oxygen inwards, and that with the increased oxygen percentage this was overcome. Nothing but practical trial, for which I have at present but few opportunities, will show to what extent, and under what conditions, the administration of oxygen is of use in various pulmonary and cardiac affections. Cyanosis may always be taken as an indication that oxygen inhalation should be considered.

The immediate effect of suddenly giving an abundance of oxygen to a cyanosed person may sometimes be unpleasant, as I well know from experiments on myself and others. The heart may become tumultuous in its action, and the breathing irregular for the time, or the patient may wake up to the realization of pain or discomfort. His respiratory centre may also wake up to reaction against accumulated CO_2 . It is well, therefore, not to add oxygen too rapidly to the inspired air in cases of cyanosis.

Existing methods of giving oxygen are nearly always very crude and wasteful of oxygen, and it is not possible to graduate efficiently the percentage of oxygen administered. The simple apparatus now to be described is designed to remedy these defects and render practically possible the prolonged administration of air enriched with as little oxygen as will suffice for the purpose aimed at.

An ordinary 20-foot oxygen cylinder is fitted with a pressure gauge and adjustable governor of the type employed in mine-rescue apparatus. By means of the governor the delivery of oxygen can be varied at will from nothing to 10 litres a minute. The oxygen is delivered into a small bag of thin vulcanized rubber of about 2 litres capacity. From this bag there passes to a facepiece on the patient a flexible tube of about five-eighths of an inch in diameter. At its origin from the bag this tube is provided with a non-return mica valve. The last part of this tube is of light and perfectly flexible corrugated rubber tubing of the kind introduced by Mr. Fleuss for mine-rescue apparatus. The facepiece is of the ordinary type, fitting over the mouth and nose, but so designed as to leave a minimum of dead space when applied to the face. It can be secured in position by an elastic strap. Besides an inlet for oxygen, the facepiece has inlet and outlet valves for air, so that if no oxygen is turned on the patient can breathe air quite comfortably and freely. Some air

will also leak in and out round the facepiece which need not be at all tightly applied.

When oxygen is turned on it accumulates in the small bag during expiration, since the very slight expiratory pressure in the facepiece closes the non-return valve, and this prevents the issue of oxygen from the bag, and, of course, at the same time prevents expired air from entering the bag. During inspiration the bag is emptied, the oxygen passing into the facepiece and thence into the patient's lungs. If only a little oxygen is turned on the patient will be breathing mostly air, but by turning on more oxygen the proportion of oxygen can be increased till nothing but pure oxygen is being inspired, and the bag

does not completely collapse till the very end of inspiration. Thus no oxygen is wasted, and enormous economy of oxygen results, so that prolonged administration of oxygen becomes practicable.

Where prolonged administration of oxygen seems desirable, the minimum quantity of oxygen which will remove the cyanosis should be carefully ascertained by observa-

tion of the patient, and the governor adjusted to give this minimum quantity, which is likely to be anything from 1 to 3 litres per minute. The quantity needed will of course depend on the weight and age of the patient; and if hyperpnoea due to CO_2 is present, a larger quantity will be needed to reach a given percentage. A man at rest usually breathes about 7 litres of air a minute.

The probable risks of prolonged administration of pure oxygen must be borne in mind, and if necessary balanced against the risks of allowing the oxygen want to continue. No fixed rule can be given. The proper course to pursue must be determined by the physician after careful observation of the patient, and in the light of experience and knowledge. Many points with regard to the utility of oxygen administration are still obscure, owing to the haphazard methods hitherto used in administering the oxygen.

The apparatus is shown in the accompanying figure, and is made by Messrs. Siebe, Gorman, and Co., Westminster Bridge Road, London, S.E. A simple resistance meter can also be supplied for rapidly checking the indications of the governor on the cylinder.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, July 22nd, 1916.

MINOR INJURIES TO JOINTS.

BY

FRANK ROMER, LIEUT.-COLONEL R.A.M.C.(TEMP.).

At the Croydon War Hospital, where we receive every class of crippled limb, I frequently come across cases of ordinary sprains and dislocations where recovery has been delayed from want of suitable treatment in the initial stages. The conditions of active service render men particularly liable to such injuries, but when the medical officers have many serious cases requiring urgent surgical attention, those who are incapacitated by minor injuries are often unable to receive the attention they would otherwise get. It is in no carping spirit of criticism, therefore, that I refer to this point, but with the view of drawing attention to the importance of immediate treatment when dealing with men sustaining these injuries in England, since by so doing they can be returned to duty more quickly than by waiting for treatment at a later date. Delay not only renders recovery more difficult, but prolonged acquaintance with hospital life is apt to sap the moral of the men.

A sprain has been described as an incomplete dislocation, and is said to occur where a joint has been wrenched by a force sufficient to overstretch or rupture the controlling ligaments and tendons. It may vary from a condition where the joint is completely incapacitated to a mere deviation from the normal, where pain is only elicited by some particular movement.

Hitherto textbooks have made scant reference to the treatment of these common injuries, yet the disability caused by them often persists long after all active trouble has subsided. Treatment should be directed not only to the relief of the immediate pain but to the prevention of those common sequelae—weakness and stiffness of the joint.

If we examine the history of a sprain—and most of us have at some time or other experienced it—there is the curious sickening and painful sensation of its reception, followed by a sense of numbness, which is quickly followed by swelling of the joint and increase of pain. This pain is due to pressure of the extravasated blood and lymph on the sensory nerves, and the more quickly this effusion is absorbed the sooner may recovery be looked for.

For many years absolute physiological rest, combined

with various ways of applying either heat or cold, was considered the only method of treatment in cases of sprains and dislocations, and, in fact, this idea still holds good in many quarters. Nowadays, however, most surgeons have substituted massage as being a much quicker method of reducing the swelling and restoring soundness. In these days when there are so many well-trained masseurs and masseuses to be obtained it is not necessary to describe the various movements of massage; but it is as well to point out that in the early stages the gentle stroking movements of light effleurage must alone be employed, and should be performed daily for about twenty minutes.

As the swelling subsides, which should happen in the course of two days or so, the massage can become firmer. Deep massage and forced movements in the acute condition will do more harm than good, and unless the masseur can be depended upon it is wiser to postpone the massage to a later stage. I have seen a too energetic masseur cause considerable damage to a tense knee-joint by his misdirected efforts. In the intervals of massage the joint should be supported by a bandage and a certain amount of use encouraged. Little fear need be felt as to the patient doing too much; the difficulty is usually the other way.

The employment of massage from the commencement not only aids absorption of the extravasated material, but by so doing obviates to a large extent the formation of adhesions. Again, together with the gradually increasing use of the joint, after the first few days the wastage of the controlling muscles is to a large extent prevented.

In my own practice, as soon as most of the swelling has subsided, I am in the habit of strapping the joint with an adhesive non-irritating plaster in such a way that only normal movements are possible. I find that the plaster gives more support than a bandage, and consequently the patient uses the joint with more confidence.

In fact, in treating a sprained ankle, no matter how severe, I invariably strap it at once by the method described by Wharton Hood, and enjoin use. It is essential that in the early attempts at walking the ankle-joint be used. To permit the foot to be everted and walking accomplished with a rigid ankle is of no use, and this point must be impressed on the patient.

Those who have not yet tried or seen the effect of such treatment would be surprised at the rapidity of recovery. The plaster, by alternately slackening and tightening on the joint during the toe and heel motion of the ankle, goes through the action of massage, yet it is so adjusted that any untoward movement likely to injure the torn ligaments is checked.

The great point to remember is to apply the strapping so that it fits no tighter than a well-fitting glove. Too tight an application increases the pain, whilst if put on too loosely the massaging effect is lost and the joint is not sufficiently supported.

At the end of three days the plaster will need to be renewed, when it will be noticed that the swelling is considerably less, whilst the portions of the foot above and below the strapping will alone be discoloured by the extravasated blood. In the course of ten days to a fortnight the patient will be walking practically sound, but the joint should be kept strapped for a short time longer.

A sprain of the shoulder often proves most painful and troublesome, and here massage properly administered gives excellent results, since it helps to prevent adhesions in a joint which, above all others, seems most liable to be thus affected. This may probably be due to rotation of the scapula being mistaken for true movement of the shoulder-joint, which in consequence does not receive sufficient attention even by experienced masseurs.

The long head of the biceps not infrequently gets sprained, in such an action as throwing, producing most acute pain. The point to bear in mind is that the ensuing tenosynovitis is apt to spread along the tendon as it dips into the joint, and cause the whole shoulder to be affected.

Treatment for dislocation of the shoulder-joint should be on the same lines as an ordinary sprain, with the addition of a support to the capsular ligament by a strip of adhesive plaster encircling the joint, with a thin pad of cotton-wool in the axilla to prevent chafing. The patient wears his shirt and coat normally, and all underhand movements are permitted. The arm should not be lifted

above the level of the shoulder for at least a week afterwards, and then only by the medical man or masseur. No fear need be felt as to the patient doing it himself. I have seen a very large number of these cases and not one expressed the least desire to do so, hence the more orthodox method of keeping the arm strapped to the side is not necessary. I have not only never seen any bad result accrue from allowing the arm to go free, but when the process of repair in the capsular ligament has been effected there are no wasted muscles and stiff joint to deal with.

Sprains of the elbow, apart from that condition of overstrained muscles commonly called tennis or golf elbow, are commonly troublesome in the later stages owing to the tendency of the biceps to spasm limiting extension. Flexion is rarely interfered with unless the resulting callus of some fracture causes the block. In dealing with sprains of this joint, therefore, the masseuse should gently extend the joint at a very early stage of treatment.

Injuries to the knee-joint are easily occasioned, and the ensuing synovitis is an ailment medical men are constantly called upon to deal with. Massage in the slighter cases, if efficiently administered, gives admirable results, but where the joint is tense preliminary aspiration of the joint may be advisable. At some hospitals in France all full joints are aspirated, and I have found these cases do much better than when the patient has had the leg kept rigid in a back splint and the absorption of fluid left to time. From anatomical reasons the position of greatest comfort for a really full knee is slight flexion, yet time after time one sees a joint tense unto bursting point firmly bound down in full extension.

If the condition is sufficiently acute to necessitate rest the joint should be bandaged to prevent any lateral movement, and a small pillow or cushion placed underneath the knee. As the swelling goes down the supporting cushion can be lowered or removed, and the joint painlessly adapts itself to the extended position.

When the pain is severe anodyne lotions can be applied in the intervals of the massage. Traumatic synovitis due to direct violence is more likely to cause separation or injury of the semilunar cartilage than when the condition arises from a twist or sprain. Sir Arbuthnot Lane experimented some years ago in the dissecting room, and found that heavy blows on the joint caused loosening and splitting of the cartilages.

It is not within the scope of this paper to discuss the pros and cons of operation in these cases of cartilage trouble; but there is another condition met with in the knee closely allied to displacement of the cartilage. It is that in which a hypertrophied fringe or fold of the synovial membrane gets nipped between the articular surfaces. Diagnosis is not always clear between genuine slipped cartilage and this condition of caught-up membrane.

In the cases mentioned by Sir William Bennett there was apparently no difference clinically between membrane and cartilage till operation revealed the true cause, and it was obvious that nothing but operation would have relieved the condition. In cases which I have seen the knee is not kept at nearly so acute an angle as in the true cartilage lesion. In fact, the majority only complain of an inability to brace the leg fully back without a sense of pain and discomfort over the front of the joint, and provided they are not called upon to undertake much physical exercise suffer but little inconvenience. Any attempt, however, to indulge in outdoor sports is followed by synovitis of the joint. It is in these cases that the modern bonesetter scores so freely. Treatment in these simpler forms of internal derangement should be by manipulation, much on the same lines as in replacing a cartilage, followed by massage, and at a later stage by strapping or bandaging the joint in such a way that only flexion and extension is possible.

It may be taken as an axiom that if a joint be injured the muscles in control of that joint will waste. By means of massage this wasting is undoubtedly obviated to a large extent, but even then, in comparison with the uninjured side, a difference in the bulk and tone will usually be detected. This wasting of the muscles in the upper limb will probably be righted, if slight, by ordinary use, but in the case of the lower limbs, which have to carry the weight of the body, further treatment by means of suitable gymnastic exercise is essential.

The knee joint is that most commonly rendered unstable as a result of injury; this is not surprising when we consider the enormous leverage brought to bear on it, and that the principal support of a knee-joint is the muscular structure of the thigh. All the muscles in direct control of the knee join in the wasting, and not merely the extensor femoris. Any person having recovered from an acute synovitis of the knee, if attention has not been paid to the inevitable muscle wasting, is liable to get into a vicious circle. The knee joint gets overstrained from want of proper muscular support and swells, with the result that the wasting is accentuated during the abatement of the synovitis. Once more the patient proceeds to get about normally, and there is recrudescence of the trouble until the possibility of some internal trouble of the joint is suspected. Many a man has had his knee-joint opened on the supposition that the cartilage was defective when the whole trouble was due to the weak muscles being unable to support the weight of the body on a joint rendered flabby by repeated attacks of synovitis. Every case of recurrent traumatic synovitis is not necessarily due to internal derangement of the knee.

The exercises suitable for this class of weakened limbs must, to commence with, be of the lightest variety, and so arranged that no heavy strain is thrown on the joint. This can best be accomplished by means of one of the pulley and weight machines, as the amount of weight used can be regulated. Swedish and general gymnastics, though highly beneficial in other conditions of weak muscles, throw too much direct strain on joints to be made use of at the commencement where the joint itself is weakened.

In no circumstances should exercises be started till all signs of the acute condition have passed. For the first few days a certain amount of pain may be experienced after exercising in the whole limb, due to the waking up of lethargic muscles; this will pass off in the course of a short time, and may be ignored. Proper attention to the performance of these daily exercises will eventually restore soundness, even in cases of years' standing, where, in order to counteract the joint weakness, reliance has been placed on artificial support.

Most of the ingenious contrivances habitually worn as a support tend to accentuate the atrophy of the controlling muscles, and their use is to be deprecated. Of course, some of the knee trusses are of great value when the condition is one of slipping cartilage, but too often do we find people wearing elastic knee-caps, and even heavy mechanical contrivances, when proper attention to the muscle tone is all that is necessary.

Radiographs should always be obtained in all cases of severe sprains or injuries of joints, as the presence of some fracture will often be seen which might not be detected by ordinary methods of examination. For example, in sprains of the ankle-joint a small crack is often found in the lower end of the fibula which, though unimportant, somewhat prolongs recovery. Fractures of the scaphoid and "Bennett's stove" are often discovered in cases of alleged sprained wrist. Heavy falls on the shoulder sometimes cause an impacted fracture of the head of the humerus which is not infrequently mistaken for severe traumatic synovitis. If a large amount of extravasated blood be observed on the inner surface of the arm running from the axilla to the elbow, this condition should be suspected.

Radiographs should also be obtained in all cases where, for lack or in spite of more active treatment, stiffness of the joint remains behind, in order to eliminate the presence of any morbid condition. If treatment by radiant heat baths and massage fails to effect a cure, manipulation under an anaesthetic should be carried out provided the case is otherwise suitable. Properly performed, with attention to certain broad rules, this method of treatment gives excellent results.

Doubtless many have read in the press impassioned appeals for the admittance of bonesetters into the R.A.M.C. This is due to a belief that the medical profession are ignorant of this line of work. Attacks on the medical profession in the lay papers by advocates of bonesetting have been going on from the time of Mrs. Mapp of Epsom in 1787. The greater part of this recent outcry is undoubtedly biased, as, for instance, the article in the *English Review*, which implies to anyone not cognizant of the facts that no surgeon of to-day understands or practises these methods. References are made to statements

uttered by well-known surgeons to the effect that there is something to be learnt from the handiwork of bonesetters, but no allusion is made to the many surgeons who have written descriptions of these manipulations, and who practise this line of treatment in private as well as in the military hospitals. At the same time it must be admitted that hitherto *brisement forcé* has never been generally popular amongst medical men.

Nowadays, however, there are special departments attached to practically every command, where surgeons not only habitually break down adhesions when necessary, but superintend the massage, gymnastics, and other adjuncts so important to the after-care of ankylosed joints.

Lectures

ON

DISEASES OF THE MALE URETHRA.

BY

FRANK S. KIDD, B.C., M.B.CANTAB., F.R.C.S.,

ASSISTANT SURGEON, LONDON HOSPITAL, AND SURGEON
TO THE GENITO-URINARY DEPARTMENT.

LECTURE V.—TREATMENT (*Continued*).

THE URETHROSCOPE.

THOUGH a fair percentage of cases can be cured by irrigations and prostatic massage alone, yet a certain number will be found which remain uncured, and which, if left alone, will relapse. These relapsing cases need for their cure an intelligent use of the urethroscope. Some of them will thus be seen to have soft strictures, and these will need for their cure dilatations by means of bougies and the Kollmann's dilators. Others will be found to have infected glands of Littre. These infected glands can be most quickly and easily cured by their destruction through the operating urethroscope.

The position I maintain with regard to the urethroscope is this: You can cure many cases without the urethroscope, but you can only cure all your cases if you are expert in the use of the urethroscope. But quite apart from the question of cure is the immense value of the urethroscope in training the eye in the clinical pathology of urethritis. It is a curious fact that, backward though the study of urethritis has been in England, yet the English urethroscopes are far in advance of any I have seen abroad. In this branch of the subject we have little to learn from foreign practitioners.

For some reason or other, foreign authorities have not taken kindly to the aero-urethroscope. They are content to use some modification of Valentine's or Luys's urethroscope, with which no air is used to distend the canal. In this way they have missed many refinements in diagnosis which are of great importance. In my experience the best urethroscope is that invented by my friend, Mr. Wyndham Powell, after years of patient study, and I cannot too warmly recommend it to your notice. There is not space in these lectures to deal with other instruments, and in what follows I shall assume we are using a Wyndham-Powell instrument.

The Posterior Urethroscope.

I shall not discuss the posterior urethroscope in these lectures. The best posterior urethroscope is the irrigating urethroscope of Goldschmidt and Wassidlo. Such an instrument should be in the hands of all specialists, but its chief value is to teach the clinical pathology of the deep urethra. It is seldom required in routine treatment, as the large majority of cases of posterior urethritis can be cured without its use.

The Wyndham Powell Urethroscope.

A source of illumination suitable for small electric lamps is required, such as an accumulator or a rheostat working off a transformer. Do not use the direct current from the main, as it is dangerous. The instrument contains an electric lamp attached to a short vulcanite handle. In front of this is placed an adjustable focussing lens, and on top of this comes down a folding hood, which holds an adjustable pierced mirror, resembling the mirror of the ophthalmoscope. The mirror can be adjusted by a screw so as to direct the focussed light straight down the centre