symptoms. As judged by the tests performed, the liver function was normal; however, the possibility of mild liver injury, due to the novarsenobillon injections, might be considered, but does not seem probable. The blood urea figure was somewhat high while the patient was in coma (60 mg. per 100 c.cm.), but it was normal three hours after recovery. The absorption of glucose from the gastrointestinal tract was normal, as judged by the glucose tolerance test. A puzzling feature is that the blood sugar curve, obtained after the ingestion of a mixed meal containing 50 grams of starch but no sugar, at a time when the stool was loaded with starch, did not show any great departure from what one might expect to be normal; apparently, although much starch passed through in the stool, a certain quantity was digested and absorbed. It is regrettable that further study of the starch digestion was not possible. We have no knowledge of the duration of the faulty amylaceous digestion previous to admission, and we find it difficult to appraise the significance, if any, of the transient achlorhydria. We regret that we were not able to study the case more fully, and our failure in this respect was due partly to the fact that we were not prepared to meet with a condition so unfamiliar to us, and partly to the poor co-operation of the patient, who objected to the tests and to being retained so long in hospital. We desire to record the case because it is possible that acute spontaneous hypoglycaemia may be a commoner condition than is suspected. On the other hand, although more than fourteen months have elapsed since we first saw the case, we have not seen another, even though we have been on the watch for one.

The patient was prevailed upon to return to the hospital for one day in July, 1931—that is, more than a year after her first admission. She looked well, and stated that she had had no attack of unconsciousness since we had last seen her (September, 1930), but that she had occasionally felt a little giddy, especially after eating "sweets" (meaning sugar and chocolates). Her fasting blood sugar was 62 mg. per 100 c.cm.; after the ingestion of 100 grams of soluble starch in water the blood sugar was determined every half-hour for three hours, and the figures were as follows (mg. per 100 c.cm.): 1/2 hour, 50; 1 hour, 62; 1½ hours, 67; 2 hours, 82; and 3 hours, 75. The stool contained no starch, meat fibre, or fat, but a few vegetable fibres were present. These findings tend to support the suggestion that hyperinsulinism was the cause of the chronic hypoglycaemia, and that the temporary superadded deficiency of the digestion and absorption of starch was a factor in helping to produce the acute hypoglycaemia responsible for the attack of unconsciousness which necessitated the first admission to hospital.

SUMMARY

A case of acute spontaneous hypoglycaemia with severe symptoms is described; there was also chronic hypoglycaemia, and there was associated transient achlorhydria and faulty amylaceous digestion. The severe acute symptoms were promptly relieved by the intravenous injection of 10 grams of glucose.

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THE TRANSPLANTATION OF BONE*

BY

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The value of bone transplantation in the treatment of fractures is now so well established that it no longer needs argument to support it. As with so many other great operations, however, the development of a perfect technique has been slow, and failures have been frequent enough to prevent the operation from becoming as popular as it deserves. This paper is based on a review of the failures with which I have come in contact, and on a consideration of the errors that most often lead to bad results.

CAUSES OF FAILURE

The chief cause of failure is infection of the wound. In almost every case in which it occurs the graft becomes a sequestrum and the fracture fails to unite. In this operation, therefore, asepsis is imperative. It can be acquired only by painstaking care, constant practice, and by the team work of surgeon and assistants, but the improvement in the results makes the effort well worth while.

There are still a few who fancy that when a piece of bone is transplanted from one place in the body to another it will continue to live, as does a transplant of fascia or skin. This is an idea which must be eradicated if we are to reduce the percentage of failures. It hardly needs repetition that when a piece of bone is cut free from its circulation it dies, and must undergo complete absorption. The cells in the lacunae become necrotic at once, and within two weeks have disappeared. Only those cells live which are free on the surfaces and in the open mouths of the Haversian canals, and so are capable of utilizing a supply of lymph, if such is available. These are the cells, however, which make the bone graft so important in the treatment of non-union, and which must be humoured to the utmost if success is to be attained. Any abuse of them, such as boiling, immersion in strong antiseptics, and burning with a hot saw, must be guarded against, and any treatment of the graft that mechanically removes the periosteal and endosteal surfaces and leaves only hard compact bone, such as results from putting a graft through a dowelling machine, must be avoided. I do not suggest that an autogenous dowel is not better than a boiled bone peg or a nail, but it certainly is not nearly so valuable as if its surface cells had not been removed.

The revascularization and replacement of the dead graft are processes which are well known. Within a few days after the operation the capillaries are growing into the open Haversian canals, and masses of osteoblasts are making excavations in the dead bone. A few days later they are plastering the walls of the excavations so made with layers of new bone. As the blood vessels spread

* Read in opening a discussion in the Section of Orthopaedics at the Annual Meeting of the British Medical Association, Eastbourne, 1931.

into the interior of the bone, osteoblasts move in also, and so carry on the processes of absorption and replacement from within at the same time that they are going on on the surfaces. In this way the graft is ultimately wholly absorbed and replaced with new cancellous bone, which may be expected to overcome the defect for which the operation was performed. If this defect has been a non-union in a fracture, the success of the operation will depend on several factors. These are: first, healing by primary union; secondly, the firm healing of the graft to the fragments; thirdly, the firm healing of the fragments to one another, either through the graft alone or through new bone joining the fragments to one another around the graft.

The question of the firm healing of the graft to the fragments is of great importance in a review of the failures. Time after time cases have come into hospital with persisting non-union because the graft has failed to unite to one of the fragments. An analysis of these cases shows that one or more defects in the operative technique account for the failure. The commonest defect is neglect to secure contact of graft to bed over a sufficient area. It is futile to expect to overcome non-union by introducing a graft which only butts against a freshened fragment or rests in a bed half an inch long, as is so often the case. In a radius or ulna the graft should be embedded at least an inch and a half into each fragment, and in a tibia at least two and a half inches. Another defect is failure to secure close apposition of graft to fragments. Albee has referred to this over and over again in his papers, and he is perfectly right in the matter. I have seen dozens of failures result from one end of a graft losing contact with its bed, or from the careless fitting of graft and bed, so that contact occurs only at points, and not throughout surfaces. Study of the union of bone transplants to their beds in experiments on dogs is most convincing in this regard. If the graft is placed in tight contact with its bed, union takes place within two weeks by the laying down of trabeculae of new bone on the surfaces and without the intermediate stage of cartilage or fibrous tissue formation. If even a narrow space is left between the graft and its bed, union is much delayed, and, if the space is as much as an eighth of an inch, may be prevented altogether. Clinical experience confirms these experimental observations completely, and demonstrates that the successful grafting of bone calls for a fair degree of craftsmanship.

It seems hardly necessary to speak of immobilization as important in securing success in bone transplantation. So often do operations fail, however, because of neglect to immobilize, that a word here may be of value. I am convinced that immobilization is of even greater importance in a bone-grafting operation than in a simple fracture, and to secure it we should not only use an external splint in the form of plaster, but we should use some form of internal fixation which will ensure perfect quiet in the healing area until consolidation of the callus has occurred.

A fourth point of importance concerns the bed into which the graft is to be laid. In most cases in which a bone graft is necessary the ends of the fragments have become so sclerosed that they are almost totally incapable of reacting to irritation. Such bones are hard like ivory, bleed very little when cut, and show practically no cellular activity when injured. It is well known that operations aiming at overcoming non-union in this kind of bone, which simply provide for bringing freshened ends into contact, almost always fail. For the same reason bone grafts fail to heal to this kind of bone, and experienced operators know that, to have any chance of success, the graft must extend beyond the sclerosed area and come in contact with healthy bone. A preferable technique, which

will be discussed later, gets rid of most of the sclerosed bone and replaces it with an appropriately shaped graft.

Some writers have been so impressed with the importance of cutting through the sclerosed bone at the ends of the fragments that they have inclined to the idea that this is the really important part of the operation, and that, except in so far as the bone-grafting operation requires the free opening up of the fragments, it is not a real contribution to the treatment of non-union. Waring and Milligan in 1922 published a paper in which they suggested that the deliberate comminution and artificial impaction of the fragments was a more dependable method of treatment than bone grafting. They cite cases in which bone grafting had failed, and the comminution operation had subsequently proved successful. In this, however, they are undoubtedly mistaken, although the point they emphasized is of basic importance in inducing union. Without the thorough opening up of the fragments, bone grafting would be futile. With the fragments well opened, however, it has been our experience that a bone-graft operation well done greatly increases the probability of solid union, and is a most valuable addition to our treatment.

A good deal has been said about the stimulus that the bone graft gives to the osteogenetic cells in the ends of the fragments. Whether such a stimulus exists or not I have been unable to determine. It seems clear, however, that it is of no great importance, as the osteogenetic activity in the ends of fragments in experimental animals seems to be quite as great when the fragments are simply cut open as for the reception of a graft as when the graft has actually been inserted.

TECHNIQUE OF A BONE-GRAFT OPERATION

The technique of a bone-graft operation must necessarily vary a great deal, depending on the problem presented. It is folly to try to force the same plan on all cases. As a rule, the surgeon must determine the mechanical details of his operation after the field has been exposed. The operation will be considered under the headings of the preparation of the fragments, the preparation of the graft, and the insertion of the graft.

Preparation of the Fragments

To prepare the fragments properly an adequate incision is required, a longer one than is needed for a plating operation, as the motor saw must be used in the wound. The fragments are then brought into line, and, if possible, into contact. During these manipulations we avoid all unnecessary injury to the circulation of the fragments. The temptation to strip the periosteum freely off the terminal two or three inches of the fragments must be resisted, as this invariably results in extensive aseptic necrosis, which reduces the fragments to more or less the same condition as the graft, and so lessens the tendency to healing. I have seen several cases fail to unite, and several others definitely delayed in uniting, in what were otherwise technically good operations because of ruthless stripping of the periosteum.

The next step depends on the thickness of the bone involved. If it is the radius, ulna, clavicle, fibula, or any of the slender bones of the hand or foot, the motor saw is applied to the fragments so as to cut out a V-shaped piece from the end of each, as shown in Fig. 1. This V-shaped piece of bone takes out practically the whole of the sclerosed bone which plugs the medullary canal, and opens the fragment well back to the normal medullary cavity. An osteotome is then applied at the point of the V, and the shaft split till the two halves spring open widely. This is the preparation for the diamond graft described by Albee.

In the case of the tibia, femur, and humerus, the diamond-graft operation is obviously not suitable, and

some form of inlay, or onlay, or medullary plug must be employed. We are altogether in favour of some type of inlay, as it conforms best to the principles which we think should govern bone grafting. The onlay graft deforms the part, it interferes with subsequent function, and it fails to make the most use of the osteogenetic powers of the fragments, as it does not open up the endosteal region. The medullary plug is defective in that it is often difficult to insert it far enough beyond the area of sclerosed bone, and it too often literally acts as a plug and prevents the outflow of osteogenetic tissue from the interior of the fragments. The inlay graft, on the contrary, does not add to the deformity; it may be made as long and as wide as is necessary, and in cutting the bed for it the fragments are thoroughly opened up, almost as well as in the diamond-graft operation, so that every advantage is taken of the natural powers the fragments may have towards healing. In our experience it is much the best method.

The preparation of the fragments in such large bones as the tibia consists primarily in restoring proper apposition and alignment. This usually calls for some stripping of the periosteum, but it should be kept to a minimum. At the same time the fibrous tissue, cartilage, and bony plates on the ends of the fragments should be removed, and the freshened surfaces brought into as close contact as possible. If there is any tendency for the fragments to slip apart, and particularly if any amount of force is required to keep the ends in close contact, I always use some form of internal fixation, such as a beef bone or steel screw, or even a steel plate and screws. This precaution does away with the risk of the fragments slipping during the application of the splints or afterwards.

The preparation of the bed for the graft is now proceeded with. With a single or twin saw a wide mortice is cut, extending about three inches on each side of the fracture, if this is possible, and exposing the medullary cavity. In the immediate vicinity of the fracture this will still be plugged with sclerosed bone, which must be chiselled out completely. If the fracture is in or close to the expanded end of the bone, length must be sacrificed in the graft, but to make up for this the mortice and graft may be cut much wider there so as to make a dovetail (Fig. 2).

Preparation of the Graft

The preparation of the graft is of the greatest importance. The requirements of a suitable graft may be summarized as follows:

1. It must contain sufficient living elements to enable it to take an active part in the healing of the fracture.
2. It must be strong enough to act as a temporary internal splint.
3. It must be of such a type that it will resist the disintegrating effect of the invading osteoblasts until sufficient new bone has been laid down in and around it to prevent its collapse.

In order that the maximum of living cells may be transplanted with the graft, its periosteal and endosteal

surfaces must be preserved. I do not mean by this that the periosteum should be transplanted with the graft, for our experiments, and those of many others, have shown that the amount of new bone forming on the surface is approximately the same, whether the periosteum is transplanted with it or not. As a rule, in cutting the graft, we do so subperiosteally and preserve the periosteum to sew over the cavity left by the removal of the bone, in order that a subcutaneous haematoma may be prevented. In removing the graft, however, the periosteal surface should not be roughly scraped or chiselled, as such treatment would undoubtedly remove the osteoblasts which are lying in all the irregularities of its surface. Similarly, the cancellous bone which lines the deep side of a tibial graft should be preserved, as it is readily permeable by lymph, and contains large numbers of osteoblasts, which quickly spring into activity after the transplantation, and are very important in absorbing and rebuilding bone.

The choice of the particular bone that shall be used in any given case is always important. Our experiments have shown that the transplantation of loose-textured bone, such as rib or crest of ilium, is followed by much more active proliferation of osteoblasts and much more rapid absorption and replacement than when the transplant is cut from the hard, compact bone of the crest of the tibia. Theoretically, therefore, cancellous bone should be preferable for transplantation. This is not true, however, in all cases, for in fractures of long bones, such as the tibia, if a transplant of cancellous bone is used, it rarefies so quickly that a fracture often occurs through it, which usually fails to unite again. For long bones, therefore, particularly those in which union naturally takes place slowly, sufficient compact bone is required in the graft to enable it to remain an efficient splint and a trustworthy bridge until new bone formation is well established. The bone that best supplies these requirements is the inner face of the tibia.

One sometimes has to decide whether the graft may be taken from the fractured bone itself, making the so-called "sliding graft," or whether it would be better to go to the opposite limb. As a rule, the sliding graft is perfectly satisfactory, and is therefore preferable. Occasionally, however, when the ends of the fragments are very sclerosed and it is certain that union will be delayed in any circumstances, and where the bone at a little distance beyond the sclerosed ends of the fragments is very thin and atrophic, it is better to cut the transplant from a normal bone, and so avoid the risk of complete failure. The trouble with the sliding graft in such cases is that it tends to absorb and disintegrate before sufficient new bone has formed, very much like grafts made from ribs and iliac crests.

There is a distinct place, however, for cancellous bones as transplants. Nothing has been so satisfactory in our hands as rib for non-union in the mandible. Again, in operations designed to fuse joints such as the subastragaloid, or to fuse the laminae of the vertebrae together, I like to lay in the prepared bed both long strips

FIG. 1.
Bone prepared for diamond-shaped graft.

FIG. 2.
Diagram showing method of introducing graft in ununited fracture close to extremity of bone.

of cortical bone and a crushed-up mass of cancellous bone, with the idea that a great proliferating mass of bone-forming cells will result and ultimately fuse all the raw bony surfaces together. Experimentally it can easily be demonstrated, by transplanting a block of cancellous bone into the muscles of an animal's back and in another place transplanting a similar block after it has been well crushed up, that after three or four weeks a great deal more new bone formation takes place around the crushed bone than around the solid piece. The explanation is that much more bone surface has been exposed, and therefore many more cells brought into contact with lymph. Clinically the same thing can be demonstrated by examining x-rays of patients in whom fusion of the vertebrae has been attempted with a single graft in one case and by multiple strips and crushed grafts in another.

Cutting and Insertion of Graft

The technique of cutting and inserting the diamond graft is worth reviewing. With the fragments prepared as already described, the surgeon exposes a tibia, reflects the periosteum, and with the motor saw cuts a diamond-shaped graft, which is as wide at its central point as the transverse diameter of the bone, such as the radius or ulna, into which it is to be inserted. It tapers down to a fine point at each end, and is from three to three and a half inches long. The saw cuts are made perpendicular to the periosteal surface, and they go right through to the medullary cavity, so that the graft is lined on its deep side with cancellous tissue. This graft is then held by a suitable forceps, and one end of it is hammered into the split fragment which has been prepared for it (Fig. 3). The other fragment is then sprung open by means of a narrow osteotome, and the other end of the graft pushed into its bed. If this graft has been cut to fit the bed it will now be held firmly in the split ends of the fragments, and may require no further fixation. As a rule, however, it is not safe to omit further fixation, as the graft has been known to pop out at one end at some stage in the manipulations, and so spoil the whole operation. It has been our custom to pass a drill transversely through each fragment as it embraces one end of the graft, and to slip a beef bone pin through this hole. In this way accidents are avoided (Fig. 4).

The insertion and securing of the inlay graft also requires care. As mentioned above, if there is a strong tendency for the fragments to slip sideways, we do not hesitate to immobilize them with steel screws or plates. If not absolutely necessary, however, we omit non-absorbable material. We make a point of seeing that the graft fits its mortice accurately and has contact over a large area. We further make sure that graft and mortice are pressed tightly together, and this is done by fastening the graft down in its bed in each fragment by one or more

beef-bone screws, or, if greater security is needed, by long steel screws. The main point is to get a strong graft which is well lined with cancellous bone solidly embedded in the fragments and to fasten it there, so that there is no risk of a little accident spoiling what has often been a serious and difficult operation.

The use of boiled beef bone in the form of pins and screws has been very helpful in immobilizing both fragments and grafts. The screws are inserted into holes which have been drilled and tapped with a special cutting tap. Being ordinary beef bone they have ordinary Haversian canals into which new blood vessels quickly grow, and they undergo the changes which occur in an ordinary autogenous graft—namely, absorption and replacement. The only difference that one can detect between the changes occurring in the boiled beef bone and in the autogenous is that in the former all changes are much slower. It takes six months for a bone screw to be replaced by living bone, whereas an autogenous graft of similar size would have lost its identity in half the time.

FIG. 3.
Graft being hammered into position.

FIG. 4.
Graft fastened in position with bone pegs.

BRIDGING GAPS

The great frequency of failure in attempts to bridge gaps in the long bones by means of transplants has led to almost complete abandoning of the method. Experience has shown that it is usually wiser to accept shortening sufficient to bring the ends of the fragments into contact or nearly so, and then do a bone graft, than to attempt to maintain the

length and to bridge the gap by any method of bone grafting yet devised. As a rule, such attempts have ended in failure owing to fracture of the graft. A study of such grafts in animals has shown that these fractures occur close to the point of contact of the graft with its bed, and are due to the fact that absorption has been going on in the graft more rapidly than the building up of new bone, so that a time comes, between two and three months after the operation, when the graft, which originally was quite strong, has softened down till it cannot stand any strain, and so spontaneously fractures.

Occasionally, however, it is absolutely necessary that a gap be bridged, as, for example, in ununited fracture of the mandible. In such cases the surgeon should bring to his assistance all the forces he can command. Thus, in addition to bringing a suitably shaped graft into intimate contact with the bed in the fragments, provision must be made to ensure that the greatest number of osteoblasts possible survive and take part in rebuilding the graft. This requirement has been met by using a rib which has been split on the flat so as to allow lymph to bathe the cancellous bone of the interior. This plan, if combined with rather prolonged immobilization and a guarded return to motion, will cure most cases of non-union of the mandible.

In the rare cases of fracture in the long bones in which it is necessary to bridge gaps, as in severe loss of substance

in the ulna or radius, one must combine the diamond type of graft with multiple slivers, strips, and crushed up cancellous bone, which is laid in the periosteal tube along with the diamond graft. The latter forms a framework upon which the smaller grafts can build new bone and so ultimately fill the space with material strong enough to do the work of the normal ulna or radius.

CONCLUSION

Much of what I have said has had to do with failures. Failure, however, should occupy a very unimportant place in the surgery of bone grafting, and if the general principles discussed are remembered when the operations are being performed, it will be rare that a failure will need to be recorded.

ABDOMINAL MANIFESTATIONS IN RHEUMATISM

BY

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Although abdominal manifestations in rheumatism are quite well recognized and have frequently been reported, cases in which pain in the abdomen is diagnosed at the outset as definitely rheumatic in origin must be very rare. It is usual for the rheumatic nature of such symptoms to become apparent a few days after their onset, and thus make the diagnosis certain. In a recent paper Giraldi¹ has called attention to this subject, and has given a very good review of the literature relating to it. The matter seems to be of sufficient importance to merit a report of the following cases, and prompts one to consider how frequently abdominal pain in childhood, in the absence of other symptoms, may be rheumatic in origin.

CASE I

D. H., male, aged 10 years, was admitted on the surgical side of the London Hospital, under the care of Mr. Alan Perry. Family history was negative. Past history: The boy was said to have suffered from rheumatism, with involvement of the heart, at the age of 5; since then he had suffered from time to time from limb and joint pains, which had sometimes been severe. No history of repeated sore throats or colds. Present illness: Four days before admission he complained of pain in the lower abdomen, and vomited; bowels had been constipated for two days.

December 8th, 1930 (on admission): There was tenderness and rigidity in the right iliac fossa, and appendicitis was diagnosed. At operation the peritoneal cavity was found to contain a little clear fluid, and the appendix was injected. On section it was reported to show changes consistent with slight chronic appendicitis, which, however, did not appear to be due to an acute attack. The boy progressed well for seven days, and then the temperature began to rise again.

December 16th: The boy looked ill, but, except for slightly diminished air entry and impaired percussion note over the lower lobe of left lung, no abnormal signs were noted. The following day a friction rub appeared in the precordial area, which subsequently became more marked and was heard distinctly all over the precordium.

December 30th: The patient was extremely pale. No rheumatic nodules noted. Throat normal. Heart: signs of pericardial effusion; mitral systolic and soft diastolic murmurs, and accentuated pulmonary second sound. Lungs: in left lower lobe percussion note impaired, with tubular breath sounds and crepitations, but nothing further abnormal. Liver enlarged almost down to umbilicus. The operation wound was healed.

January 2nd, 1931: Pericardial effusion markedly decreased.

January 12th: Hardly any effusion noted; lungs practically clear.

February 6th: Much better. Area of cardiac dullness normal; at apex, systolic murmur still heard and second sound reduplicated; pulmonary second sound accentuated.

March 2nd: No reduplication of apical second sound now present, otherwise physical signs in heart unchanged.

March 3rd: Some pain in left shoulder, and rise of temperature and pulse rate.

March 7th: Patient seemed very well. Pulse rate 88 to 90. Condition of heart as above; apex beat not fixed, and no other signs of adherent pericardium. Liver not enlarged.

About a week later the boy was discharged to a convalescent home. He was treated with sodium salicylate while in hospital.

CASE II

S. H., female, aged 8. Family history was negative. Past history: The girl was said to have had rheumatic fever, but the exact age at which this occurred was not known. Generally speaking she had not suffered from limb or joint pains, and there was no history of frequent sore throats or colds. She was admitted on the surgical side of the London Hospital (May 2nd, 1929) under Mr. Lett, with a history of vomiting and pain in the right iliac fossa for three days; for one day pain in the right knee. She appeared flushed and ill, had a furred tongue, and there was tenderness and rigidity on the right side of the abdomen. The heart at this time appeared normal. Appendicitis was diagnosed. Operation revealed an oedematous and injected appendix containing threadworms. On section the appendix was reported to show the changes of slight acute appendicitis, sufficient to have accounted for her symptoms. Three days after operation the pain in the right knee was more marked, and the left knee was also painful.

May 7th: Acute rheumatism diagnosed.

May 13th: Blowing mitral systolic murmur noted in heart. Patient transferred to the children's department.

May 15th: Knees tender but not swollen. No nodules noted. Heart not enlarged; localized blowing mitral systolic murmur; pulmonary second sound accentuated; no other abnormal physical signs. Pulse somewhat rapid, but otherwise child progressing well.

July 3rd: Physical signs in heart unchanged, except that the systolic murmur was not quite so marked.

July 31st: Child now appeared very well; no abnormal physical signs, and pulse rate had decreased.

August 23rd: Tonsillectomy performed.

September 17th: Child discharged. Heart appeared normal at this time; pulse rate 88 to 90.

The patient was treated with sodium salicylate during the early part of the illness.

I should like further to mention a case which I had the opportunity of seeing while working with Professor Marriott at the Children's Hospital, St. Louis, U.S.A. The child was admitted to the hospital on account of abdominal pain, and on examination appeared to present a picture of acute appendicitis. The case was not, however, entirely typical, and the surgeon who saw the boy decided to wait and watch him for a period. On the following day he had pain and swelling of the joints, and a typical attack of acute rheumatism developed, and ran a normal course.

DISCUSSION

It is still open to question whether appendicitis may be caused by acute rheumatism, or whether acute rheumatism itself may cause symptoms resembling those of acute appendicitis. I feel that the above cases exemplify the fact that abdominal disease may be simulated by rheumatism. The pathological changes in the appendix were slight in both of the cases reported, while there can be no doubt that these children were suffering from acute rheumatism. (The appendix showing the greater pathological change was that found to contain threadworms.) These cases are similar to certain of those reported and discussed by Giraldi and others.