power in lunatic hospitals and other state charitable institutions where sick and suffering persons are kept. Every member of the Society was requested to use his influence with his Senator and Representative. The District Societies were asked to co-operate.

1862. Dr. Bowditch offered resolutions calling attention of Secretary of War to abuses in ambulance system in the army.

1868. Dr. Jarvis offered resolutions asking Legislature to order investigation into infant mortality in almshouses and to reform management if found necessary.

1880. Committee appointed to investigate the treatment of insane persons by the public authorities immediately prior to their commitment.

1881. This committee reported that an act had been passed that was better than before existed, but still not as good as it should be. The matter was recommitted to them for further effort.

1885. At the request of the Association of Medical Superintendents of American Insane Institutions, it was voted to join in urging Congress to pass laws to prevent immigration of defective classes.

1889. On motion of Dr. Henry P. Wolcott it was voted to send to the President of the United States, to the members of Congress and to the State Boards of Health resolutions urging the organization by the general government of a department independent of existing bureaus for the protection of the public health.

In 1893 Dr. Walcott reported (for Committee on Bill for Creation of Cabinet Officers for Public Health) resolution that Congress be requested to create a national sanitary authority independent of Army, Navy or Marine-Hospital Service.

In 1910 the Society passed resolutions in support of Owen's bill for a National Health Bureau with an officer in the President's Cabinet.

1891. A committee was appointed (Dr. W. N. Bullard, chairman) to urge the Legislature to provide proper care for chronic epileptics.

In 1895 Dr. Bullard reported that a bill had passed providing a State Hospital for Chronic Epileptics.

1894. A Standing Committee on State and National Legislation was established and directed to take such action on proposed legislation as they might deem conducive to the interests of the medical profession. In 1899 this committee reported the defeat of a bill making the teaching of the physiological action of alcohol and narcotics to public school pupils of all grades compulsory.

Between this time and 1905 this committee assisted in defeating anti-vivisection bills and bills for establishing licensing boards in osteopathy and optometry.

In 1905 it obtained the passage of an act regulating the sale and possession of wood alcohol.

In this year this committee appointed a secretary and began to keep systematic records; it was authorized and appointed an auxiliary legislative committee consisting of one member from each district of the Society, to the end that the

efforts for influencing legislation might be carried to all parts of the state.

Later one member was authorized from each senatorial district.

From that time to the present the number of measures both state and national over which this committee has exerted its influence has steadily increased.

In 1911 a vote that this committee shall present to the Council such information as may seem to them to call for action with regard to initiative as well as defensive work was passed.

1895. Committee appointed to consider the teaching of physiology and hygiene in the public schools.

In 1899 they made a long and valuable report in which they advised limiting this instruction to older pupils and that a commission be appointed of which a part shall be medical men to examine and select textbooks.

1899. A committee appointed to consider contagious diseases in connection with schools published in the transactions of the Society recommendations in regard to the proper length of absence from school after the various contagious diseases.

1905. The District Societies each appointed a committee for the prevention and control of tuberculosis. These committees had a joint meeting and organized themselves into a general committee under the name of the "Associated Committees for Prevention and Control of Tuberculosis."

In the succeeding years these committees did much work in founding anti-tuberculosis societies, dispensaries, day camps, hospitals; in promoting the distribution of visiting nurses; in improving the preventive work of boards of health and the inspection of schools, factories, cattle and dairy products, and they have exerted their influence in promoting legislation directed against tuberculosis.

1908. Voted that the Council of the Society urge that the insane of Boston be placed under state control and recommend the establishment of observation hospitals for the insane in the larger cities. The Committee on State and National Legislation were instructed to use their efforts in making this vote effective.

WHY AND WHEN TO OPERATE ON FRACTURES.*

BY F. J. COTTON, M.D., BOSTON.

WHY and when to operate on fractures?

Why?—only because non-operative results are bad, very bad, in certain cases and classes.

When?—only when we can promise better results under operative measures.

This opens up the broad and important question, not of rules, but of circumstances, and I see no way for the present that the complex question can be answered save by a surgeon who has had a

* Read at the annual meeting of The Massachusetts Medical Society, June 13, 1911.

fair amount of experience with both methods, who really knows what can be done by skillfully applied, non-operative, "old-fashioned" methods, judged by the end results (the only criterion worth bothering about), and who understands clearly that the present furor for "plating" fractures does not altogether lead to a bed of roses.

Any operator can plate a fresh fracture; the question is, had he better plate it or leave it alone?

I think I was one of the first in this community to do routine open operative work on fractures, eight years ago, at a time when few in Boston, except the late Drs. Porter and Burrell, used to touch any simple fracture (save the patella or olecranon), — a time when I had to get at least two seniors in consultation before I was allowed to touch a case of this sort.

Since then my work has grown more radical, and my field of operative work has broadened in this class of cases as I have tested results.

Within a short time a certain surgeon, not of maximum repute as to surgical judgment in other matters, has come here and declared that we should plate many fractures, if not all, and lo! what has happened?

Every one buys unto himself plates; every one takes to plating.

Not only the difficult cases are subjected to operation, but fractures of the elbow, nay, even Colles' fractures, are subjected to surgical incision and the insertion of indiscriminate hardware.

No one seems to have recalled the fact that the English treatment of fractures by splints, like that on the continent, was notoriously bad and sorely in need of improvement; no one seems to have questioned whether much of the American routine was not, after all, pretty satisfactory in trained and skillful hands; no, we must straightway "plate"!

In the face of this fresh flood of enthusiasm, I feel that I am a hopeless back-number.

I am not ready to say that all fractures should be operated on, nor to assent to the notion that all fractures not easily reducible call for open operation, nor yet to the notion that all fractures not perfectly reducible belong to the knife of the surgeon.

I have never seen a fracture with displacement perfectly reduced without incision, but I have seen many fractures that have been so excellently handled without operation that the results have left nothing to be desired.

After all, we all refer eyes to the man who knows eyes, though possibly it would be easier to have the general practitioner do the easy operation of enucleation rather than bother with the eye specialist, who might not operate.

Perhaps in fracture work it might work no harm to consider the man who knows fracture work rather than to rely on the general practitioner.

Just now we are in the grip of what seems to me a foolish wave of enthusiasm for operation on fractures, and I am sure that in spite of any protest I may make, much more radical operative

work is going to be done here on simple fractures in the next five years than I would care to do.

I am going to present to-day what I believe (so far as it may be formulated) as to why and when one should operate on fractures.

To begin with the most obvious problem, there is one class in which we must intervene — the compound fractures. Here it is not a question of interference with the danger of introducing infection, but a question how one may best deal with a bone wound already putatively infected. The chance of trouble is far greater than with a deliberate operative wound, but it is a chance we must face.

What shall we do? Certain compound fractures do well anyhow. Shall we trust to luck, with the chance of safe healing on one side, on the other the possibility not only of staphylococcus or streptococcus sepsis, but of gas bacillus or tetanus infection? The surgeon will take the surgical chance and will open up and clean up.

Save in cases in which age or infirmity, shock or contra-indication to anesthesia, force us to consider the vital rather than the local indication, — save for these cases we must intervene, and we must act radically in nearly all fresh compound fractures.

Compound fractures may be divided, roughly, into three classes¹: First, the cases in which the fractures are merely incidental to a wholesale crushing of the soft parts, — a condition not uncommonly met with in severe injuries to the hand and foot.

These cases are so largely involved in questions of tissue necrosis, in questions of vessel injury and nerve injury, that the treatment of the fractures as such is often negligible. They hardly enter into the problem before us for consideration.

Broadly speaking, all we can usually do here is to clean up and secure decent position. In the past this has been a question of chlorinate of soda and soap, corrosive or alcohol dressings or dry dressings, with such provision for blood drainage as may be needed. The results have not been particularly good in the past.

To-day, we have presented to us the scheme of sterilization with iodine tincture. It is too soon to talk of results with this method, save that they seem rather better than under the older routine.

One word only I would like to wedge in, namely, that iodine is an irritant as well as a disinfectant in these cases as in the use of iodine for wound dressings and for sterilization of the operation field. I think I have done better with repeated applications of a 2% alcoholic solution than with single applications of the officinal tincture.

Apart from these cases of grave crushing injuries, compound fractures fall definitely into two classes (in both of which the broken bone has inflicted the damage), namely, those in which the prominent fragment of the broken bone has merely protruded to the skin level, — has just "pinked" the skin, and has gone back, — and those in which the bone has either torn the integument widely or has itself been driven out through

¹ I am not considering gunshot fractures here.

the skin, and often is found greatly contaminated with all sorts of dirt.

It is only in the first class that we can hesitate. If the sharp corner of a broken tibia has made a bruised hole in the skin of perhaps one-eighth inch across, — as so often happens, — it can hardly have come out far enough to gather much infection before its retreat into the tissues.

Every one knows what a large proportion of these cases heal cleanly under any reasonable antiseptic treatment or even without it. Every one knows that the "Treves" treatment of fifteen years ago — air exposure with protection of the wound by aristol dusted on — gave good results.

But some cases showed and still show sepsis or even the dreaded gas bacillus infection.

What shall we do as a routine?

I can only give my own answer.

If the case is in camp, in the country, or if the patient is in poor shape to do anything with, we may take a chance on external disinfection and internal immunity-reaction. Infection is of course present, but it may be so combated in the tissues as to do no harm. It is justifiable to disinfect with corrosive, alcohol or iodine, and take chances.

If, on the other hand, the best hospital facilities can be utilized, and if an experienced operator is at hand, I believe we are safer in opening up and radically cleansing the wound.

In this class of cases I have found that my house-surgeons at the hospital usually favored the "closed" method, and justified their choice by results. My own results have been better with the "open" treatment. So I assume that here (as so often happens in surgery) an intangible personal element enters in.

Under any method in this class there will be a proportion of failures, — a proportion will "go septic."

I have not seen, however, any fatal sepsis, or any case of the dreaded "gas bacillus" infection, follow on a thorough open cleansing of the wound.

In the remaining class, — the more open compound fractures, — we must clean up.

Often enough the bone that has protruded is ground full of railroad cinders or factory smut or the smear of shops, or even the filth of stables.

First of all we must clean the bone. Bone has a low resistance to sepsis at best; traumatized bone is even less resistant.

Clean the bone end with a brush, bite out the dirty surfaces with rongeurs; scrub clean or cut out all devitalized tissues in the soft parts, wash with weak corrosive sublimate, followed by profuse douching with normal salt solution, and we have at least done our best at cleansing.

If the wound was foul, pack it open with gauze; thus we may best combat possible infection with the dreaded "gas bacillus," that is so deadly, but so dreads fresh air — a strict "anaerobe."

As a rule, of course, the attempt is made in compound fractures to reproduce conditions that would obtain had the fracture been a simple one.

A question of grave interest is how much one should do in relation to operative fixation at the time a compound fracture is cleaned up. My own practice is to do rather little. I have even gone as far as to let a compound fracture heal and cut down later to secure better position. This Lambotte has also done, and advises, and his advice is worth listening to.

Perhaps it is not usually necessary to go as far as this, but I do believe that plating at this time, or anything more than the insertion of a single suture of wire (or better of kangaroo tendon), is about all we had better do at the outset.

Remember that a compound fracture is already infected; disinfect as we will, we cannot get it really sterile. Given a good chance it may (and usually does) heal by first intention, but every unnecessary manipulation, and most particularly every foreign body left in, is a hindrance and a menace to aseptic healing and must lessen the chance of a clean result.

In a certain few cases vessel injuries determine the absolute necessity of operation. If an artery is torn there can be no question; it is operation or gangrene.

If the artery is only compressed, the indication is nearly as absolute.

Venous hemorrhage gives a little more leeway, for sometimes hemorrhages absorb or are tapped successfully, but hematomata from rupture of the larger veins usually call for operation.

Here and there, generalized swelling associated with hematoma (especially in fractures of the leg) calls for slashing of skin and fascia to relieve general tension and so to prevent impending gangrene. This, however, is in no sense an operation on the fracture as such, and may not even open the field of the direct trauma.

Far commoner as an indication for operation is injury of the nerves.

This indication is not absolute, for nerve damage may be done at the time of injury (as, for example, in musculospiral contusion with fractured humerus) that represents no continuing trauma.

Commonly, however, damage to the nerves is from continued tension.

Oftenest such lesions occur with shoulder luxations overlooked or for other reasons left unreduced, or in cases of fracture luxation at the surgical neck with the head left luxated. In such cases operative relief of nerve tension, due to stretching of nerves over the humeral head, is insistently called for, irrespective of any possible improvement in bony relations.

The same remark holds as to elbow luxations and fractures in which the ulnar nerve is damaged.

This latter injury is rare: I have seen but two cases, in both of which a separation of the epicondyle had accompanied a rotary luxation; in both the broken chip was displaced into the joint; in both, open operation resulted in cure of the nerve damage as well as in good elbow function.

All the foregoing indications for operation are substantially absolute.

Are there any uncomplicated fractures which should always be treated by open operation?

I know of but one, — fracture of the patella with separation of the fragments.

Even here we must qualify our absolute indication by the statement that non-operative treatment gives very tolerable results and is to be preferred in the aged or the infirm.

Nevertheless, nearly all patellar fractures should be sutured if we can command proper surroundings and proper skill.

What is the reason?

First, because the non-operative results are relatively poor.

Second, because operative treatment saves months of time.

I think this time element very important, not only here, but also in regard to all fractures in which non-operative treatment gives very slow results.

Most accidents occur to working-men, laborers and artisans.

In these classes, perhaps in all classes, work is a composite result of hunger and habit. Remove the element of habit, and hunger alone does not suffice.

With men of these types, if they are laid off for six months they come to the end of their resources and become "bums" of the park or of the free-lunch variety, and never become workers again.

If we can halve or quarter the period of convalescence, nearly all of them will go back to work.

This, to my mind, is a most cogent argument for operation in many fractures, including particularly the fractures of the patella, and, only to a slightly less degree, those of olecranon, shoulder, etc., — fractures in which ordinary apparatus treatment gives poor or long-delayed results.

In patella and olecranon cases incision is almost obligatory if there are no contra-indications. Of lesions at the shoulder, fracture with luxation practically always means open operation; and all compression fractures of the os calcis are to be subjected to the remodeling and reimpacting process which I originated and have so often described; they are not subjects for open operation, however, save in rare instances.

Now, with these four classes, — patella, olecranon, shoulder luxation with fracture, fracture of the os calcis, — we have finished the list of typical fractures in which operative measures may be called the usual and routine procedure.

I believe I am correct in saying that there are almost no fractures or luxations save those above noted in which a routine primary operation is justified.

In all other fractures I believe it is our duty to try non-operative treatment first.

Our danger to-day is that of neglecting skilled non-operative treatment, and leaning back on operative open reductions, just as we, many of us, on the advent of the x-ray, neglected all that had gone before and abjectly referred everything to the radiographer for diagnosis.

To-day most good observers concede to experienced skill a value not less than that of an in-

differently interpreted x-ray picture; and we are presently coming to learn, I think, that really skillful handling of simple fractures with apparatus is usually efficient.

Fortune has favored me with a considerable experience in operative fracture work, but a very small percentage of my cases have been cases that I saw immediately or shortly after the original injury, and of the rest very few cases indeed had gone through the hands of either surgeons or general practitioners whom I consider fully competent from mechanical intuition or through clinical experience to handle fractures to advantage.

There is no manner of question that there are many fractures that no one can reduce and hold properly. My only contention is that it is our duty to try to handle these cases without incision, and to operate only when we fail in this trial.

This is our duty to-day and will continue to be our duty until we can show better statistics as to the risks of operative treatment.

It does not help in the least that some one else says, "Sepsis — never — never have it!" We know that we do have it, occasionally, and it does not help us that another alleges that he does not.

To-day, in this country, in this community, there is rarely any justification for open operation on fractures² unless and until really expert effort has been exhausted in the direction of non-operative treatment.

Our duty is to try the simple and safe methods first.

To test the results of such efforts we need only the "x-ray within a fortnight," which I have so often and so tiresomely championed. It may fatigue very much to hear it, but I still believe we should try for the best reduction we can get, and then — within two weeks at most — get an x-ray — a good one — and interpret it in clinical terms and decide whether we should undertake more radical treatment by readjustment under ether or by open operation.

Perhaps it may be well to review in brief the more usual fractures and luxations in this sense — to consider what reasons should impel us, in the given case, to resort to operation.

Please remember — if I am right — that we are here dealing with injuries that call for operation only for some special reason.

Commonest of all fractures is Colles' fracture at the wrist. When should we operate on these cases by open operation?

The answer is, Almost never if the case comes to us fresh. In the worst cases, not readily held in place, the cause is a comminution not to be remedied by operation.

In unrecognized cases that have gone for some time, or in cases in which (perhaps without fault on any one's part) the result is not very good, we can operate easily and successfully, but it is to be remembered that in operations on Colles' fractures, especially in operations on old consolidated fractures, united but united with malposition, the results of the operation are essentially

² Except in the very limited classes above noted.

cosmetic. The wrist will look better, but probably will not work any better, than if we let it alone.

Fractures and luxations of or in the carpus are a worse problem. Many of them call for operation. But if we have, for instance, a fracture of the scaphoid bone with displacement, or a scaphoid fracture with backward luxation of the distal row of carpal bones, we should in the first place try to reduce the displacement. Only if the displacement recurs, or if a bad result is evidently assured, are we justified in operating, for operation in these cases means excision of the carpus, total or partial — often a very useful operation but not to be undertaken lightly. At least half these cases, however, do eventually call for operation to get good function.

As to fractures of the forearm, — of one bone or both, — what are we to do with these?

We are first to recognize that they usually do well under non-operative treatment, skillfully carried out. Position of fragments so bad as to be striking in the x-ray plate is perfectly compatible with recovery of perfect function. Mutual overlapping of the bone-ends will not do to leave alone, but in even the most successful recoveries the position of one bone — the radius usually — is apt to be rather bad.

If we decide that the position is too bad to leave, there is something to be said as to the manner of operation. All we need here is to bring bone-ends opposite one another, — and there is no great displacing force to be counteracted. This can most securely be done with plates, but unfortunately plates in the forearm tend to make trouble, and I have found that staples or sutures could be so applied (with splints) as to give results, and have never had any trouble. Several of my forearm cases have been operated on to quicken delayed union, and in all these, staple or suture fixation has been sufficiently firm to insure the results wished.

Fractures of both bones just below the elbow, or radial luxation with ulnar fracture, may call for early operation if irreducible, but as a rule such lesions are readily reducible.

Olecranon fractures call for open operation as a rule, as noted.

Fractures of the radial head and neck call for operation very often, but not as a routine.

Many of these cases do very well anyhow under early motion and massage even where the skiagraph shows a much deformed head of the radius. All we care about is the recovery of the motion of rotation.

The rule is to test at three to five weeks and see if motion is coming back; if not, and if the check to motion is bony, then excise the radial head. Few operations are more satisfactory in results than this, perfect recovery of function being the rule, but it is not needed as a routine.

Now as to fractures of the humerus at the elbow, — a common fracture in the adult, one of the commonest in children. Should we operate on these cases as a rule?

I think not, as a rule, and my conclusions are

based on examination of the end results of a rather long series of cases.

The results of non-operative treatment are far from bad, even in adults, if early massage and active motion are taken advantage of, and in children the results are good, far better than one would think from reading the classic and pessimistic textbooks on the subject, and we need some really good reason for subjecting the patient to the risk of operation.

Unless there is some peculiar difficulty in reducing or holding the fracture, or some injury to nerve or vessel trunks, I should not think of operating on a fresh case of fracture of the humerus at the elbow. When I have operated, I have not used plates or even staples, and rarely even pins or sutures.

The late operations will be considered further on.

As to fractures of the humeral shaft, the question is different.

Here we have a definite indication for interference in many cases: The humerus is a single bone, unsplinted, so to speak, by a sister-bone, and displacement is often great and hardly controllable, while the chance of long-delayed union or non-union is relatively great.

No quarrel is to be made with the surgeon who proposes operative interference in most fractures of the humeral shaft. His results will probably show up better in the long run than non-operative handling can show as a rule. Personally, I do not operate often, but this is because I think I can do things with splints. In cases in which splint treatment is unsatisfactory, I have had no hesitation in carrying out the open treatment.

When we come to fractures of the "surgical neck" of the humerus, or the separation of the epiphysis, which is the youthful equivalent of this fracture, we face a special problem. Nearly always in these cases reduction without open operation is peculiarly difficult.

It should be tried, and in a fair proportion of cases it succeeds. If it does not, we must cut. These fractures are hard to reduce, partly because soft tissues are often jammed in where they do not belong, but more particularly because the pectoral muscles adduct the lower fragment and the biceps draws it up. Perfect position is not essential, but the mechanics of the joint requires pretty good position if we are to get good function, and if need be we must operate to get it, and we must so operate in a large percentage of the cases.

The difficulty is one of reduction, not of retention.

We often must cut down to reduce the fracture; but after it is reduced we need nothing more than a suture, often not that; adduction of the arm maintained with adhesive plaster gives admirable results in many cases; if there is rotation of the head outward, abduction may work better; in any case we need adjusted position of fragments and fixation of the arm, not any special retention apparatus buried in the wound.

Fractures of the anatomical neck are usually

best let alone. They come out pretty well, even in cases with a loose unimpacted head, and if we operate we shall have to take out the head anyway.

The cases (two in number) that I have operated on have been fractures complicated with luxation; in both of them the head had to be removed.

All these cases of luxation with fracture, whether the fracture is of surgical or of anatomical neck, should be operated on, particularly as they are so often complicated with problems of tension of the brachial plexus over the displaced head, etc.

As to pure luxation of the shoulder, there may be a little leeway for judgment.

In fresh luxations we may say that practically all cases are reducible by manipulation. I have failed once, but this was in a case of an out-patient who refused ether and disappeared.

A certain number of cases came to us, however, usually unrecognized, at two weeks to two months after injury. These cases should be operated on, in my opinion, by incision, unless reduction is really easy. No one who has operated on these cases and seen how massive the formation of new tissue is, and how vessels and nerves are bound down to the displaced head, will ever feel safe in applying much force to such a case in trying reduction.

The results of operative reduction in these luxations are not by any means perfect, for some of the short rotators are sacrificed usually, but the function is far better than if the joint is left luxated.

However, it is to be said that such operations are bloody and carry much shock, and that in old infirm people it may be justifiable to leave the luxation if it is not giving pain, for the functional results in such cases may in time be very fair.

I find that I have operated on sixteen cases of shoulder injury.

Four of these were luxations, pure and simple. Three were fracture luxations. Seven were fractures of the surgical or anatomical neck with malposition.

In three, the involvement of nerves by pressure was an indication for interference, and there was one case of rupture of the artery, one of the vein; both treated successfully.

Clavicle fractures do not call for operation ever, as far as I know.

Clavicle luxation at the acromial joint, on the other hand, is distinctly operable. Only by operation do we get anything like perfect results. The operation is simple, and the only reason it is not regularly done is that the lesion is not a particularly painful one, and is likely to happen in laborers who care little about the treatment of anything that doesn't hurt them, and are indifferent to the weakness resulting from the ordinary treatment.

Next in order come hip-fractures, often operated on, but in my opinion ordinarily inoperable, unless luxation is combined with the fracture. Most hip-fractures are impacted; if impacted in a tolerably good position it is a crime to disturb

the impaction. If position is very bad (e. g., if outward rotation is extreme) we may in selected cases break up the impaction and correct the position and then reimpact (I have done this successfully in one recent case), or we may put the limb up in abduction after breaking up impaction.

Union usually occurs even in cases originally unimpacted if we use abduction-treatment, and cases recently reported by me show the feasibility of artificial impaction for added security.

Only cases in which treatment by apparatus has been tried and has failed justify open operation, and the proportion of these cases after all is small, if we except those occurring in old enfeebled individuals in whom operative treatment of any sort, for any cause, is not to be considered. I have personally done such fixation operation but four times, always with improvement in function, but never with anything near a perfect result, and never could I convince myself of any bony union. From these cases and those of others the operation strikes me as useful, but not anything to get enthusiastic over.

Fractures of the femoral shaft will be considered later, with your permission. Here I will only say that I believe very many of them to be operable, and think operations far too seldom done.

At the knee, patellar fractures are nearly always operable, for reasons already given.

Separations of the lower epiphysis of the femur unless easily reducible are always operable on account of the peculiar danger they present of vessel pressure and consequent gangrene of the leg. Rarely, fractures near the knee, of the femur or of the tibia may call for prompt interference for the same reason.

Fractures of the lower leg, responsible for much disability in very many cases, call for better treatment than they usually get. Better treatment than they usually get is usually practicable without incision, and in the worst cases, those with comminution, open operation is to my mind out of the question.

On the other hand, many cases do admirably that show up badly in the x-ray. So far as may be formulated, we may say that any fracture so ill-reduced that the fracture surfaces are not at all in contact is too bad to let go by. Many other cases should be operated on, but at least these must be fixed, unless there are good reasons to the contrary, and even this rule would mean many more operations and less cripples than at present.

As to ankle fractures, the question is different: Here it is a question of reduction, not of holding the position; once reduced, these cases are easily held (with the rarest exceptions), and if these cases come to us fresh they will furnish practically no open operations. Personally I have never operated on a fresh ankle fracture that was not compound, and have not regretted my abstinence yet.

The same applies to fractures of the tarsus and foot, save for the os calcis fractures, which almost

uniformly call for reduction and reimpaction, but not for incision. Even if we wished to incise and reduce in these cases, the risk of sepsis in opening down through thick doubtful skin on the always comminuted mess of cancellated bone is almost prohibitive.

This is but a rough incomplete survey; in general, it is a plea for operative measures restricted to cases in which there is a definite reason for operating on the individual case.

In general, I am inclined to fear too great an activity in fracture operating in the next few years.

There are, however, two classes of fractures, by no means always to be operated on, that nevertheless deserve frequent operation because operation is often the only way to get good results, and because the ordinary results are far worse than the profession realizes; namely, fractures of the femoral shaft, and leg fractures. The accepted theory is that these cases usually do well. They very usually do not, if one is at all careful as to what he calls doing well.

Only those who see the shortened legs, the occasional vicious deformities, the routine stiff knees, the slow unions, the common refractures following our treatment of femur fractures can appreciate how much is left to be desired, and in leg fractures the condition is only a grade better. Now these lesions occur in young workmen as a rule who need good legs to work on, and I think no one who has looked much into the matter of end results will hesitate long between the probability of crippling and the chance of operation in such cases as cannot be well reduced and held; for to-day, what between "plating" and such screw-bolt apparatus as I have repeatedly used, we can in any case be sure of reduction and of maintenance of practically perfect position and (bar sepsis) of a greatly lessened period of convalescence as well as of far better end results.

Generalizations are notoriously unsafe, perhaps unwise, but I will hazard a guess that about half the femur fractures as they run (including nearly all the transverse fractures), and of the leg fractures not less than a quarter of the total, will in the future be considered operable if perfectly satisfactory adjustment is not brought about within ten days.

I have not spoken of late operations on fractures badly healed, and this paper is perhaps no place to consider this subject, in itself already grown to be a large one. Suffice it to say that, particularly in fractures about joints, wonderfully satisfactory work can be done. Particularly is this true of injuries of the carpus, of the elbow and about the ankle. I think I can truthfully say that I have never had or seen an old fracture in any part subjected to proper operative measures that was not improved thereby, and in many cases the restoration of function is unbelievably good even if a long time has elapsed since injury. These are, however, complicated special operations as a rule, and we have no time for their discussion now.

Let me say only that I believe late operations

on cases showing disability after fracture offer a field second to none in usefulness, probably even more important in the present stage of fracture treatment than open operations on fresh cases.

They are, however, incomparably more difficult than the operations on fresh cases and are successful only in proportion to the care expended in planning the operation suited to the individual cases and to the perfection of the operative technic.

To return to the operative handling of recent fractures, a brief summation is in order:

We have,

(1) Operable as a routine:

- (a) Compound fractures.
- (b) Fractures complicated with vessel lesions.
- (c) Fractures complicated with nerve lesions.
- (d) Patella fractures.
- (e) Olecranon fractures.
- (f) Fracture luxations, especially at the shoulder.
- (g) Acromio-clavicular luxations.

(2) Usually operable after trial of milder methods:

- (a) Carpal injuries.
- (b) Fractures of the femoral shaft.

(3) Often operable:

- (a) Humerus fractures.
- (b) Leg fractures.

(4) Operable on occasion: All fractures in fit patients that promise a bad result as they lie, even though they have had good care, provided that we can show good reasons for expecting a better result from operation.

In general, we may say that fractures of the wrist, forearm, hip, knee, ankle and foot call for better non-operative treatment than they get to-day; that fractures of the carpus, humerus, shoulder, shaft of femur and lower leg call for more and better operative work than we have given them.

Technic deserves only a word.

In large measure technic is, after all, personal and non-transferable. In this work we most need —

- (a) A clear idea of what is to be done.
- (b) A clear field.
- (c) A minimum of cutting.
- (d) A minimum of handling.
- (e) Accurate reposition.
- (f) Adequate fixation, with a minimum of foreign material left in the wound.

We must use adequate means for fixation, but, in general, I think accurate reposition of fragments is usually the main thing. Beyond this, muscle tension does much; the enclosing plaster may be made to do more, and in the end we come out very well, usually, if we have inserted only a suture, perhaps a staple. Often enough we need neither.

Where there is a pull of strong muscles, as in fractures of humerus or lower leg, and particularly in femur fractures, the problem is different.

We must have something more rigid. Here is where the bone plates come in, and, as far as I can see, about the only place they come in legitimately. In cases of femur fracture, I have known even bone plates torn out under the tension. Under these circumstances a fixing apparatus with removable long bone screws is better even than a plate.

MANAGEMENT OF THE HEART IN CERTAIN CASES OF INTEREST TO THE GENERAL PRACTITIONER.*

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FOR convenience of consideration, the subject of the paper is divided into the management of the heart in certain acute infectious diseases and in some of the chronic diseases of the organ itself. Under the former heading croupous pneumonia, typhoid fever and acute bronchitis in the very young and in the aged will be taken up, and under the latter the more common valvular diseases.

In *pneumonia* the chief means of maintaining the cardiac efficiency is to have the patient in a large, light, well-ventilated room, if he must be kept indoors, and with the windows open so as to renew the air constantly. Coldness of the air is of less consequence than freshness. It is, moreover, important that the patient be kept out of "dead" spaces in the room, pockets where the air can at best be but slowly changed. Such places are alcoves, the corners of rectangular rooms, and close up against any of the walls. I am apt to try and have a current of air sweep through the room. It is astonishing how soon a patient learns to resent even the temporary closing of windows to allow of the use of the bedpan without undue exposure. The importance of fresh air has received renewed emphasis from the laboratory as brought to our attention by an editorial in the *BOSTON MEDICAL AND SURGICAL JOURNAL* of Sept. 28, 1911, vol. clxv, no. 13, pp. 493, 494, with the title "Ventilation and Anaphylaxis," which refers to the investigation of Rose-nau and Amoss, which appeared in a paper entitled "Organic Matter in the Expired Breath," *Journal of Medical Research*, vol. xxv, no. 1, pp. 35-85, September, 1911. "Briefly, the result of the investigation is as follows: The clear aqueous liquid which is condensed by means of cold from the expired breath of man is to all ordinary tests a harmless and simple thing, free from bacteria and specific substances. But when studied by means of the methods which have arisen in the investigation of anaphylaxis, it reveals possibilities of extraordinary biological power and the possession of specific characteristics. The injection of small quantities (1 to 35 ccm.) of this liquid into guinea pigs does not of itself produce any significant effects. But a few weeks later, when such treatment is followed by the injection, otherwise quite harmless, of a little human blood serum (commonly 0.2 ccm.), marked symptoms of hypersensitiveness or anaphylaxis develop.

In the authors' researches 26 out of 99 guinea pigs were very much affected by the second injection and displayed marked and characteristic respiratory disturbances with agitation, coughing, scratching, convulsive movements and the like. In four of these cases the reaction was so violent that death ensued."

"The final explanation of these carefully controlled results is not for the present."

"At all events, we are now in possession of facts which clearly indicate the possibility of unknown dangers in the air we breath out. It will not be easy to show that these dangers do not exist, and for the present it is safe to say that we must stand with common sense and let in fresh air."

Another important thing for the pneumonia patient is the sponge bath, which materially aids in the elimination of the toxins, the retention of which in the system is such a prolific source of the heart's giving out. In robust individuals I have found the cool compress over the precordia frequently renewed for several minutes at a time to prove of value, the temperature of the water to be gauged by the effect it produces, beginning with a temperature of 90° F. and not going below 70° F. save in rare cases.

Since my student days it has been the almost universal custom of those practitioners whom we most highly regard to teach that in the care of the heart in croupous pneumonia alcoholic beverages should hold a high place. Careful observation and much thought over a series of years have convinced me that this is probably an error.

At the twelfth annual meeting of the American Therapeutic Society, held in Boston May 11, 12, 13, 1911, in the address of the President, Dr. Harvey W. Wiley, he is reported in the *BOSTON MEDICAL AND SURGICAL JOURNAL*, Sept. 7, 1911, to have said among other things "that it had been shown by Atwater and his assistants that the average adult human organism is able to oxidize with practical completeness about 3 oz. of alcohol per diem if the ingestion is distributed over different periods of the day. On the witness stand he had stated that he considered alcohol a food because a certain quantity of it is burned in the body, resulting in the production of heat and energy. In the light, however, of recent investigations and from theoretical considerations, he was inclined to the opinion that the effort to rid the body of alcohol, although only in the small amount mentioned, perhaps consumes much more energy than is furnished by its combustion and that upon the whole alcohol cannot be regarded as a food, even in the limited sense referred to. Without question it was a substance which does not nourish the body, build tissue or repair waste, and it was quite likely that its value either as a food or medicine had been greatly overestimated. The susceptibility of persons addicted to alcohol to certain diseases had been noted by many writers; furthermore, the experiments of Dr. Reid Hunt on the effect of nitrils on small animals showed that mice which had previously been given alcohol were much more susceptible to toxic influences than those

* Read before the South Boston Medical Society, Oct. 9, 1911.