Hospital we have leaflets for distribution to female patients containing in simple language the most important facts concerning this fearful scourge.

POST-MATURITY.

It must have happened to everyone who has practised midwifery that on occasions he has had a patient who, by the usual methods of reckoning, has gone beyond term. Such an event not only causes worry to the patient and her relatives, and additional expense because of the nurse, but it may also be a source of much anxiety to the doctor, who in the end has perhaps to attend a difficult labour, followed in many instances by death of the child. The following points are of interest¹:

1. Post-maturity may be recognized by the presence in the child of excessive length, weight, ossification, and an easy separability of its dura mater.
2. It is probable that spermatozoa cannot live longer in the genital canal than ten days.
3. Although the time between the first day of the last menstruation and delivery, and that of insemination and delivery, can be calculated, that between impregnation or fecundation and delivery cannot within ten days.
4. There are undoubted dangers both to the mother and the child when pregnancy is prolonged beyond its normal time. These dangers are mostly concerned with the difficulty in the passage of the child.

The correct treatment when the practitioner thinks that the child is post-mature is to induce labour. How is he to arrive at such a diagnosis?

1. By noting any prolongation of pregnancy beyond the expected date of delivery, as calculated from the first day of the last period.
2. By a careful ante-natal supervision of his patients, noticing particularly, in the absence of uterine contraction, the ease with which the head of the foetus is passing into the pelvis in a primigravida or can be pressed into the pelvis in a multipara.
3. If an allowance of ten days be made over and above the date selected for the day of delivery it may safely be assumed that after this the pregnancy is post mature, due regard being paid to the relation of the foetal head to the mother's pelvis.
4. With this information, therefore, the doctor may justifiably induce labour 290 days after the first day of the last menstruation, and, indeed, many authorities think that he should do so.

HOT-WATER BOTTLES.

Burns from hot-water bottles are not as uncommon as one would think. The late Dr. F. J. Smith stated that he knew personally of 80 cases.

As a working rule never allow a hot-water bottle to be placed in the bed of a patient recovering from an anaesthetic, not even if it is surrounded with blankets, because in such a case the patient may be restless and kick the blanket off, when the exposed hot-water bottle may burn her. If, however, it is considered essential, because of shock, to place protected hot-water bottles in the bed, a nurse should be directed to stay by the side of the patient until she has completely regained consciousness to ensure that she is not burnt. When such precautions have not been exercised, burns may result which take months to heal and then only with dreadful scarring.

I introduce this subject to warn you that even with this knowledge you may be let down owing to the carelessness or disobedience of the nurse.

A friend of mine operated upon a patient. The operation was a very severe one, and he deemed it necessary to give her an intravenous infusion, and as he could not expose the vein in one arm he had to cut down on a vein in the other. The patient, who was in a nursing home, was put back to bed and was frightfully burnt on one buttock and foot with hot-water bottles. Neither the patient nor her husband appears to have been very inquisitive, and the doctor, therefore, did not feel called upon to discuss with them the exact state of affairs. At the end of fourteen weeks the husband said, "Don't you think that those wounds you made on the buttock and leg, which have been so septic, would heal better at my own home?" My friend then discovered that the owner of the nursing home had told the husband that the surgeon had made wounds on both arms and in two places on the leg to inject saline into the veins, and that the wounds on the buttock and leg were larger because the blood vessels could not be found. This was more than my friend could stand, with the result that when the husband was enlightened he refused to pay the expenses of the nursing home. The owner of the home then brought an action to recover the money; the husband brought a counter-action for damages, and the matter was settled out of court, the husband being paid £500 and costs.

I remember the case of a lady from whom I removed with the greatest difficulty a very adherent ovarian cyst. There was some very free oozing from the raw surfaces left, and no bleeding point could be secured. I therefore had recourse to the method of

temporarily packing the pelvis with swabs wrung out of boiling water. Three days later I visited this patient in the absence of the doctor and with his consent, and discovered to my horror that her buttock and leg had been frightfully burnt with hot-water bottles. The nurse, of course, had to own up, but begged me not to tell the doctor, saying that he might not employ her again if she did not tell him herself. Foolishly I agreed. I heard nothing more of the patient at the time, and was a little disappointed that the doctor had not written to me, because the operation as a surgical exercise was a great success, and it was the first time this particular doctor had given me a case. Some years later a relative of the patient consulted me; told me that her relative's leg was frightfully scarred. Expressing surprise and inquiring how this accident had arisen, the answer was, "Why, don't you remember, it was due to your pouring all that boiling water over her." I asked who said this, and was told the nurses. I then had no hesitation in telling her the true facts. Naturally I at once wrote off to the doctor, from whom I had never heard again, and he replied that the nurses had told the patient that I had had to use boiling water to stop the bleeding, and when wringing out the swabs had spilt the water all down her side. Further, the doctor was kind enough to add that he had thought it wiser to let the blame rest on me because I could be excused in an endeavour to save the patient's life, whereas the nurse could not be excused, and the husband, if he had known the true facts, would have been certain to have brought an action for damages against the nurse; and he, the doctor, hated law suits!

REFERENCE.

¹Ballantyne, J. W., and Browne, F. J.: The Problems of Foetal Post-maturity and Prolongation of Labour, *Journ. of Obstet. and Gynaecol. of the British Empire*, 1922, vol. 29, No. 2, p. 177.

THE DIAGNOSIS OF INDEFINITE MASSES IN THE BREAST.*

BY

DUNCAN C. L. FITZWILLIAMS, C.M.G., CH.M., F.R.C.S.,
SURGEON, ST. MARY'S HOSPITAL, LONDON.

THE diagnosis of small indefinite masses in the breast presents such peculiar difficulties to the medical man, right diagnosis carries with it such advantages, and wrong diagnosis or unnecessary delay such awful penalties to the patient, that the subject is well worthy of consideration.

In early cases of lumps in the breast it is curious, but true, that though the question, Is it a new growth or is it an inflammatory mass? always arises in one's mind, the smaller the mass is the more one is inclined to put it down as inflammatory. Malignancy is associated in our minds with something sinister and threatening. A small and apparently harmless mass is acquitted merely on account of its small size. This is of course quite wrong; malignant growths must all begin small, and then is the right and most favourable moment for their extirpation; that, indeed, may be the only time at which a cure can be guaranteed. But how many small malignant growths do we operate upon, and how many large ones? The proportion is not more than one in six.

It is widely recognized that if carcinoma is removed early, especially in an organ like the breast, where such a large part of the lymph field is easily accessible, the very best results may be achieved. The difficulty is to decide what is early removal, and how it is to be effected. That difficulty I wish chiefly to deal with.

At the same time it must be recognized that we are not dealing with the constant factor of a machine, but with the vagaries of human nature, with those peculiarities of the human mind, with those prejudices inborn centuries ago, and those leanings which we can only explain by saying that they are second nature. We have all heard of cancer cures—the violet-leaf cure, the cure by turpentine, and by escharotic paste, not to mention some of the older ones; then lately x rays, then radium, then selenium, and now back again to x rays, and larger and more expensive instruments. Wait! these will go like their predecessors, and will be succeeded by some treatment just as effective or ineffective as you may be pleased to term it. Explanations are useless. Each of these methods not only claims its cures, but each can, I know, produce them; people live after each of these treatments for ten, fifteen, and twenty years in the case of the older methods, and the modern methods and future ones will, I am quite sure, afford similar instances. Each holds out just sufficient encouragement to lure on and, I am afraid, to delude the practitioner into thinking that at last the cure is about to be discovered.

• Investigations and experiments should and must continue; I should be the last to decry them. But we, as a profession,

* A paper read before the Chelsea Clinical Society.

are so prone to rush after every goose long before it flies, crying out so loudly that it is a swan, that a note of warning must be sounded. We are only yet at that stage where, alas! in the vast majority of cases it is the knife, and only the knife, on which we can rely with any certainty. That is the only method upon which we have relied for the last two hundred years. All other methods change constantly; each is said to be successful—why does it fall into disrepute? I think perhaps its success may possibly be fanciful, and due not to the cure, but to the well recognized vagaries of the disease. I believe the same thing will happen with the methods now employed.

Why is it that human nature, especially female nature, fears the knife? You may use an *écraseur* or a cautery, if you like, to do an incomplete operation, but a complete and clean one by the knife is often objected to; and yet for every case receiving benefit by any other means a hundred receive it from the knife. Again, why is it that the knife is refused in early cases, when it is most useful, and resorted to after the waste of so much time that its success is a matter of conjecture? Why is it that human nature prefers a cure by some unorthodox means? Why is it that Naaman the Syrian was wroth and wished Elisha "to come out and strike his hand over the place and recover the leper," instead of doing what the man he had come so far to see told him to do? Human nature is the same to-day as it was then—it still craves for novelty.

In dealing with tumours perhaps it is not recognized sufficiently clearly that the vast majority are malignant. It is computed that 80 to 85 per cent. of tumours of the breast are malignant, and at most 15 to 20 per cent. are innocent, or innocent in their early stages. I do not think that these figures are entirely accurate, as they are collected from records, and it must be obvious that many small and apparently innocent lumps such as we deal with in the out-patient department will have no records at all. But still, if we take 70 per cent. malignant and 30 per cent. innocent we shall be within the true figures.

That means that a lump in the breast, however small, is more than twice as likely to be malignant as it is to be innocent. This is a point which needs emphasis to bring it home to us. It is one of the most difficult things in practice to imagine that a lump, however small, is twice as likely to be malignant as innocent; we are always ready to acquit it on size alone. Then one must bear in mind that there are a large number of cases which we admit are innocent to begin with, but which later take on malignant characters. They do this in two ways—either the character of the growth changes and becomes malignant, or a malignant growth starts in part of a purely innocent growth, such as a cyst wall. To begin with these must obviously have all the symptoms and characters of innocency.

Now if I ask, What is the difference in character between an innocent and malignant growth? you will at once begin to say adherence to the skin, to the deeper structures, glands in the axilla, retraction of and perhaps discharge from the nipple, shrinkage of the organ, etc.—these are the characters with which we associate malignancy, and the absence of these characters denote innocency. The presence or absence of a tumour felt with the flat of the hand, which used to be, and is even now, so insisted upon, is of course quite fallacious. A large malignant growth will of course be felt, but an early and a small one will be just as imperceptible as a chronic mastitis, in which indeed it is very often embedded. I do not, however, intend to go into these characteristics, but rather to deal with the subject in a different manner and ask, What is the meaning of all these characters that we take to be malignant? Is it really true that absence of these characteristics veritably denotes innocency? and we realize at once that the answer is "No." After a moment's reflection we realize that these characteristics denote nothing more than spread, and, pursuing this matter to its more logical conclusion, spread means that much time has been lost before a diagnosis has been made. To extirpate a growth we have to go outside all areas of spread—that is admitted. Why, then, do we wait deliberately till spread has occurred before we arrive at a diagnosis?

I now invite you to accompany me in imagination to the out-patient department. A healthy-looking woman of 50 complains of a lump in the breast which her doctor has seen six months previously and told her was nothing. She now shows a breast with scirrhus written large across it. There is a temptation to abuse the doctor for not sending her to the surgeon for advice sooner, and I have even heard very severe

comments made upon such behaviour to the students. But wait—the very next case which comes up is a woman of the same age who says she has shown her doctor something in her breast, and he has sent her up for advice. On examination there is a small indefinite mass, not adherent to the skin or underlying structures, lying far from the nipple, so that there is no suspicion of retraction, there are no glands in the axilla, there is nothing to point to any cause whatever. On you now rests the responsibility. What are you going to advise? It is often extremely difficult to refrain from giving much the same advice as the doctor you were quite ready to blame a moment ago. You might quite well say, "This is nothing, my good woman, do not worry your mind about it; just come up and see me in a month's time," and think you were justified in doing so. Two or three months may pass without any very obvious change, and then the woman might neglect to come, thinking that it was not very important, as no operation was suggested—for to her an operation is the only important association she has with a lump—and that she need bother no further. Four, six, or eight months might quite well elapse before you see her again, and then the diagnosis may be as easy as in the first case we supposed. Spread has been going on slowly all the time, and the comments you were ready to pass on others may be as justly applied to yourself. You missed the opportunity offered you the first time of carrying out an investigation which would have placed the matter beyond the region of doubt at a time when, if it proved to be malignant, success was almost certain, while now, six to eight months later, it is very problematical.

But while making every excuse for the doctor who has failed to make certain in the early and doubtful stages through which every malignant growth must pass, there are certain cases we all know in which blame may rightly attach to the medical man. There is the careless man, always in a hurry, who never makes a thorough examination—you cannot alter him. Then there is the stage through which we all naturally pass, of non-experience, that rights itself with time. And lastly, and worse than all, there is the too fussy man who knows everything—he alone can assure the patient that "it is nothing." He, curiously enough, is almost always believed implicitly; perhaps the patient wants to believe him. If any doubt is raised he will put in a hypodermic needle, and if he succeeds in drawing off some clear fluid from a mastitic cyst will say, "Now what did I tell you? It is just a fluid cyst." I might here say that the use of a hypodermic needle or simple puncture is a most misleading and useless procedure. There is, lastly, our teaching, which is grievously at fault in this matter, as it does not sufficiently lay stress on the necessity for an immediate and thorough investigation.

Let it be clearly stated at once that no one has any right to tell a patient that a lump which has no characteristic at all is nothing; no one can tell. But yet the procedure I have laid before you from one cause or another is that almost universally adopted in practice.

We know that malignant disease must start in a small area, and yet how many cases are operated upon before anyone of any experience can diagnose them! By the time they can be diagnosed with certainty they are no longer to be considered early cases: they have spread to such an extent that they are now characteristic of the disease. These should be classed as advanced cases in which it should clearly be understood the prognosis has become grave. We do stumble on early cases sometimes, it is true, but the gospel of immediate investigation has yet to be preached a long time before it will be generally accepted. It is rational, it is right, it is only fair to the patient, and it will be generally accepted some day. The other day I came across an old-fashioned physician who advised against an operation for well marked recurrent appendicitis because "the last attack was only a mild one." That advice is now the exception, but twenty years ago it was the rule. We are still in this old-fashioned stage with regard to diseases of the breast.

Now, what can we do in early cases? We may as well confess at once that by the ordinary methods of inspection, palpation, etc., we can get no farther—we cannot, in fact, make a diagnosis. We can only say that there are as yet no characteristic features of malignancy; but if we are not to sit down calmly and deliberately and wait for these features to develop under our noses we must do something more. The probabilities are, in sporting parlance, something between two and three to one that the mass is malignant; that alone should urge us forward.

What are the innocent masses, adenomata, cysts, chronic

mastitis from whatever causes, tubercle, lipoma, gumma, hydatid?—we need go no farther into the rarities. Which of these are important? Adenomata, which have a very typical and definite feel however small, occur in young subjects, and are nearly always removed at once when diagnosed; they offer very little trouble.

Deeply seated lipomata, gummata, and hydatids may be placed aside too, for all practical purposes, for they are rare and still more rarely diagnosed. Tubercle, also, unless it is advanced, or has ulcerated, is much more often diagnosed by the microscope than by any other means. There remains, therefore, that large group of cysts, and chronic mastitis, and involution masses. These arise in the same period of life as malignancy develops. In the early stages they have the same lack of characteristics as early carcinoma. They may cause more pain, but not always. Do what we will, the microscope is the only method of distinguishing between these classes.

I think it should be pointed out to every patient over 30, and certainly to everyone over 35, that the microscope is the only method we have at our disposal of arriving at a diagnosis without losing so much time as to render the outlook exceedingly grave if a growth should prove to be malignant.

Perhaps I should add here a note of warning about the danger of acquitting a tumour on no other grounds than that of the age of the patient. I know of two cases of cancer of the breast which occurred under 12 years of age, and many which occurred in the teens. Rodman collected 5,000 cases, of which nearly 10 per cent. were under 30 years of age. These facts alone will show you that you are acquitting a very doubtful tumour on very inadequate evidence.

How is the investigation to be carried out? We do not want to cause more disfigurement than is necessary. Luckily what is necessary can easily be done without leaving any visible scar. The operation is associated with the names of Dr. Thomas and Dr. Collins Warren of Boston. It consists in making a sweeping incision in the circumference of the breast below and to its outer side. The incision extends nearly half-way round the breast, and goes right down to the muscles. The breast is then lifted up so as to expose its deep surface. The deep surface even of the upper part of the breast can thus be brought into view. A wedge-shaped portion of the breast is then removed, containing the suspicious mass in its centre. The wound can then be closed. Once free of the body the mass may be cut into and inspected. Often this gives most valuable information, though it should also be borne in mind that the knowledge thus gained may be misleading, as the cases quoted below prove only too well.

If one can arrange to have a pathologist with a freezing microtome waiting to cut a section this may be done, and the microscopical examination made there and then in the course of a few minutes. The surgeon can be told, with a fair amount of certainty, whether he has done all that is needed, or whether he should proceed to do the complete operation.

As a rule it is only in hospital that we have the advantage of a pathologist upon the spot, most of us being content to wait the verdict after a lapse of some days, and then if necessary perform a second operation. There are pros and cons for both ways, as I have known the freezing microtome give a wrong diagnosis, simply because in the hurry the wrong piece of tissue had been frozen and cut, or the section had not traversed the growth. To me the more methodical examination conducted in the laboratory seems the safer of the two, especially if the raw surface is seared with the cautery, or the lump cut out by this means so as to close the ends of the lymphatics.

It matters not which plan is adopted, so long as this method of diagnosis and treatment is urged on the patient, and it is explained to her that the responsibility for delay rests solely with herself, for her medical man can give her no further help in the matter. Delay is the method relied upon heretofore; it should now be discarded. Delay means spread and the development of characteristic signs, but at what a price! The needed information can be obtained with certainty within a few days by the operative means.

The following cases illustrate the method; many others might be quoted.

CASE I.

A lady, aged 50, seen in private, had noticed a small lump in her left breast for some two months. There was no pain. As the lump did not go away she had come for advice. Examination showed a small indefinite mass or ill-defined thickening, hardly a lump, deeply placed in the upper and outer quadrant of the breast. It was hardly perceptible to the flat hand as the patient was well

developed. There were no signs or symptoms of malignancy, and no glands to be felt. She was advised to have it investigated. It was removed by circumferential incision. To the naked eye it looked doubtful. It was sent to the pathologist, who returned a verdict of carcinoma. A complete operation was performed after the lapse of a week. There has been no sign of a recurrence since.

The following cases show that the method must be carried out systematically and carefully, and that no reliance whatsoever must be placed upon examination by the naked eye. This last truth I find personally is very difficult to learn. The difficulty of diagnosing the true nature of the mass by any other means than by microscopical examination is illustrated by Case II.

CASE II.

A lady, aged 54, under the care of Dr. Fiddes, was seen on November 8th, 1920. About a month previously she had noticed a small lump in her right breast which had caused a small amount of pain on stretching and reaching with her arm. There was nothing of importance in her family or previous history.

A very small but indefinite mass, deeply placed, about the size of a date, was detected just outside the nipple. The skin was free but the mass was incorporated in the breast. There was no discharge from the nipple. The nipple was attached to the mass and appeared slightly retracted; this, however, she denied, and said that the nipple had always been like that. There was one small gland in the axilla. The diagnosis lay between a cyst and early scirrhus.

The same procedure above advocated was advised, and in November the mass was removed. It seemed quite obvious to the naked eye that it was a simple mastitis, but it was sent to the pathologist. In the meanwhile the friends were told that it was probably quite simple and were reassured. A few days later the pathologist reported that the mass was a carcinoma of the ordinary scirrhus type. The patient had to be told, and a radical operation was performed. There has been no sign of a recurrence.

However awkward it may be to tell the patient disagreeable truth, after having assured her that the mass was to all intents and purposes a simple condition, the gain in having got the condition so early amply compensates for the unpleasantness. It, however, illustrates how unreliable is an examination by the naked eye.

CASE III.

A single woman of 45 was sent by Dr. Kellett to see me in 1911, with what was obviously a chronic interstitial mastitis of the involution type and cystic in character. There was such pain that she wished to have the mass removed. The whole breast was removed by the circumferential incision, the nipple being left. It was a mass of involution cysts and mastitis. A portion was sent to the pathologist; this portion, however, was innocent. I did not see her until 1912, when she said that seven months previously she had noticed a tiny nodule in the region of the scar, and later others came, but she took no notice of them as they were some distance from the scar. She had only gone to her doctor again the night before. Her condition now was as follows: There was a ring of small nodules varying from the size of a wheat grain to that of a pea, about nine in number, all situated about two and a half to three inches from the nipple, mostly to the upper and outer side of the breast. They were obviously secondary growths. A complete operation was then performed and a large area of skin had of course to be removed, the deficiency being made up by sliding in skin from the back. The pathological examination showed them to be carcinomata, and as the whole breast had been removed they were obviously secondary to a primary focus in the removed breast. The patient was seen this year with no signs of recurrence.

In this instance a small part only of what had been removed was sent to the pathologist, and this portion did not contain any malignant tissue.

This was one of my earlier cases, and since that time I have always been careful to send to the pathologist the whole mass as it has been removed.

The last case I wish to quote illustrates how one may be misled by naked-eye appearances in just the opposite direction and mistake a simple tumour for a malignant one.

CASE IV.

A Russian lady, aged 42, seen in private last year, said she had noticed a small lump in her left breast for twenty years, but it had now started to grow larger; she thought there was one coming in the right breast.

There was an ill-defined mass in the left breast in the upper and outer quadrant. There was no pain. It could be felt with the flat hand, though the breasts were large. The skin was distinctly attached to the mass, but the nipple seemed free. In the right breast was a similar but smaller mass just above the nipple, and here again the skin was drawn down and did not move so freely. There were glands in both axillae. On account of the history that she had had the lump in the left breast for twenty years a diagnosis of old mastitis was made, but at the same time she was urged to have the mass removed. She consented.

At the operation the breast was turned up and a portion radiating from the nipple was removed. On cutting this open a small area a little larger than an almond, but with an irregular outline, was found surrounded by mastitis. This area was grey and presented

every appearance of being malignant. It cut like an unripe pear; it retracted and hollowed on section; on scraping with the knife it gave the well known "cry of a cancer." Cancer I thought it to be, and proceeded to do a radical operation.

The mass was sent to the pathologist, and the husband was told what we had found, what we feared, and what had been done. He was also informed that the other breast would have to be treated in the same way.

There was a delay in receiving the report from the pathologist, but as the case was so obvious one did not give the matter a second thought. What was my surprise, therefore, the evening before the second operation had been arranged for, to get word from the pathologist that the mass was an old fibro-adenoma. The news was at once communicated to the patient and her friends. The next day a circumferential incision was made and the growth removed from the remaining breast. On cutting this across, exactly the same typical carcinomatous appearance presented itself. An experienced surgeon of high standing who was present gave it as his opinion that the mass was undoubtedly carcinoma, although I had purposely told him my previous mistake. We were now in a quandary; there was this tissue in my hand presenting to the eye every known appearance of carcinoma. Should we perform a radical operation or be content with the partial one, relying on the experience we had gained from the other breast? Would we get the same verdict from the pathologist as in the other breast? We had promised the patient that we were only going to do quite a partial operation. Should we have to come later and inform her that the pathologist's report required us to do a larger one? It was a very difficult position. I decided to close my eyes to the naked-eye appearances, to shut my ears to the surgical advice of our friend, and be content with a partial operation.

Fortunately, the pathologist returned again the same verdict as in the case of the other breast—that it was an old fibro-adenoma.

These cases have been quoted to show that, though radical investigation must be urged on patients at an early stage, there are yet many pitfalls for the unwary, and the very greatest care is necessary to arrive at a correct diagnosis.

MINOR TRAUMATIC DISABILITIES OF THE UPPER LIMB.*

BY

P. JENNER VERRALL, F.R.C.S.,

SURGEON, MINISTRY OF PENSIONS HOSPITAL, SHEPHERD'S BUSH; CHIEF ASSISTANT, ORTHOPAEDIC DEPARTMENT, ST. BARTHOLOMEW'S HOSPITAL.

I HAVE used the word "minor" to exclude fractures, dislocations, and gross lesions of the vessels and nerves, but in a way it is a misnomer, as the disability caused by a fracture or a dislocation, though more complete at the time, is often more easily repaired, and as it is regarded by both patient and practitioner in a more serious light more care is taken in the after-treatment and re-education of the limb in order to ensure a perfect result. The greater disability caused by comparatively minor lesions of the upper limb as compared with similar lesions of the lower limb is, to my mind, explicable by the finer adjustment of the neuro-muscular mechanism and more sensitive connexion between brain and periphery found in the former. Unless we are professional dancers or something akin, we do not ask our legs to perform very intricate movements, and the sensation is not so acute. We are content if our legs will bear our weight and carry us along. Good evidence of this sensibility is seen in the behaviour of amputation stumps. It is quite rare to find in leg stumps what we call "pain of central origin," whereas an upper arm stump is frequently the seat of great pain, for which no local cause can be found, and on which no artificial limb has ever been worn. Bulbous nerve ends may have been excised again and again, even up to the plexus above the clavicle, and yet the pain continues. Even posterior root section often fails to relieve the pain, proving conclusively that the pain is of central origin, and a very long period must elapse before the cortical cells give up their hopeless struggle for activity. The only hope lies in active occupation of mind and body, thus diverting the nervous impulses into new channels and relieving the tension in the now useless mechanism.

I desire to call attention to the extreme importance of the presence of septic foci in other parts of the body in the conversion of a minor strain into an intractable disability. As common septic sources I would put in order of frequency the teeth (root absorption, abscess, and generalized pyorrhoëa), the tonsils (especially in younger subjects), the colon (chronic colon bacillus infection), the uterus or prostate, and the nasal sinuses. Unless these sources of infection are cleared up the

treatment of a minor lesion may prove wellnigh impossible. When these underlying causes have been excluded, the question of diagnosis turns on, first, the history of the injury—that is to say, the precise action that the patient was performing at the time symptoms first appeared; secondly, a diligent search for a spot tender on pressure; with these must be combined accurate knowledge of the structures underlying that spot; thirdly, the limb must be put systematically through its normal movements in order, noting by which of them pain is produced and whether or no pressure on the tender spot during the performance of these movements relieves the pain or not.

The vast majority of minor traumatic disabilities in the shoulder region are due to adhesions in or around the joint, the movements most frequently affected being those of abduction and external rotation. The shoulder is a simple joint, unstable in itself, and depending for its stability with the help of its own ligaments on the interaction of a complicated musculature surrounding it; its capsule is weak in all parts and actually lax beneath the joint at the apex of the axilla. Acute simple traumatic bursitis of the subdeltoid bursa is a condition described in the textbooks and frequently diagnosed, owing to the fact that tenderness is elicited below the end of the acromion process, but in my opinion it only rarely occurs. The source of trouble is much more frequently either strain of a muscular attachment or adhesions. With other more serious forms of subdeltoid bursitis we are of course familiar—such as tuberculous, gouty, or calcareous bursitis—and I would regard definite swelling in the situation of the subdeltoid bursa as an indication for taking a more serious view of the case, or at any rate for obtaining a skiagram of the shoulder.

As to adhesions, we must understand how these come about and how they can be diagnosed. We will assume that there is no clinical sign of a gross lesion and that the skiagram (if one has been taken) shows a normal joint. First we must exclude active arthritis, which may be present although the skiagram shows a normal joint. Pain and limitation of movement in all directions indicate arthritis. Sir Robert Jones expresses the matter well when he says that if there is limitation of movement in all directions there is probably arthritis; if even one movement is free there is probably none.¹ The point is important, as the treatment of the two conditions is diametrically opposed—rest for active arthritis, movement for adhesions. Adhesions commonly give rise to pain and limitation of movement in one or more directions, but not in all, and come on fairly soon after the accident. Sir Robert Jones also calls attention to a condition which he terms "confusion of joint cartilage," such as may occur from a fall on the outstretched hand, pain and limitation of movement coming on gradually about a fortnight after the injury and being due to a process of repair in the damaged and bruised cartilage during which there is vascularization of the injured area. We have here the phenomena of an aseptic inflammation, and the treatment is determined by this. If due rest be given, the symptoms clear up, but if movement be allowed or forced at this stage, the recovering cartilage is further injured and recovery is delayed. However, the later history of such cases may well be that of "adhesions." As long as there are visual signs of active inflammation in the neighbourhood and of a definite arthritis, so long must we employ rest and soothing applications. When, however, this stage has passed we may allow movement without forcing it—that is to say, active movement, but not passive. Passive movement, apart from the full mobilization of a joint under an anaesthetic, is of very limited utility, and the temptation to employ it, although very great, should be firmly resisted. This applies to all joints. Assisted active movement should commonly take the place of true passive movement in the treatment of all joint lesions. If active movement is allowed and inflammation has passed, the movement of the joint should steadily increase in range. If it does not and the range begins to lessen, inflammation is still present and a further period of rest is indicated. If the range increases steadily with active use of the joint, let well alone. If it remains stationary, especially if the limitation of movement is in one or two directions only, the joint should be mobilized under an anaesthetic. It is commonly said that gas does not give sufficient muscular relaxation, but I maintain that with gas properly administered adequate relaxation can be obtained for the mobilization of all joints, with the possible exception of the hip. Under the anaesthetic all the normal movements of the joint should be carried through to the full extent,

* Abridged from an address delivered to the annual meeting of the Essex Division of the British Medical Association July, 1922.