finger prints, are then sent by mail to the War Department, Washington for file.

CLASSIFICATION.

The method of classification and file of the finger prints is, briefly stated, as follows: The patterns of finger prints are divided into two general classes, loops and whorls. In the former are included the arches and in the latter the composites. Each of the ten prints will be there, either a loop or a whorl, designated L or W, respectively, and the ten digits, being taken in pairs, there will be four possible combinations of each pair,

which are written as a key thus:

LL	LW
WL	WW

Since we have the same number of combinations for the second pair, each of which can be combined with each arrangement of the first pair, the total number of combinations will be 16 for the two pairs; 64 for three and 1,024 for the five. This number being the square of 32, a cabinet containing 32 sets of 32 pigeon holes each will be necessary for all combinations of the loops and whorls of the ten digits taken in pairs. This cabinet is divided into four quarters by a vertical and a horizontal bisecting line, each containing 256 pigeon holes, each quarter in the same way into 4 eighths, each eighth into 4 sixteenths, and each sixteenth into 4 thirty-seconds, containing 4 pigeon holes apiece.

Fig. 3.—Form of photograph adopted as part of the identification record system (reduced in size).

If a finger print is received for file in which, for example, the right thumb is a loop, the index a whorl, the middle finger a whorl, the ring finger a loop, the little finger a loop, the left thumb a loop, the left index a loop, and so on, the formula for the print would be LW, WL, LL, WW, LW. By reference to the key above given, the first pair of letters, LW, would be seen to be in the upper right quarter of the key, which would locate the card in the upper right quarter of the cabinet. The second pair, WL, would further locate it in the lower left sixteenth; the third pair, LL, in the upper left sixty-fourth division; the fourth pair, WW, in the lower right two hundred and fifty-sixth division, and the fifth pair, LW, in the upper right pigeon hole of that division.

To subclassify the cards in a pigeon hole from each other and break up large accumulations in one compartment of the above primary classification, a secondary system of classification is made based on the occurrence of arches and loops which are radial or ulnar in position with reference to the index finger or fulcrum.

A still further differentiation is made by counting the number of ridges which intervenes between characteristic fixed points in the impression of a finger, known as the inner and outer terminus, and by noting other charac-

teristics of the ridges with reference to them. For the details of this method the reader is referred to the little book by Henry.¹

BENEFITS OF THE SYSTEM.

An expert in searching for a duplicate by these methods can find it in five or six minutes if it exists in a record of 100,000 cards.

This system will be very valuable in obviating the necessity of much correspondence and collection of evidence at present required to prove identity in cases coming before the War Department and the Pension Bureau. After the introduction of this system, any man who has had service in the Regular Army, can at once establish his identity by placing his right forefinger on the ink pad of an ordinary rubber stamp and making a finger print below his name. Unknown dead, brought from battle fields into field hospitals, or who die there, can in this way give a record which will lead to their identification; and a copy of the finger print buried in a vial with the body will be a permanent and certain identification of it. It is expected that the new system will be put in operation soon after Oct. 1, 1906.

THE TREATMENT OF FRACTURES OF THE PATELLA.*

JOSEPH RANSOHOFF, M.D., F. R. C. S.
CINCINNATI.

This theme certainly lacks the element of novelty, since Barton gave the impulse toward its solution by operation, in 1834. Nor is there any dearth of numerical data to shed light on it. Seven years after the report of the first successful cases of the antiseptic period by Cameron and Lister, Jalaguier, in 1884, was already enabled to collect ninety-four cases of patellar suture with five deaths from infection, not to mention a few disasters like ankylosis, amputation, etc. Eight years ago Powers collected over seven hundred additional cases from literature and from personal reports. The surgeon who is fond of figures, can find few richer fields for statistical deduction than is afforded by the enormous literature at his command. The harvest may be rich. I gladly leave it to another, for farming of this sort is little to my taste.

The fact that the entire question is brought before this tribunal at this seemingly late day, by request, is proof of the unsettled state of some of its features, and perhaps in an irrelevant way, of the slowness of the surgical mind to determine definitely that any one thing is the right thing to do, if another that is not very far wrong can be done.

This brings us at once to the meaty feature in the contention between conservatism and operation in the treatment of fractures of the knee cap. Good and even excellent results can be obtained by conservative measures in many cases, even if a restitution to the normal is not thereby attainable. Operation is, therefore, always one of expediency only. Many years ago, it is said, Malgaigne offered a large monetary prize to him who would show him a bony union of a broken patella. In his classical brochure, published in 1880, embodying a study of one hundred and twenty-seven cases, Hamilton concludes that under any plan of treatment a fibrous

* Read in the Section on Surgery and Anatomy of the American Medical Association, at the Fifty-seventh Annual Session, June, 1906.

union of the fragments is all that can be expected, and that probably a fibrous union with a separation of half or three-quarters of an inch is as useful as a bony union.

To understand the varying, functional limitations which may follow fractures of the patella, there must be a clear understanding of the physiologic value of the patella as constituting only a part of the extension apparatus of the leg. The subperiosteal removal of the patella in the cadaver does not annul the extensibility of the leg at the knee when traction is made on the quadriceps. This experiment is easily verified in the dissecting room. In a few cases in which the entire patella was removed *intra vitam* for tuberculosis, for example, there was little impairment of the power of extension. Complementary to the patellar ligament are the lateral expansions of the quadriceps tendon, the wings or "ailerons" of French anatomists, the fibers of which springing chiefly from the Vasti strengthen the joint capsule and are in part inserted into the enveloping fascia of the leg. Tillaux depicts the lateral patellar ligament as running as far back as the origin of the gastrocnemius.

Fracture in posterior surface of patella.

These anatomic data, far from new, explain the comparatively little limitation of motion at the knee, when even wide diastasis of the fragments exists. In two patients, whom I have been enabled to follow for long periods, in one of whom there was a fracture of each patella, I have seen the power of extension remain stationary in the face of a growing diastasis of the patellar fragments. The chief inconvenience of fibrous union in fractures nearly limited to the patella itself is the insecurity of the joint in extension. These patients fall easily, and it is a matter of common experience that with the laying aside of some protecting knee cap the patient sustains a refracture, or, more properly speaking, a tear through the uniting fibrous bands. In these refractures, if the appellation is justified by long usage, the rent of the parapatellar expansions of the quadriceps is of necessity more extensive than after the original injury. Every surgeon who has operated often for pa-

tellar fracture has operated after the recurrence of the second fracture because of the greater disability it entailed.

A logical conclusion of the foregoing considerations is the reserving of conservative treatment to cases in which the damage is largely limited to the patella. The absence of large diastasis and crepitus as indicating the approachability of the fragments without intervening fascial shreds would speak for non-interference. Fortunately, also, the etiology of the injury and at least one symptom helps us to recognize these cases. Direct fractures from falls or blows on the knee cap are of commoner occurrence than the pure indirect fracture from muscle strain. So far as I can make out from an examination of the histories of fifty-one cases observed in the Cincinnati Hospital twenty-six, or nearly 50 per cent., are clearly of this type of direct fracture. In only fourteen of the cases, or 27 per cent., was it fairly assumable that a cross strain produced the fracture. In this connection it is of importance to bear in mind that even direct fractures of the patella are almost always transverse. This I have demonstrated on the cadaver in over twenty subjects when the blow was delivered with the knee in forcible flexion. As might be expected, there is often no perceptible separation of the fragments and none is possible by most forcible traction on the quadriceps until the tear is made to extend into the parapatellar extensions. In experimental work along this line I have produced direct subperiosteal fractures, which could only have been demonstrated *intra vitam* by an x-ray exposure, or by the linear tenderness so characteristic of subperiosteal fractures in general. A study of the plates of fractures so produced shows that, contrary to every expectation, they often start from within, and that the gap is widest on the joint surface of the patella (see illustration). In some plates it appears that the fracture, when incomplete, leaves the cutaneous surface intact. I have no data to explain this, but the phenomenon may explain the hemarthrosis, which so often follows injuries of the knee, in which a fracture is not even suspected. Perhaps most frequent x-ray examinations of this kind will reveal fractures of the patella to be of commoner occurrence than they now seem. A longitudinal fracture could only be produced on the cadaver by a blow delivered on the lateral margin of the bone and did not show in the radiograms taken.

Although there is often considerable comminution in these direct fractures, the main line is transverse or nearly so. Here, however extensive the bone comminution may be, there is no great separation of the fragments until, as often doubtless happens, the lateral expansions of the tendon give way in the effort of the patient to save himself from falling after the bone has given way.

There is one way in which to ascertain the integrity of the parapatellar wings as proven in fracture of the patella. It is by the ability of the patient to extend his leg or to lift it with some little assistance, and that within a few days of the accident. This symptom might, in my judgment, be invested with the dignity of a sign pathognomonic of an intact capsule. Its presence should for many patients and most surgeons militate against operative interference, unless this be limited to the aspiration of the joint exudates.

Surely the words of Lister uttered thirty years ago in regard to the general question of operation for fracture of the patella are applicable now to the class of cases

under consideration. "No man is justified in performing this operation unless he could say with a clear conscience that he considers himself morally certain to avoid the entrance of any septic mischief into the wound."

It is beyond the scope of this paper to discuss any of the scores of methods of treatment by splints, adhesive dressings, elastic extension, plaster of paris and the many mechanical devices. They may all be good, but they certainly all are bad if continued in use too long or if they are made the chief factor of the treatment. The intra-articular hemorrhage, if at all extensive, not only by pressure tends to keep apart the patellar fragments and to tilt them outwards, as has been shown in innumerable radiograms, but by aseptic irritation leads, after its slow absorption, to a shrinking of the synovial sac and to adhesions, which to a large extent account for the restriction of joint movements. Where, therefore, non-operative measures are to be adopted, two factors are essential to good functional result. First, aspirate the joint as soon as feasible; second, within ten days or two weeks, massage and passive movements should be made, and retentive dressings used only while the patient is permitted to go about on crutches. There is no other way to forestall the atrophy of the thigh, which is an almost constant sequel of a broken cap and a menace to the other patella.

The thought is uppermost that if the conservative treatment fails an operation may be beneficial if performed later as it is in other ununited fractures. While my personal experience is limited, it has been sufficient to satisfy me that a hope based on such a thought will be frustrated. The most difficult operations I have had have been in delayed cases with wide diastasis. The approximation is so difficult that I have decided in such a case in the future to entirely extirpate the patella. Indeed, one of the most satisfactory results I have had has been in compound, badly comminuted fracture, in which suturing was impossible, and in which practically all of the patella was excised. If conservatism is to be practiced, it should not be as an expedient to be supplemented by a later suture, but on the assumption of the integrity of the patellar anatomic complement.

At this juncture I would invoke the exercise of that common sense which regards not only the fracture of the patella, but considers as well the age, the occupation and the station in life of the subject of that fracture. Manifestly, in functional value a fibrous union can never equal complete anatomic restitution, so that if there is any doubt as to the indication for either conservatism or operation the decision should be for the latter. In young persons and in those of the middle decades of life, particularly of the working classes, the taking of some risk is justified, as it would not be in older persons and in those who do not need their legs to live. Of the fifty-one cases tabulated for me treated at the Cincinnati Hospital, the average age was 39. Of the thirty-three non-operated cases, it was 40 years, and of eighteen operated cases, 35 years. Only five of the total number of patients were over 50, and twelve were 30 years of age or under. The entailment of some risk is justified when the indications for operation are clear, particularly in view of the fact that even non-operated cases occasionally succumb. Of our non-operative cases, two died—one of sepsis and the other of alcoholic leptomeningitis. Of 223 cases investigated by Thiem, six died. They were all subcutaneous fractures and were treated without operation.

Of the fifty-one cases admitted into the City Hospital ward, eighteen, or over 35 per cent., were subjected to operation. These figures do not reflect accurately the view point of the surgical staff, since nine of the non-operated cases either refused operation or left the hospital within the first week. In fact, 45 per cent. of the cases completely under control had some form of patellar suture made.

I believe this fairly reflects the trend of surgical practice, since the statistical contribution of Powers was published eight years ago and discussed by the American Surgical Association. It is that, if soon after the accident there is a diastasis of a third of an inch or more, a decided eversion of the fragments, where elevation of the limb is impossible and where there is a marked hemiarthrosis, the indications seem clear that the patellar-capsular appendages are torn, and demand operative repair if even a fair result is to be attained. Of the seventy-five surgeons who responded to Powers' inquiries, no less than seventeen expressed themselves as opposed to operation in any case. Of those of the seventeen who were accessible and responsive to inquiries, Weir and Lilienthal have modified their views in favor of an operation in properly selected cases. A. T. Cabot at first confined operation to compound fractures. In a personal communication he assures me that in workingmen he now operates invariably. Dr. F. Tilden Brown would to-day operate in all cases unless some unusual condition presented. This swaying toward operation for fractures on the part of surgeons meets with an occasional exception. Thus Mueller recently claims that the postoperative results are not as good nor as quickly obtained as those from conservative methods.

It almost goes without saying that the only tenable objection to operation in suitable cases is the increased risk to limb and life. That this exists can hardly be questioned by the warmest advocates of operation. Of our own eighteen operations, one was followed by death from infection. Of 711 cases collected by Powers, there were only three deaths from sepsis, with no amputations. Powers himself does not believe that this represents the true mortality, and few are they who do not share his belief. I know of no way in which to estimate the mortality of suturing the patella. After looking over many series of hospital reports without finding more than an occasional death after patellar suture, I ought to be struck with the innocuousness of the procedure. But I am not, and fear that I never shall be. Twenty, even ten years ago, the statement of Kocher seemed justified (Schmidt) that the technic of asepsis would have to make many advances before the indications for patellar suture should be much extended. It can be stated, I think, that such advances have been made. Certainly, mishaps do not come as often in the last decade as they did in the first two after the publication of Lister's cases. To bear this out, the bad results, which are found in every large series, belong to the earlier years from which they are gathered. Nevertheless the opening of the knee will always be attended with danger. Therefore, no surgeon should operate for patellar fracture, even when it is plainly indicated, except under conditions insuring the greatest measure of safety. With these conditions in doubt, the peritoneum is confessedly a less dangerous field for operation than the knee joint. Let him who would venture an operation bear in mind that the man with a fractured patella may die, but the operation as one of expediency increases that danger somewhat.

With proper regard to environment and skilled assistants, I am convinced that operation is not only justified, but positively demanded when the conditions point to extensive involvement of the capsular expansions beyond the patella. The question at once arises, When shall the suture be made? Even ten years ago the doctrine was current that the safest time for operation is after from fifteen to thirty days. In the eighteen cases of our series operated on, the operation was performed twice on the second day, once on the third, twice on the fourth, and in the remainder, with the exceptions to be noted, before the fifteenth day. The average day of the early operations was the seventh day after the accident. In two it was twenty-eight and thirty days, respectively; in another three months, and in yet another seventy-nine days. The only fatality occurred in the patient operated on seventy-nine days after the accident.

This experience has convinced me that the dread of early interference in fracture of the patella is now unwarranted, as it has been shown to be in most surgical conditions calling for operation. Although by reason of the large joint opened there is no absolute likeness between the patellar and other subcutaneous fractures, I am sure that few surgeons would hesitate to open a recent fracture of a long bone, if there were no other way of keeping the fragments in apposition than by bone suture.

The average of stay in the hospital of the early operations was thirty-nine days, of the average non-operative cases it was sixty days. Of the late cases it was eighty-four days. The greater length of time and extent of dissection required in cases of longer standing than two or three weeks reduces the probability of an undisturbed postoperative course. From the more recent literature it is apparent that postoperative mishaps occur oftenest in cases of long standing and where the suture is made for so-called refracture. Nor can the end-results be as good, for the reasons above given when considering the results of conservative treatment. The difficulties encountered in the few late cases with wide diastasis I have seen have led me to abandon suture altogether in this class of cases. If I should find an operation at all indicated, I should, instead of endeavoring to overcome the great separation of the fragments, remove these fragments altogether and attempt a tendon plasty. The suggestion of Bergman and Pucet might in some cases be practicable. After dividing the patellar ligament at its attachment, it is moved upward as far as possible and fixed there with a metallic pin. It is certainly an ingenious way of approximating the fragments. The division of the quadriceps tendon transversely or in Y-shape has given good results to some operators.

It is manifestly improper to compare in a general way the end-results of operated cases with those conservatively treated. The comparison to be just must be made between fractures of the same degrees of severity, some of which have been treated one way and the rest by another. Of the difference in results there can be, in my judgment, no question to the unbiased investigator. Bony union along the length of the fracture, or at least along part of it, is the rule after suture, the proportion of such unions depending altogether on the methods of retaining them employed. As a compromise between conservative treatment and suture, many plans have been devised to hold the fragments in position by means of sutures of wire or catgut introduced circularly around or behind and in front of the patella. The various pro-

cedures of Barker, Ceci, Kocher, Berger and the purse-string suture of Roberts come in this category of compromise operations and are of about equal worth. They are based on the dread of free exposure of the joint. Not having had much personal experience of them, my judgment is worth little. I, nevertheless, venture the opinion that in the very simple cases when they might do good they all are superfluous, and in the severer ones they fail of three essentials to a good result, namely, cleansing the joint of exudates, the removal of tendinous and periosteal fringes from between the fragments and close approximation of the torn parapatellar, tendinous expansions and of the bone fragments. These indications can only be met by an open operation, which allows full inspection of the damage done by the trauma and a clean method of repairing it. How to do this is a matter of technic, the details of which vary with different surgeons and should vary according to the conditions found.

In the eighteen operations above alluded to, suture with silver wire was done five times, with kangaroo tendon or chromicized catgut nine times and circumferential or tobacco pouch suture was used in four cases. In a number of cases, it is difficult to state how many, the bone suture was followed by periosteal catgut suture. From the record of our cases it does not appear that those sutured with wire fared better than those treated with animal suture material. Of course, we have met the tribulation of having the wire break. In one of the cases it was necessary to remove the wires after the patient left the hospital. Since most of our cases could not be followed, it is impossible to state what became of the wires in the remainder. From a rather extensive investigation of the literature I am inclined to believe that the use of properly prepared absorbable suture material is displacing the wire, although in some of the more recent series of case reports, such as Hamilton of Edinborough, Körte and Mikulicz, wire was almost exclusively used.

As very considerable difficulty is encountered when the fracture is near the apex of the patella and when it is stellate, the purse-string suture of whatever material used is more applicable than an attempt to use the interrupted suture after the ordinary way. I have been impressed with the method of Perarresi, who, after making a periosteal suture as carefully as possible, reflects a square flap from the anterior fibers of the quadriceps tendon over the broken patella, and sews it to the patellar ligament below. By this teno-plasty the eversion of the upper fragment is easily overcome. Furthermore, since there is no drilling of the fragments, the danger of necrosis is avoided.

In my operations for fractured patella I have used the transverse incision in my earlier work. More recently I have used the curvilinear incision with convexity above or below. When the separation of the fragments is wide, the best access to the parts can be obtained by an incision with an upward convexity. It is almost needless to add that the success of the operation depends on the repair of the parapatellar expansions of the extensor aponeurosis.

In two of the cases remaining longest in the hospital, a considerable degree of ankylosis remained. I believe the result was more satisfactory than if they had been discharged with a wide gap. Although an ankylosis can hardly be called a success, it is a matter of common observation that a locked knee, if in good position, does not materially lessen the capacity of the individual for

even the hardest kind of work. Between the serviceability of the locked knee and the flail joint there can be no question. In properly selected cases the indications for an arthrodesis seem to me perfectly clear.

To secure the best results after operation, the retentive dressing should be tentatively removed after two weeks and passive and some active movements encouraged by the end of the third week, at the latest the fourth week.

In conclusion, I submit the following theses for your consideration:

First.—Fractures of the patella are often partial and subperiosteal and require no operative treatment even if recognized.

Second.—A master of aseptic surgery may operate in every case of patellar fracture where separation of the fragments can easily be recognized.

Third.—Where the diastasis indicates the involvement of the lateral expansions of the quadriceps, the indications for operation are plain, unless the valid contraindications alluded to in the body of the paper are present.

Fourth.—The proper time for operation is the first week.

Fifth.—The operation ordinarily indicated is the open operation with suture of the lateral tears and fixation of the fragments with one or other method.

Sixth.—In old standing cases with very wide diastasis of the fragments, excision of the latter and suitable tendon plastic will probably give better results than bone suture.

Seventh.—The knee joint will always remain for him who occasionally does surgery a most dangerous field for operative interference. For him a fracture of the patella should remain a "*noli me tangere*."

DISCUSSION.

DR. ROBERT F. WEIR, New York, stated that, seeing the dangers that have followed in the wake of these operations for fracture of the patella for a long time, kept him from surgical intervention in their treatment. Since other surgeons, however, have shown such good results, and especially now that no finger or instrument is allowed to enter the joint, and since he has seen the brilliant results which have followed this careful procedure, he has resorted to the operation in certain cases. He found, however, that some things are yet to be said. An *x*-ray of their best cases showed that in a large proportion of them there was not a bony union of the fragments, but only a fibrous union. Furthermore, Dr. Weir believes that only masters of surgery should operate in these cases of fracture of the patella, because it is the most risky operation we have to do to-day. He would rather have his abdomen cut open than his knee joint. He has found that one surgeon had an amputation following a fracture of the patella and another had an ankylosis and a third a fatal result. At the Roosevelt Hospital, in New York, these patients are only operated on when there is good reason to believe that the tear runs into the fibrous tissues on both sides; but in cases in which the rent is only on one side, they are very apt to treat the case by the conservative method. Dr. Weir declared, however, that notwithstanding that he does not resort to the operation in a restricted manner, if he were to sustain a fracture of the patella he would not want the knee joint opened.

DR. CHARLES A. POWERS, Denver, said that in the operative management of recent fractures of the patella there should be no contradiction on the part of the patient to the operation itself. It should be definitely restricted to patients of suitable age, patients with healthy viscera and vessels, and patients, who, after the pros and cons of the operation have been carefully explained to them, request the operation. Some twenty or twenty-five years ago Dr. Weir said that antiseptic surgery was not "cock-sure" surgery. That may be said to-day of a

septic surgery. No man can open a knee joint and repair a patella with an absolute certainty that the patient will escape infection. He expects that he will escape infection, the patient will probably have no trouble; but there is always an element of risk, and the patient himself must take it. Dr. Powers believes that it is better in recent cases to wait five or seven, or, perhaps, ten days before operating. As to the operation itself, he advised the curved incision as recommended by Dr. Ransohoff, the removal of the interposed aponeurosis from between the fragments, washing out of the blood clots, and such suture as the surgeon may see fit to apply; the open operation, as Dr. Ransohoff says, should always be done. The results after the operative management in cases with a wide diastasis Dr. Powers believes are better than in cases treated without operation, but the patient is the one to decide and to take the risk. In old cases in which there is a wide separation and the fragments can not be approximated, scoring of the quadriceps extensor or its tendon or transplantation upward of the tubercle of the tibia will greatly permit the fragments to come together and a good suture can be made. Dr. Powers has never found it necessary to remove the patella.

DR. ARTHUR T. CABOT, Boston, stated that he began in this work by wiring only in compound fracture. Since then he has acquired the habit of wiring the patella in all cases that come to the hospital when they occur in laboring men, in whom it is necessary to get a quick result. These men can not afford to lay up for six or eight or ten months to limber out a stiff knee. When the patient is in good circumstances, and can give the time to limbering out the knee afterward, Dr. Cabot frequently treats the case on the expectant plan by bringing the fragments together as closely as possible; but in those cases he thinks it is very important to put off passive motion for some six or eight weeks in order to allow the fibrous union to become as firm as possible. Patients treated in that way get a very good limb, but it takes a long time. He has not yet had an unsuccessful wiring, nor a case of sepsis. He appreciates, however, the danger of which Dr. Powers speaks. Dr. Cabot tells his house surgeons that he wants them to take more pains in disinfecting a knee than in disinfecting the abdomen for laparotomy, because the danger of infection is greater. The absorption from the knee joint is not nearly so good as from the peritoneum, and sepsis in the knee joint is more likely to occur than in the peritoneum. By taking excessive care the very great majority of wiring of knees can be done with perfect success. He has not yet had his unlucky case.

DR. F. D. GRAY, Jersey City, has had an experience within the last year which leads him to make some exception regarding the advisability of attempting late suture. The patient, a woman, had been operated on successfully for fracture of the patella about ten months before Dr. Gray first saw her. The operation had been performed very carefully by the surgeon in charge of the case and the result was a good one. The patient left the hospital at the end of four or five weeks. While under subsequent care of her family physician, a fracture took place, either through the carelessness of the physician or of the patient. Nothing was done to correct the trouble. After nine months the patient consulted Dr. Gray with a separation of the fragments of about two and a half inches. He told her that he would not promise anything in the way of results, but that inasmuch as her condition was so bad, he would do what he could by performing a secondary operation. He succeeded better than he expected in bringing the fragments together. The upper fragment was softened somewhat. He introduced two wire sutures, but one tore a little. He sutured the adjoining fibrous tissue with catgut and then put on a plaster splint which he kept on for two months. During the next four months gradual mobilization of the joint was effected, and to-day the patient walks with barely a limp. She can flex the knee to a right angle with the thigh and she can raise the foot from four to six inches from the floor, while sitting. The quadriceps extensor, of course, is still considerably atrophical.

DR. J. RANSOHOFF, said that he wished to emphasize the desirability of taking as many *x*-ray pictures as possible in every case of hemarthrosis, in order to see whether the experimental findings which he reported can be confirmed by practical clinical experience.