salt of methyl. Are, then, the subsequent changes of physiological effects produced by the action of the added salt of methyl? This hypothesis is so improbable as scarcely to deserve consideration. It is opposed by the experiments made with iodide of tetra-ethyl-phosphonium, to which I have already alluded; for this, also, is the salt of an ammonium base, which, however, differs greatly in composition from any of the substances examined by Dr. Brown and myself, although it exerts the same physiological action. It is opposed, also, by the results of experiments with conia and its derivatives; for the hydrochlorate of the nitrile base (methyl-conia), formed by the addition of hydrochlorate of methyl to the imine base (normal conia), exerts, notwithstanding this addition of methyl, a more marked spinal-stimulant action than normal conia, into whose composition methyl does not enter; while the salts of the ammonium base di-methyl-conium have a prominent curara action, and no spinal-stimulant action whatever. Besides, the action of iodide of methyl itself does not give the least support to this idea—for its effects are those of a powerfully irritating substance, and its action, even when induced by subcutaneous injection, results in inflammation of the bronchial mucous membrane and coma, and not in paralysis of motor nerves.

It might also be asked, if the processes by which these ammonium bases are prepared do not so profoundly modify the chemical nature of the alkaloids from which they are derived, that no actual relationship exists between the new substances and their original sources; that, for example, sulphate of methyl-strychnium, though derived from strychnia, is in no special manner related to sulphate of strychnia—the elements of the latter substance having been so disarranged in its conversion into the former, that the strychnia has been altogether destroyed. It is, I think, a sufficient answer to this conjecture to point out that the ordinary colour reactions of the alkaloids are retained by their methyl derivatives.

Gentlemen, the various facts which, in a somewhat discursive manner, I have now brought before you, confirm the opinion that chemical composition bears some relation to the physiological action of active substances, and they also prove that this relationship is to an important extent due to the arrangement of the atoms in the substance. They appear, likewise, to point to the conclusion that physiological action is often, if not always, the result of a chemical reaction between the foreign body and certain of the constituents of the vital structures whose action is modified by it. The results of investigation with such substances as carbonic oxide, show, indeed, that physiological action may be chiefly the result of chemical reactions. The effects of other substances have not been connected with chemical action in so direct a manner, but this is to a great extent explainable by the difficulties attending the demonstration of a connection of this kind. Although experimental research, in many cases, has discovered the exact histological elements which are acted upon, the chemical characters of these elements have not yet been sufficiently ascertained. We have no means of determining their normal conditions with the delicacy that is required, and we are, therefore, unable to investigate the chemical reactions that almost certainly accompany modifications of their normal physiological condition during the operation of active substances. Thus, although we know that the normal physiological condition of the terminations of motor nerves are modified by the salts of the ammonium bases derived from strychnia, brucia, thebaia, etc., and that this modification is produced by substances that have definite chemical properties, we cannot discover what chemical change is produced so long as we are ignorant of the special chemical properties possessed by these structures. The trustworthy observations of Kühne have shown that a recognisable change occurs in the physical characters of the nerve terminations—a change which renders their outlines more distinct; but we are unable to connect this change with any definite chemical reaction. In the course of time, reactions of a more delicate kind than any we yet possess will, no doubt, be discovered, not only for these structures, but likewise for each of the special structures on which the physiological action of active substances is localised. Physiological investigation has shown that one substance may chiefly exert its influence upon the cardiac inhibitory ganglia, another on the nerve-fibres intermediate between these ganglia and the ends of the vagi nerves, and another on these endings themselves. How are these localisations of action to be explained? There must undoubtedly be a difference between the chemical properties of each of the structures influenced. The discovery of the spectroscopic characters of hæmo-

globin has greatly extended our knowledge of the action of such substances as carbonic oxide, by placing at our disposal a means of defining the chemical reactions that take place between it and the blood. In giving expression to the anticipation that similarly delicate tests of chemical reaction will yet be discovered for each of the special histological elements of the body, I do not think that we err by being too sanguine. Were such means of investigation at our disposal, it may safely be predicted that knowledge would be acquired of as perfect a kind as is indicated in the following quaint sentence, written by Locke: "Did we know the mechanical affections of the particles of rhubarb, hemlock, opium, and a man, as a watchmaker does those of a watch, whereby it performs its operations; and of a file, which, by rubbing on them, will alter the figure of any of the wheels, we should be able to tell beforehand that rhubarb will purge, hemlock kill, and opium make a man sleep." It is encouraging to find that even now we know of certain "affections of the particles" of active substances which enable us to tell beforehand that, wherever these affections occur, well defined and characteristic physiological effects will be produced.

CLINICAL LECTURES

ON

MENTAL AND CEREBRAL DISEASES.

By J. CRICHTON BROWNE, M.D., F.R.S.E.,

Medical Director, West Riding Asylum; Lecturer on Mental Diseases to the Leeds School of Medicine; etc.

III.—SIMPLE MELANCHOLIA.

GENTLEMEN,—You will recollect that, at your last visit to the wards, I called your special attention to the case of Jane S., as being, in many respects, a typical example of a form of mental derangement about which I should have to speak to you to-day. You will remember that this woman was an inmate of Ward 25, to which she was admitted on the 31st of May last, just a fortnight ago, being returned as twenty-eight years of age, single, and a domestic servant, from Bradford. The history of the case, which I read to you, was as follows. Jane S. is a native of Scotland, but has been resident in Yorkshire for five years. Her mother's brother was once insane and an inmate of an asylum; but, with that exception, no member of her family has ever suffered from mental or nervous disease. The patient herself has had no serious illness nor cranial injury, and has always been of sober habits. On the 1st of May last, she gave birth to an illegitimate child. Her fall from virtue had preyed much upon her mind during her pregnancy; and the depression of spirits thus occasioned deepened considerably at the time of her confinement, when she was in poor lodgings and could not command liberal nourishment or careful nursing, and passed into morbid despondency three days after delivery, when the unexpected announcement of her father's death reached her. She at once formed the idea that her father (who was a very aged man, and really died in the course of nature) had been killed by the shame of her misfortune. She sank into a state of inconsolable grief, wept incessantly, was sleepless, and twice attempted to put an end to her existence and sorrow by jumping through the window. After this she refused all food, complained of insupportable misery and weakness, and repeatedly threatened suicide; so that, for her own protection, she was sent to this asylum. After reading this history, as you will recollect, I introduced you to the patient—a thin, pale, careworn-looking woman, whom you found seated in the day-room, with her head bowed down, and her hands crossed upon her lap, in an attitude of listless dejection. Her features were fixed in an expression of mental suffering, the angles of the mouth being drawn down, and the corrugators of the upper eyebrows being firmly contracted. When I spoke to her, she answered slowly and with evident reluctance, turning away from me, as if shrinking from observation and seeking solitude. In reply to my repeated questions, however, she told me that she was quite wretched, and tired of life, and that she had nothing to look forward to but death. She added that she had killed her father by her conduct, and had no affection for her child, so that she did not care if she never saw it again. Her answers must have satisfied you that she was perfectly intelligent—she at once apprehended the meaning of all that was said to her; that her memory was good—she accurately recalled all the facts of her past history which had been communicated to you; and that no delusion existed in her mind—she repudiated several delusive beliefs which I suggested to her. The nearest approach to a delusional state of mind which she

exhibited was in the tendency to exaggerate all the transgressions and peccadillos of her past life, and their consequences, which she from time to time displayed. Not only had she killed her father, but she had perhaps shortened her mother's days by her levity as a girl, and brought on the fever which carried off her youngest sister by a beating which she had once given her. She was so miserable, she said, that she had no anxiety about her soul; but she dreamt sometimes that she was in flames of fire, and then started up alarmed. The nurse who was in attendance upon Jane S. added to her statement, for your information, that she could not be induced to employ herself; that she sometimes refused her food; that she was "lowest" in the morning, and brightened up as the day advanced; that she had sometimes "attacks of crying"; and that she slept badly. A physical examination of the patient, which, as you will remember, was then made, showed that she was greatly emaciated and anæmic. Her pupils were widely dilated; the mucous membrane of her mouth was pale and sanguine; her muscles were soft and flaccid. The lungs were healthy, but there was a soft systolic murmur at the base of the heart. There were a slight white fur on the tongue, and a leucorrhœal discharge from the vagina. I closed our bedside consideration of this case by describing to you the treatment adopted, upon which I shall not at present enter again, by predicting that complete restoration to mental and bodily health would take place within three months, and by telling you that it was a well marked example of simple melancholia, which we should more fully discuss to-day.

Now, I am very anxious that you should become practically familiar with simple melancholia in all its relations, and should be able to deal with it successfully. Most of you are destined to engage in general practice, and it is in general practice that this disorder most frequently presents itself. It does not, as a rule, come under the cognisance of the alienist physician, unless it be peculiarly intense in character, or until it is on the point of developing into a more pronounced variety of mental aberration. If you wish to utilise to the greatest extent your studies in this asylum, you will give the closest attention the simplest and most elementary forms and initial stages of insanity, and to the earliest deviations from mental health. A knowledge of these will avail you more hereafter, than the most intimate acquaintance with the pathological anatomy of general paralysis. You will discover in your after-life that your observations upon those great cases—those ovarian tumours and thoracic aneurisms which now, perhaps, chiefly interest you—are of comparatively little practical use to you, and that your professional reputation depends far more upon your management of indigestion and chronic bronchitis than upon your skill in diagnosing an obturator hernia. And so it is with reference to mental ailments. For one case of acute mania that you will be called upon to treat, you will encounter ten of slight anomalous conditions of mental excitement and agitation. For one case of acute melancholia, you will have ten of simple melancholia, or mental dyspepsia, as I sometimes call it. I hope you will not misunderstand me, and suppose me to advocate a partial education, or to underestimate the value of a striking and impressive case. I am far from desiring to do so. I only wish to caution you against an exclusive or excessive attention to rare diseases, to the neglect of common maladies; and to secure your heedful consideration of that unfortunately very common mental malady which I am to describe to you to-day.

Of the extent of simple melancholia in its milder forms no estimate can be formed, because very often it runs its course, even to a disastrous end, without being recognised as morbid. Some circumstances, however, indicate that it is of very common occurrence. Cases of developed melancholia are being constantly admitted into our asylums, and of these a large proportion have originated in simple melancholia, and have grown out of it just as pneumonia may grow out of a neglected cold. There are above 1500 suicides in England and Wales annually, and for a very large number of these simple melancholia is undoubtedly responsible. The "fatal act", as it is termed, is but the last and crowning symptom of a mental disorder which most generally stops short of such an issue. And thus the "rashly importunate" victims of simple melancholia, who "take arms against a sea of troubles," are but a meagre representation of the multitudes who suffer from it in silence and patience. Even the hundreds of cases of self-destruction in which it is revealed, at inquests, that depression or lowness of spirits had been noticed for some time previously, give but a faint and inadequate idea of the wretchedness, bitterness, and anguish due to this disorder, and constantly prevailing around us. The confessions of the consulting-room perhaps afford the best criterion for measuring the extent of simple melancholia; and these indicate that it is broadly diffused, and that it often affects those who are little suspected of mental infirmity.

In what, then, does this frequent and distressing disorder consist?

Essentially, in a state of mental pain; in a vague feeling of anxiety, gloom, and depression; in indifference to the ordinary interests of life; and in the lack of all hope in the future; or in positive fear and trepidation. Those who suffer from it labour under an indefinite despondency, which they can neither shake off nor explain: with Antonio, they may say, "In sooth, I know not why I am so sad." They are rational and intelligent; they labour under no delusions; and yet they are aware of a change in their moral nature, of a tormenting self-accusation and poignant grief, and of a difference in their mode of contemplating the objects of existence and of external nature. How, then, does this state, called simple melancholia, differ from that depression to which healthy men are subject when bereft of an object of affection or overtaken by any calamity? The distinction is important, and is not always easily drawn, as simple melancholia not rarely originates in the normal emotion of sorrow or in reasonable apprehension of coming evil. When fortune has been sacrificed, when honour has been lost, when the support of some main-stay of existence has been taken away, a bitter sense of helpless, cheerless privation and misery takes possession of the mind. But, in the ordinary course of events, this misery becomes abated, the pangs of grief are mitigated, consolation is felt, and new interests and aspirations are awakened. Sometimes, however, this is not so. The grief is protracted and deepened, and will not be comforted. A state of unyielding moody misery becomes habitual; in fact, simple melancholia is established, and medical treatment is requisite. The same transition from healthy to morbid feeling may be noticed in other directions. The natural regret which an evil action or a wicked and lawless career entails in a sensitive mind may be prolonged into diseased compunction and remorse. Wordsworth tells us that Peter Bell

"Forsook his crimes, renounced his folly,
And after ten months' melancholy,
Became a good and honest man."

He suffered an attack, and a well merited attack, of simple melancholia. Now, where is the line to be drawn between healthy grief and its morbid continuation? How is simple melancholia to be distinguished from natural depression? In a variety of ways. In the first place, simple melancholia is disproportionate in its degree and duration to the grief or calamity with which it is connected. A man who is cast down in spirits because he has committed a great fraud is suffering a healthy reaction of feeling; but another man, who is equally dejected because he has appropriated two pins which he found on the floor of a neighbour's house, is obviously deranged. A mother who is in passionate affliction because she has just lost a child, is only displaying natural feeling; but another mother, who is equally distressed because she lost a child three years ago, is giving way to morbid melancholy. In the second place, simple melancholia may be distinguished by its intractability and independence of external influences. In ordinary grief, the mind may be diverted for a time from the contemplation of its misery, and is not incapable of amusement nor of social pleasure. But in simple melancholia, the attention is riveted to painful impressions and can scarcely be attracted by outward allurements. At our entertainments here, you will see melancholics sitting forlorn and self-absorbed in the midst of mirth and merriment. In the third place, simple melancholia is in many cases distinguished from healthy grief by its periodic exacerbations and remissions. Of course, all feeling is subject to fluctuation, and grief is more intense at one time than at another. When, however, persistent grief is acutely aggravated, at a fixed hour two or three times a day, without anything at these hours specially to recall its original source—or when mental disquietude regularly alternates with mental tranquillity—then there are good grounds for believing that it has assumed a morbid type. You may see now, in Ward 25, Mary F., aged 27, who is usually in a state of quiet sadness, but who springs up suddenly about mid-day, and six in the evening, and once during the night, wrings her hands, sobs and cries piteously for a half-an-hour, and then subsides again into silent suffering. This woman has good cause for grief. Refined and educated above her station, she was ill-treated by her husband and his relatives immediately after her marriage, and was subjected to a horrible outrage in the Liverpool Docks, where she was taken one night and left, it is believed with the foulest intentions. She may well feel wretched and forsaken; but the diseased nature of her despondency is clearly indicated by its paroxysmal character, to which I have adverted, as well as by other signs. In the same ward, you may observe Jane C., who has what might be called quotidian attacks of depression. She has a good day and a bad day alternately. On the latter, she is in the depths of despair about nothing, and generally tries to hang herself; and on the former, she is moderately composed and quiescent. In the fourth place, simple melancholia may be distinguished from ordinary grief by the impairment of voluntary power,

which almost invariably accompanies it. He who is distressed by any mournful or vexatious occurrence is not deprived of resolution and the power of decision; but he who is distressed by cerebral disorder is so deprived, and is reduced to a state in which he hesitates and doubts about every trifling action, or in which he is indisposed for any exertion, and is dull and torpid. This paralysis of will is very remarkable and pathognomonic in simple melancholia. The sufferer is unable to make up his mind on any subject. He stammers for ten minutes over the opening and closing of a door; or he is so inactive that he will not move about unless obliged to do so. Determination and firmness are shown only in one direction, and that is in the way of efforts at "shuffling off this mortal coil." In the fifth place, simple melancholia is distinguished from ordinary grief by certain accessory symptoms; which, although not constant, are present with sufficient frequency to constitute them valuable aids to diagnosis. These accessory symptoms, which are both mental and bodily, and which are necessary to a complete picture of simple melancholia, we shall next consider.

Of the accessory mental symptoms of simple melancholia, irritability of temper is perhaps the most general. The isolation in which his misery places him; the scant sympathy which his fictitious but to him terribly real sufferings, obtain, render him who labours under this disorder, either irascible or morose according to his inherent disposition, if indeed, his misery is not so vast as to overwhelm all other feelings. Particularly where the cankering care is concealed—where the sorrow is hidden in the sufferer's own breast, as it sometimes is at its commencement, does this tendency to irritability display itself. I have known cases in which unaccountable outbursts of passion, with singular capriciousness and perversion of affection, have been remarked before it was discovered that a consuming melancholy was preying on the mind. It is important you should understand that when irascibility and extreme fretfulness are present in simple melancholia, the tendency of the disorder, if it be further developed, is to pass into acute melancholia.

At any part of the progress of simple melancholia, morbid impulses may start into existence. Commonly, however, the disorder has existed for some time before these come to the surface, and I cannot recall any case in my own experience in which such impulses were the first symptoms observable. They have always been preceded by depression, so severe and peculiar, as to be recognised as morbid. But at whatever time they occur, they are hostile and destructive in character. They may be directed against the individual himself, for it is unquestionable that suicide, although much more frequently the deliberate consequence of disgust with life, or a convulsive throes of insupportable agony, may also result from an impulsive and almost reflex spasm. More frequently, however, they are directed against others or against inanimate objects, leading to homicidal attempts, or to the smashing of glass, or rending of clothing. Suddenly, without provocation, an act of violence is perpetrated upon some one, who is, perhaps, loved and cherished, or property which can be ill-spared is reduced to ruin. Several cases in which such impulses have arisen during simple melancholia are now accommodated in this hospital. Let me quote to you as an apt illustration that of Charles F., Ward 2, who is fifty-eight years of age, and a coal-miner from Tadcaster. This man was admitted, for the first time, on the 1st of April of the present year. A strong hereditary tendency to insanity must have resided in him, as his father and sister have both been inmates of an asylum. Another sister died of phthisis; he himself, however, was always sound-minded and robust until nine months prior to his admission here, when he was severely burnt on one arm. The burn healed satisfactorily, but he was confined to the house by it for eleven weeks, and seems to have been greatly annoyed by his enforced idleness. Whenever he resumed his work he began to be low-spirited, and has been so at intervals ever since. The depression has increased upon him, but he has never had a delusion of any kind, always saying that he did not know why he was so low-spirited. The morning before his admission here, without any warning, he suddenly stabbed his wife with a knife which was lying on the table, and then struck her with a poker as she lay wounded on the floor. When brought here he was filled with regret for his rash act, which he alleged he "never meant." He said he had no cause to feel offended with his wife, whom he loved with all his heart, but that "a dark cloud came over him so that he couldn't help doing it." He allowed that, because of sheer wretchedness, he had often thought of hanging himself, but had never actually attempted to do so. He felt fearful that something terrible was going to happen, and that worse was in store for him. He was intelligent; his conservative faculty was vigorous and correct in its operation. Sleeplessness, pallor of complexion, dilatation of the pupils, tremulousness of the tongue, failure of appetite, and indistinctness of the cardiac sounds were reported. Under good food, regular exercise and occupation,

iron and the bromide of potassium, Charles F. has improved marvelously, and is now convalescent. Vestiges of depression are sometimes perceptible, but on the whole he is cheerful and contented, and looks forward hopefully to his return home to his wife, who has now recovered from her injuries.

In this case of simple melancholia, as in that previously mentioned, it is distinctly stated that intelligence was unimpaired. The same might be said of most cases of simple melancholia, and yet the statement, though correct for all practical purposes, would not be strictly accurate. Tested by all the ordinary means, perception, memory and judgment are acute and vivacious, and yet gauged by some more delicate experiments, they would be found defective. In some slight degree they fall short of their average standard of activity, and it is not singular that they should do so. The concentration of consciousness on one centre of thought and feeling, implies that other fields of mental and emotional enterprise are left fallow, or rather are deprived of that light which is essential to their fruitfulness. The lavish expenditure of the wealth of being on one class of ideas and sentiments, implies the impoverishment of others, and hence, in simple melancholia, a keen scrutiny will reveal traces of weakness in the intellect and affections. Former pursuits and studies become distasteful or are altogether abandoned. The process of thinking is slower than it used to be. Insight is not so clear. Judgment has lost its cunning. As the disorder advances this becomes more apparent, especially in the failure to appreciate the real significance of acts and circumstances. Little omissions or faults are magnified into heinous offences; trivial incidents are believed to produce momentous consequences; and commonplace events are regarded as portents of evil. A just and rational view of life is no longer taken. The predominant feelings have partially crippled the intellect. Of course, it is of the nature of all strong feeling to do this. Grief shades and modifies our reminiscences of the past; and fear and anxiety exaggerate danger and distort reality. Thus, even those who are healthy, are not trustworthy witnesses as to what took place when they were very much alarmed. False estimates of peril, erroneous conceptions and judgments, are the every-day offspring of dread and doubt. The ideas become less truthful as the emotions become urgent; and hence we need not be surprised to find some slight intellectual enfeeblement in simple melancholia. The enfeeblement, when present, is, however, trifling and difficult to detect, and never reaches into perversion. When the intellect becomes so weakened or altered as to entertain morbid beliefs or delusions, then it is no longer with simple melancholia that we have to deal. The essential condition of that disorder is that the depression which characterises it should be vague and indefinite, or should be connected with a *real* occurrence, misfortune, or source of apprehension. True, the real occurrences or misfortunes round which the depression of simple melancholia seems to circulate may be exaggerated in themselves and in their consequences, but the belief in them is never converted into actual delusion. The presence of these in the mind betokens that simple melancholia has advanced into another phase of pathological existence, which must be known by a new name, as it involves new elements and new dangers. Such an advance on the part of simple melancholia is by no means uncommon. I have already told you that most of the species of melancholia begin with and end in the simple species, which has just four terminations, viz., recovery, death, other forms of melancholia, and a variety of dementia. Of these, recovery is happily the most frequent, and death (if suicide be excluded from consideration, as an abrupt interruption, and not a termination, of the disorder) is the least frequent. Many cases, however, of simple melancholia pass into other forms of melancholia, and the transition is instructive. The vague depression or fear which has been held as it were in solution in the mind gradually crystallises into certain delusional forms or beliefs. And these delusional forms or beliefs can be classified into certain systems, just as crystals can. Minds have their special delusional tendencies, just as chemical substances have their special crystalline forms; and of some it might be predicated that, on being attacked by melancholia, they will pass into the hypochondriacal or religious variety as certainly as it may be foretold of borax that, on crystallising, it will assume the form of an oblique rhombic prism. Now, numerous illustrations of the condensation of simple melancholia into other more permanent forms are always to be met with in our asylums. In No. 2 Ward, at the present time, you will find John G., admitted on the 1st of March last, who became insane five years ago, who has ever since then been depressed, and who has passed through the following stages. 1. He was dejected in spirits without knowing why or how. 2. He became excessively anxious about his health, because he suffered from constipation of the bowels. 3. He exaggerated the degree of this constipation, and alleged that he went sometimes ten days or a fortnight without passage. 4. He developed the delusion that his bowels had been stitched together, and that passage

was impossible. 5. He evolved several other false ideas, such as that his blood was dried up, and that his body was decayed and offensive in smell. These latter delusions he still entertains. A short time ago you might have seen in Ward 35 David D., who at the close of an industrious and frugal life, in which he had amassed a competency, lost his wife, who had been the companion of his toil and thrift, and was profoundly affected by his bereavement. This grief, instead of being tempered as time went on, became intensified, and led him to attempt suicide. It then changed its front, and fixed itself upon the inroads on his savings which had actually taken place during his illness. He deplored the loss, he exaggerated the loss, he thought that he was ruined, and must die in the workhouse. Until an attack of pneumonia cut him off, he used to wander about the ward mourning because he had not wherewithal to pay for his night's lodgings; he also refused his food because he could not afford it.

When simple melancholia does not advance into any other form of melancholia, it sometimes results in dementia; and, indeed, it sometimes passes into a stage of dementia when recovery is about to take place after a protracted attack. The long continued state of mental pain is followed by exhaustion; the faculties are sluggish in their action; the abused feelings are blunted; a condition of mental inertia or stupidity is established—a condition which has been described by one who has experienced it, as “a total deadness and distaste; an indisposition to do anything or to be anything; a suspension of vitality; an indifference to locality; a numb soporific good-for-nothingness; an ossification all over; an oyster-like insensibility to passing events.”

[To be continued.]

ABSTRACT OF A LECTURE ON EXCISION OF THE KNEE-JOINT.

By T. HOLMES, F.R.C.S.,

Surgeon to St. George's Hospital, etc.

ALTHOUGH, gentlemen, the short time allowed for the course of lectures on Systematic Surgery obliges us to be very dogmatic, there are, in truth, two sides to almost every surgical question; and it seems to me that the chief value of these clinical lectures is, that they allow us to explain, separately, these debatable points at greater length, and with the aid of illustrative cases. Excision of the knee is just such a point. It is not many years since it was first performed by Sir William Fergusson, and the number of cases operated on is even now not sufficiently large to enable us to judge of the results with perfect satisfaction. It is only lately, too, that the conditions under which the operation can be favourably performed have been at all clearly defined. In the early days of excision of the knee, the operation was performed on patients advanced in phthisis, or for malignant tumour. No English surgeon would now consider this justifiable. Yet, though the operation has, even now, scarcely passed beyond the experimental stage, its employment has been advocated and condemned with a partisanship which is, I think, quite out of place in such a controversy.

The operation has, indeed, its advantages and its disadvantages. In considering these, it has been the fashion to compare it with amputation; but we must also compare it with an expectant treatment and conservation of the limb.

Disadvantages—The *shock* of the operation is very severe, and it is followed by severe surgical fever. After amputation for disease in the child, there is usually but little shock or fever; the child often sleeps soundly a few hours after the operation, and mends steadily from that time. The shock and suppurative fever after excision are, however, not often fatal.

Arrest of growth in the limb after the operation.—This is rather common; it is due to the removal of the whole of the epiphysis and part of the shaft of the bones. In the femur, the epiphyseal line comes very close to the edge of the cartilage, and, consequently, the risk of removing the epiphysis is great. In some cases this can be avoided by merely slicing off the cartilage, and leaving a rounded or truncated end to the bone; but often, owing to the extent of the disease, a horizontal cut is absolutely necessary. In the tibia, the space between the articular surface and the line of junction of the epiphysis is greater, and, consequently, there is a better chance of being able to save part of the latter. Of course, the younger the patient the greater would be the relative shortening from this cause.

The risk of soft union between the bones and of bad apposition.—The tibia has always a great tendency to fall back, so that only the anterior part of the cut surface is in apposition with the femur, and the partial union thus formed is not strong enough to support the weight of the body; or, if the cicatrix be stronger, it may yield gradually to the weight of the trunk, and the limb may bow outwards, giving it a shortened and awkward appearance. These deformities may be corrected by splints if treated at once, and, unless the shortening and bending be excessive, the limb is still better than a wooden one. A shortening of six inches, compared with the sound limb, is no great hindrance to walking; the pelvis drops on that side, and this obliquity, with a high boot, readily compensates for the shortening.

These, then, are minor disadvantages; the real obstacles to the operation are its severity, the tedious convalescence which follows, and the liability to recurrence of the disease.

It is very difficult to judge of the comparative mortality after excision of the knee; statistics especially are very fallacious. It is not sufficient to compare the total mortality after excision with the total mortality after amputation. Even the most enthusiastic surgeons limit their practice of excision to young patients and to favourable cases, while amputation is performed at all ages, and often under desperate circumstances. Excision, again, is never done for cases of acute injury; in military surgery it has been exceedingly fatal. To arrive at any satisfactory result, we must compare *similar cases* in considerable number; and this is not an easy matter. I believe myself that the mortality after excision is about double that of amputation. I should say, too, that the period of convalescence is about four times as long after excision as it is amputation. This estimate is, if anything, rather below the mark.

The risk of recurrence of the disease is not great when the wound heals rapidly; but, if convalescence be prolonged, a renewal of the caries often results. And when this does happen, do not be in too great a hurry to amputate; treat it as you would caries in the continuity of a bone; there is now no joint to complicate the treatment. Scrape out the diseased bone or apply caustics; if this do not answer, you can excise again; though this, of course, increases the shortening.

The *couleur de rose* doctrines which have been advanced by some surgeons have certainly produced very mischievous results. Excision is not an operation which can be applied indiscriminately; it must be reserved for cases of favourable age, and in which the disease is not too acute or too extensive. When it is thus reserved for suitable cases, the result is infinitely superior to that of amputation. The advantages, indeed, are more marked the earlier the age of the patient.

Amongst the lower orders, amputation of a leg almost ruins a child's prospects for life; few will have anything to say to him, and the greater part of his life is passed at the cripples' home and the workhouse. But after excision he is fit for a sedentary or even for a moderately active life. I have known patients who could easily walk ten and fifteen miles a day after excision; and a German surgeon has recorded the case of a man who was able to follow successfully the arduous profession of a chamois-hunter after this operation. After middle life, the advantages are doubtful. The result of the operation is not generally so good, and an adult can seldom afford the long period necessary for convalescence. The complete use of the limb, after excision of the knee, is not fully acquired for some years.

On the other hand, the number of cases which are available for excision, even in the child, are limited by the fact that many of them are curable without any operation, if you can only give them time. In private practice, amongst well-to-do people, where the parents will readily nurse a child for three or four years, you may cure cases of abscess in the knee-joint, or even of chronic disease of the bones, by means of simple expectant treatment, and may even get a tolerably useful joint. In hospital practice this plan of treatment is impracticable, and then it is that, by excision, you can hasten and facilitate the process of cure without materially altering the nature of the result.

On the whole, then, whilst I fully recognise the advantages of excision, I am strongly in favour of the close restriction of the operation to a limited class of cases.

So far, we have been dealing with the operation in the abstract. We have now to consider, more particularly, the principles which should guide us in the selection of cases, the best mode of performing the operation, and the necessary after-treatment.

Age.—The patient must be under forty or forty-five. The elbow or shoulder may be successfully excised at a much greater age; but, after middle life, excisions in the lower extremity are exceedingly fatal. In the case of very young children, free incisions into the joint and expectant treatment are so successful, that formal excision is seldom necessary; the risk of getting an excessively shortened limb is also very great. This is not absolute contra-indication, since excision may be, and has been, practised successfully in early infancy; but the most