PROVINCIAL MEDICAL & SURGICAL JOURNAL.

A COURSE OF LECTURES ON SURGERY,

DELIVERED IN THE
MEDICAL SCHOOL OF CAMBRIDGE.

By GEORGE MURRAY HUMPHRY, Esq., Downing
College, Surgeon to Addenbrooke's Hospital.

LECTURE V.

EFFUSIONS OF SERUM AND LYMPH.

Effects of Inflammation ; the Order in which they occur varies according to the Vitality and Peculiarity of the Tissue affected, and the Peculiarity of the Inflammation : Effused Serum generally disappears with the Inflammation ; occasionally is persistent ; sometimes is the only Symptom, as in Hydrocele, Hydrothorax, Hydrops Articuli ; Treatment : Effusion of Lymph, its Organization ; rarely becomes organized on the Surface of Skin or Mucous Membrane ; the Structure into which it is converted ; shows Signs of imperfect Assimilation of Fibrin by its Contraction, which, as well as the Disposition to contract when stretched, ceases after a Time ; Strictures ; Cicatrices ; Contractions of Joints ; the Force of Contraction proportionate to the Force of Organization of the Fibrin, from which the new Structure is formed ; false Membranes liable to same Diseases as other Parts,—to calcareous Degeneration ; undergo various other Changes, according to the Movements and assimilative Influences of surrounding Parts—in Bursæ, Joints, serous Cavities ; Melon-seed-like bodies ; loose Cartilages. Insidious Lymph-formations ; Treatment by Mercury, Stimulants, Pressure, Bougies ; their Mode of Action ; Excision.

The injurious effects of inflammation upon the organ in which it is seated consist, first, in the effusion of new products, serum, lymph, and pus, into the interstices of its substance ; and, secondly, in the alteration and destruction of its texture by atrophy, softening, interstitial absorption, ulceration, and mortification. In the ordinary course of things these changes take place nearly in the order above enumerated, the effusion of serum being the attendant on the mildest, and mortification the result of the severest, forms of the disease. This order is, however, liable to be interrupted by numerous causes, such as variations in the strength of the patient, and the vital energy of the part affected. I have before mentioned that in old and feeble persons a slight amount of inflammation is quickly followed by ulceration and mortification. The vitality of the textures is with difficulty maintained in such persons

under ordinary circumstances, and gives way altogether under the disturbing agency of inflammation. Compare the inflammation of the healthy and robust man with that in the lower extremities of the old person, where the nutritive and reparative forces are failing, and the circulation is impaired by the diseased condition of the great arterial trunks. In the former the inflammation, acute and painful in its progress, is attended by the formation of lymph and pus, ulceration occurs only to a sufficient extent to open the abscess, the contents of which are well elaborated and quickly discharged, granulations follow, and cicatrization takes place without much loss of time ; whereas, in the extremities of the aged and infirm, the inflammation, consequent probably on some slight provocation, such as a little scratch or bruise, does not amount to any great severity, and the disease presents few of the ordinary characters of an acute affection ; but it is disastrous in its effects, for the textures quickly give way under it, ulcers soon occur, spreading, and difficult to heal, and mortification commences. The destructive progress of the disease depends, too, not merely on the disposition of parts to fall a prey to ulceration and mortification where the inflammation was first excited, but in the facility with which the inflammation spreads among the adjacent structures ; they offer but little resistance to its progress, so that it runs from point to point, carrying desolation with it, and terminating, for the most part, only with the destruction of the limb or life of the patient. So fatal in its results may be the slightest disturbing cause where the processes of nutrition are thus feebly conducted.

Corresponding results occur also generally in the textures and parts of the body to which the supply of vessels is most scanty, and in which the vital energies are least active, such as bone, tendinous and fibrous textures, in all of which inflammation is frequently followed by mortification. In the lower extremities inflammation is more destructive than in the upper, and in both than in parts nearer to the centre of the circulation. There appears, however, to be some peculiarity in certain textures which predisposes them to one or other of the effects of inflammation ; thus mucous membranes and the skin are very prone to ulceration, and serous membranes to the formation of lymph, although the former are more vascular than the latter.

Much depends, also, upon the peculiar character of the inflammation itself. In chilblain the congestive stage is of long duration, and, if the inflammation

proceed beyond it, the next effect is commonly ulceration. Erysipelas sometimes produces mere scaling of the cuticle or effusion of serum beneath it, in the form of vesicles, or into the subcutaneous cellular tissue, causing œdema. In other cases it passes on quickly to suppuration and mortification, not only of the skin, but more particularly of the cellular tissue. In one form of specific disease—gonorrhœa, the inflammation often lingers for months, and produces only suppuration from the surface of the membrane; in another—syphilis, the ulcer is generally the earliest symptom. In boil, carbuncle, and the plague, the inflammation hurries over the early stages, and runs on quickly to the mortification of the parts affected. The varying effects of peculiar kinds of inflammation are illustrated also in small-pox, measles, scarlatina, and croup.

Under ordinary circumstances the earliest and least injurious effect of inflammation consists in the effusion of a preternatural quantity of serum into the interstices or upon the surface of the inflamed part; this takes place with facility proportionate to the looseness of structure of the organ affected, and the delicacy of the patient. A very slight inflammation of the face will cause such swelling, by effusion of serum into the loose tissue under the eyelids, as completely to alter the features; and you have, doubtless, observed the rapidity with which œdema follows inflammation occurring in feeble, delicate, emaciated persons.

When the inflammation subsides, this serum is commonly removed as readily and quickly as it had been effused; or a slight degree of pressure, or a gentle stimulus, will suffice to effect its resorption. Occasionally, however, it remains for a considerable time after the other evidences of inflammation have passed away, and its continuance indicates a weakened state of the part, or a debilitated condition of the patient. An œdematous fulness of the eyelids often remains for a long time after an attack of erysipelas of the face, and ceases only when the patient has recovered his health and strength. There are at the present time two instances of this œdema of the face after erysipelas among the out-patients; one in a delicate young woman, the other in a man much enfeebled by the attack of erysipelas, which occurred some months ago.

In some cases the persistence of œdema in the subcutaneous cellular tissue is the result of continued deep-seated inflammation in the limb. Perhaps there is an abscess beneath the fascia which time will more clearly reveal; there may be ulceration of the cartilages of a joint, or some disease of the bone. I remember a remarkable instance of this kind in a man who suffered under œdema of the upper extremity, chiefly about the elbow; for some time it constituted the only symptom, and could not be traced to any disease of vein or obstruction to the circulation. Other symptoms supervened requiring amputation of the limb; and we found that inflammation and necrosis of the medullary texture of the humerus had been the cause of the continued swelling of the arm.

This earliest and slightest effect of inflammation requires our further attention, inasmuch as it sometimes

exists alone, and constitutes the entire disease. This occurs more particularly in the serous cavities. Hydrocele is a good and familiar example of it. The swelling of hydrocele commonly takes place slowly and imperceptibly, is not attended with pain or other decided evidences of inflammation, and is inconvenient only from its bulk. We can at first scarcely believe that this slight painless affection,—this simplest of diseases, is the result of that same morbid process which gives rise to the formation of an acute abscess, and which sometimes brings speedy destruction to limb and life. Nevertheless a little reflection will convince us that these different effects are connected together by sufficient intermediate links to chain them to one common cause; and we shall find little difficulty in admitting the serum of hydrocele to be as much the product of inflammation as the pus of an acute abscess. In the first place hydrocele frequently occurs as the remnant of an acute inflammatory attack, during which the tunica vaginalis was distended with fluid, as in the common hernia humoralis, or epididymitis, where the swelling chiefly consists of serum effused into the cavity of the tunica vaginalis; the inflammation subsides, its other effects pass away, but the serum may remain, and form a hydrocele. Secondly, an examination of the interior of the sac, in most cases of hydrocele, furnishes additional evidences of the existence of inflammation, such as adhesions and thickening of the membrane from deposit of lymph, induration of the testicle, or epididymis, and so forth. The disease is not generally to be cured by the ordinary means employed to effect the removal of serum; counter-irritants and pressure usually fail. If the fluid be evacuated, it soon collects again, and we are obliged to resort to various means of exciting a more acute inflammation to cure that slight disease upon which the effusion depends. We inject an irritating fluid into the distended tunica vaginalis upon the same principle that we apply a blister to remove a chronic cutaneous affection. We excite a new inflammation, which cures the old one, and terminates by resolution; for you must know that it is not essential to obliterate the hydrocelic cavity; the mere change produced by a certain amount of inflammation of its lining membrane is sufficient to cure the disease.

Effusion of serum sometimes takes place in the same insidious manner into the cavity of the pleura, and attracts attention by its pressure upon the lungs, the first symptom of its presence being not pain, but dyspnoea. The same affection of synovial cavities constitutes hydrops articuli, and these effusions into serous and synovial cavities are generally difficult of cure, in proportion to the slowness of the inflammation which induced them. So resistant are some of these cases to the modes of treatment usually adopted for the removal of serum, such as blisters, pressure, mercurial inunction, &c., that the same energetic proceeding which we employ for the treatment of hydrocele has been adopted in them, and the injection of a solution of iodine into the cavity of a joint, by exciting acute inflammation, is reported to have been occasionally successful in curing the chronic disorder. I do not recommend you to try this

summary proceeding, because I do not think the disease is sufficiently severe to warrant so dangerous and uncertain a remedy. Even in the tunica vaginalis, we cannot always regulate or control the inflammation excited by our injections; sometimes it is insufficient to effect a cure, at others it exceeds our wishes, and extends in a severe form to the epididymis or testicle. Much more should we apprehend danger to the joint, if not to the life of the patient, from the application of an irritating fluid to so susceptible a texture as the synovial membrane. We have sufficient experience of the destructive effects of acute synovitis to make us unwilling to adopt so decided a method of inducing it as the injection of an irritating fluid into the cavity of a joint.

Œdema from effusion of serum may result also from other causes besides inflammation, such as local or general obstruction to the circulation; general debility, when the blood is thin, and its fluid components pass with greater facility than natural through the walls of the capillary vessels, which, partaking of the general want of tone, do not sufficiently regulate the escape of their contents; and local debility, for instance, when the lower extremity has been long confined in splints, in consequence of fracture, and is at length freed from restraint, and allowed to hang down, the weakened vessels and tissues, are unable to bear the weight of the superincumbent column of blood, and œdema results, continuing sometimes for a long period, and forming a troublesome symptom for months after the injury.

In the progress of the inflammation some of the fibrin of the blood altered in the manner before described by the inflammatory process, passes with the serum through walls of the capillary vessels into the interstices of the adjacent tissues, where organization quickly commences. The fibrin or lymph, as it is often called, concretes into a more or less consistent clear jelly-like substance, in which exudation corpuscles, nearly resembling the white globules of the blood, are sometimes observed. These passing through the several stages of cell-formation, may become converted into tissue much after the same plan as that by which the embryonic structures were originally developed. At other times, and this is, perhaps, the more common mode, the fibrin becomes organized by a simpler process, similar to that which takes place in the coagulation of blood removed from the body; its particles are at once arranged into fibres, and these fibres unite into a tissue, without undergoing the more complex intermediate stage of cell-formation.

The fibrin, as well as the serum effused in inflammation, corresponds closely with that of the blood circulating through the inflamed part, having undergone very little change in its passage through the walls of the vessels. At first it is suspended in the serum, and when concreted, it presents an indistinctly fibrous or reticular structure, resembling that of the buffy coagulum formed out of the body, but more elaborate, in consequence of the more favourable situation for organization in which it is placed. A blister sometimes affords an opportunity of observing the exudation of fibrin in inflammation, and its coagulation

into a loose reticular structure, from which the serum is gradually expressed.

When the inflammatory fibrin or lymph is effused upon the surface of the body, as in the case of a blister, or upon the membranes which line the canals communicating with the surface, the process of organization never goes on to any great extent. The new product rarely obtains an organic connection with the skin, or a mucous membrane, or becomes traversed with vessels. It is soon dislodged, in consequence of the movements of the part, the formation and passage of its secretions, and other causes, and is separated from the body. Hence it is that adhesions of the opposed surfaces of canals opening upon the surface of the body are so rare, and, perhaps, never occur, without the previous destruction of the mucous membrane which lines them. The instances in which lymph is found remaining, even for a short time, upon the surface of a mucous membrane, are few. It is sometimes seen in the trachea, more particularly in croup, when the effusion takes place rapidly, and the new product is expectorated sooner or later if the child lives. The lining membrane of the uterus, after puerperal inflammation, is sometimes found to be coated with lymph, which is not much disturbed, either by the slight movements of the organ, or by the scanty secretion from its surface. In the ureters, where the secretion of the kidneys trickles slowly down, and in the bladder, where it gradually collects, and is gently evacuated, the lining membrane is sometimes found covered with tubes or flakes of lymph, though it may be a question whether they become organised even here. In this specimen the coating of lymph extends through the urethra, and in this the canal of the ureter is completely obliterated; I suppose that in this latter instance lymph had become organized and filled up the tube, but it is associated with such extensive disease of kidney, that the formation of urine on that side had probably been quite suspended for a considerable time. The small amount of secretion furnished by the mucous membrane of the bladder and ureters, which has no special glandular apparatus, is another circumstance rendering it more likely to become the seat of deposits of lymph, than the membrane lining the other excretory passages.

In the closed cavities, more particularly in those lined by serous membranes, and in the interstices of the textures, the effused lymph becomes organised, connected with the structures upon or among which it lies, and supplied with blood-vessels, which may be discovered in it after twenty-four or forty-eight hours. The mode in which these vessels are formed is not quite certain, but it is on the whole most probable that they, as well as blood contained in them, are the result of developmental processes taking place in the lymph, similar to those by which the vessels are first formed in embryonic tissues, and that they obtain a connection with the vessels of surrounding parts by the same mysterious power as that which enables them to unite together and form a plexus in the new medium. This is, I think, a more probable view of the mode of formation of vessels in new structures, than that which attributes them to the elongation and projection into the new

tissues of the adjacent capillary tubes. For the further exposition of this subject, however, I must refer you to the more particular accounts detailed in treatises on physiology.

The structure into which the lymph is ultimately converted under ordinary circumstances, is one of a simple kind, more or less resembling the common areolar or fibrous tissues; but it never attains to so great perfection of organization; it is never so soft, fine, and elastic; it is more opaque, and its component fibres are less distinct and regular in their arrangement.

It presents also another evidence of imperfect organization, and of the incomplete assimilation of the fibrin from which it is formed in its disposition to contract. This lasts for a considerable period after its formation, and gives rise to some of the most troublesome of the after effects of inflammation. It is by the gradual contraction of the lymph effused during inflammation into the substance of mucous membranes and submucous tissues lining the various ducts and canals that the greater number of strictures are produced. I say that strictures are occasioned by the contraction of lymph effused into the *substance* of mucous membranes, because, as I just explained to you, the lymph shed upon their *surfaces* very rarely remains for a sufficient length of time to acquire an organic connection with them. This property of the lymph is often not manifested till the inflammation which gave rise to the effusion has subsided, so that the active symptoms of the inflammation had generally passed away before the indications of stricture are observed.

It is rather a remarkable fact, and not very easily explained, that these strictures from effusion of lymph, or simple strictures as they are called, rarely occur except near the orifices of canals where the mucous membrane is surrounded by the striped fibres of voluntary muscles, or by these blended with unstriped fibres. I never saw, and do not remember to have read of a case of *simple* stricture of the alimentary canal in the interval between the upper end of the œsophagus and the sigmoid flexure of the colon, and suspect that it rarely occurs in the latter situation, except in connection with stricture of the lower part of the rectum. Simple strictures of the trachea and bronchi of the gall ducts, ureters, and ducts of the salivary and other glands are also exceedingly rare.

The disposition to contract continues for a certain time, and then ceases spontaneously, the new structure becoming gradually more assimilated to common areolar tissue in its properties and physical characters. So that if the contraction can by any means be prevented till that period has arrived, this evil consequence may be prevented altogether; and if the new structure be stretched after that period has elapsed in such a manner as to avoid the recurrence of inflammation, I believe I am right in saying that it will not resume its former contracted state. This specimen is a good illustration of the fact, that the narrowing of a tube from stricture goes on for a certain time only, and that the calibre of the tube at the strictured part may remain the same for a great number of years. It is the upper part of the œsophagus of a woman in whom

difficulty of deglutition had existed for 40 years. During the whole of that time she had been unable to swallow the smallest particle of solid food; even the fluids upon which she was supported were obliged to be made thin in order to pass the obstruction; on one occasion she was nearly choked by a gooseberry pip which accidentally reached the pharynx, and which was returned after causing her much suffering. Not long after the commencement of her illness she was examined by Sir Astley Cooper, who discovered a stricture of the œsophagus and gave an unfavourable opinion of the case. You see that the only trace of disease is the narrowing of the tube and a slight opacity of the lining membrane, with a few firm threads surrounding it, the shrunken remains, no doubt, of lymph effused long ago. How trifling a structural alteration in comparison with duration and importance of the symptoms occasioned by it: and how easily, in all probability, could the remedy have been applied and the stricture dilated had the precise nature of the case been understood at an earlier period.

The movements of joints are frequently impeded by the contraction of lymph effused into the substance of their capsules. This is particularly observed in the shoulder joint, and is a very frequent consequence of bruises from falls upon the shoulder; the capsule, which is very loose in order to permit the free movements of the joint, and strong to prevent its dislocation, becomes contracted in consequence of the effusion of lymph into its substance and upon its surface, and this takes place chiefly at the lower part of the joint, from the arm being kept against the side and from the capsule being thickest in that situation, so that when the active symptoms have subsided the patient is unable to raise the elbow; the deltoid wastes from disuse, and the flattening of the shoulder so produced, together with the continued inability to move the joint gives rise to the apprehension that some dislocation or fracture has occurred and been overlooked. In process of time, by use of the arm and stretching of the capsule, the movements of the joints may in a great measure be regained. These cases often fall into the hands of quacks, who proceed in a more summary manner. They declare that the bone is out of place and make forcible extension for the purpose of reducing it. By so doing they stretch the contracted capsule, and it may happen that the patient recovers the use of his arm in a short time, but I have frequently known severe inflammation of the joint excited by these rough proceedings.

The contractions of cicatrices going on for some time after ulcers have healed and wounds have united, is, in like manner, due to the continuance of this property in the imperfectly-assimilated fibrin of which they are composed. By its constant operation it becomes a very powerful force, overcoming the muscles and bending even the solid parts of the frame. It continues only for a certain time. The cicatrix ceases to diminish in size a few months after the ulcer has healed; if its contraction can by any means be prevented taking place till that time it will never occur at all, and if the cicatrix be stretched after that period without injury to its texture, I believe that it will not

return to its former state. The lad whom you have seen in the hospital much disfigured by scars after a severe burn, is said to have been unable to extend his elbows in consequence of cicatrices upon the fore-part of the arm and forearm, till one day falling down he made a forcible attempt to put out his arms for the purpose of saving himself and stretched the cicatrices; from that time he has been able to extend the elbows very well.

This contractile property of lymph is most strongly marked when its effusion is the result of active inflammation in a strong and healthy person,—that is to say, when the independent force of organization of the fibrin is greatest, and when, owing to its resistance to the assimilative influence of surrounding parts its own peculiar qualities are most fully shown. It is least perceptible in weak and cachectic persons, the fibrin of whose blood when drawn from the body sets quickly into a loose, soft, large coagulum. You have probably remarked the abundant flabby granulations and the rapid cicatrization which sometimes takes place in the ulcers of these delicate subjects, and you may have remarked too, that these cicatrices so quickly formed are thin and imperfect, contract but little, and give way again to ulceration upon very slight exciting causes.

Once organized, these false membranes,—as the deposits of lymph are sometimes called,—become constituent parts of the body, subject to the same laws of nutrition with it, and to the same deviations of those laws, or in other words to the same diseases. They may increase or diminish in size, and they may become the seat of inflammation with each of its various effects, of tubercle and of cancer. In one important respect they differ from all the natural textures, in that they do not attain to the same degree or vital force or to the same perfection of physical organization, and in consequence of this inferiority they give way before some of the common causes of disease which the other tissues are able to resist. They are the first to suffer in scurvy and other diseases of the same kind, and when attacked by inflammation they quickly fall into ulceration and mortification, and the healing processes are with difficulty and imperfectly established in them. Hence the well-known liability of cicatrices to ulcerate and the troublesome sores occasioned thereby.

Of these new productions some are the result of the reparative processes, when they take the place of a natural structure, which had been destroyed, and perform a useful office in the economy; others are extraneous or additional parts forced into existence by disease, and are altogether useless. These latter, as the common result of want of function, and in obedience to that economical law of nature, which does not suffer useless parts to be maintained at any great expense to the rest of the system, are for the most part imperfectly nourished and in course of time shrink up; or they may undergo another change which I shall again bring under your notice as an occasional consequence of atrophy—viz., calcareous degeneration, or a conversion into earthy masses, by the deposit into their substance of carbonate and phosphate of lime. Perhaps

the change may be more properly described as a transformation of the new substance into those salts. This is not ossification, for the saline particles do not appear to be arranged in any definite order, but merely to be heaped irregularly together into an amorphous mass. The calcareous masses occasionally found between the layers of adherent pleuræ are instances of this degeneration of portions of lymph which had been effused into the pleural cavity during inflammation.

Sometimes, however, it happens that the new formation instead of being subject to either of the above results of atrophy, undergoes certain other changes which bring it into a more or less close resemblance to the structures in or near which it lies. Under ordinary circumstances, lymph becomes in course of time converted into interlacing fibres which resemble those of areolar tissue, and this is more particularly the case when it is effused into that tissue or on the surface of a serous membrane. When it is placed among the tendinous structures it may assume a fibrous sinewy character, and in the neighbourhood of bones and joints it may be converted into cartilaginous or osseous substance.

The effusions into bursæ, which are the seat of chronic inflammation, and into joints, afford some curious illustrations of these changes. Here are a number of little oval bodies of about the size and shape of melon seeds, lying in the bursa beneath the annular ligament in front of the wrist; and similar bodies are not unfrequently found in that situation. They are very tough, composed of structure-like fibro-cartilage, smooth on the surface, mostly loose, but in a few instances attached by narrow pedicles to the inside of the bursa. They are probably formed of lymph effused during inflammation, and moulded into this peculiar shape by the friction to which it is continually subjected during the movements of the tendons, at the same time that it is gradually transformed into a tough fibro-cartilaginous structure in obedience to the assimilative influence of the adjacent tissues. Many, perhaps all of them, are at first attached to the lining membrane of the bursa, but they gradually become pediculated, and at last are rubbed off and float about loose in its cavity. The same explanation is probably to be given of the formation of loose cartilages in joints. There seems every reason for supposing that they originate in small masses of lymph, effused like the white patches on the pericardium during some imperceptible inflammation of the part, and that they are at first attached to the interior of the synovial membrane. They increase in size, undergo cartilaginous transformation, project into the synovial cavity, become pediculated, and at last, during the movements of the joint, are rubbed off from the surface on which they grew; then, being loose in the cavity of the joint, they are occasionally caught between the articular surfaces, and give rise to the sudden and severe pain characteristic of the disease.

These specimens illustrate some of the various forms imparted to lymph thrown out upon surfaces which are subject to attrition. On the pericardium it acquires an uneven, or more or less distinctly reticulated appearance. In these diseased and thickened bursæ it has

been transformed into tough fibrous bands and cords, crossing from one part of the lining membrane to another; and in this joint it has been converted into short fibres, set close together perpendicular to the surface, like velvet. The surfaces of serous membranes which have been for some time separated by the effusion of serum into their cavities, are sometimes sprinkled over with small, firm, glistening bodies, of about the size of millet seeds; they look like tubercles, and are sometimes described as such, but they appear to result from the coagulation of the lymph as it exudes in drops upon the interior of the membrane.

Some of these lymph formations take place without the signs of any inflammation attending them, and correspond with those insidious collections of serum of which I adduced hydrocele as an example. Of this kind, are the adhesions so often found uniting the opposed surfaces of the pleuræ in persons who are not known to have suffered any symptoms of pleurisy during life, also the white patches very commonly found in the pericardium covering the anterior surface of the heart; and nearly allied to them, appear to be those tough, dense, opaque white masses occasionally observed on the peritoneum covering the spleen and liver. These formations are interesting in a pathological point of view only, for we obtain no knowledge of their existence during the life of the patient, and they do not generally interfere with the function of the organ upon which they occur.

Fibrinous exudations may result in like manner with serous effusions from mechanical impediments to the circulation of the blood. A large loose coagulum of fibrin often forms in the serum removed by tapping from the abdomen in ascites, and the coagulation of the fibrin thus effused, together with the serum, may take place in the living body, forming the loose soft masses which are frequently found in the dropsical belly, floating about, or attached to some of the viscera.

After the enumeration of this long catalogue of evils consequent on the effusion of lymph into the cavities, and among the tissues of the body, you will feel the importance of endeavouring to arrest at an early period the inflammations of those parts in which we know by experience that it is likely to take place. I have already mentioned the beneficial influence of mercury in these cases. In *iritis*, for instance, the administration of mercury should be commenced as soon as the earliest symptoms of the disease are observed, and it can then be continued according to circumstances. It is one of the most effectual means of arresting such inflammations, and preventing the effusion of lymph, and it unquestionably exerts also some influence in promoting the removal of lymph already effused. The good effects of the medicine in checking the inflammation, and promoting the absorption of the lymph, are generally observable before the evidences which we are accustomed to watch for of its influence upon the system, such as a swollen state of the gums, salivation, &c., are manifested. An improvement in the condition of the eye in *iritis*, and a softening of the induration about a syphilitic ulcer, usually

precede the soreness of the gums and the increased flow of saliva, so that with few exceptions we may regard the first signs of mercurial influence upon the system as an evidence that the medicine is working with sufficient activity to produce its effect upon the disease. Except in a few acute cases, the advantage gained by administering mercury in such doses as to produce more than a slight soreness of the gums, is not an equivalent for the injury sustained by the constitution. In a chronic case, where the mercurial influence is required for a considerable period, a slight soreness of the gums, scarcely sufficient to attract the patient's attention, may, in most instances, be kept up with very little detriment to the health; but if, in our anxiety to hasten the cure, we go beyond this point, the increased effect of the medicine upon the disease is not proportionate to the injury done to the health, and we are often obliged to discontinue its use for a period, or altogether. I am convinced that the injurious consequences of a mercurial course may be, in a very great measure, avoided, and its good effects obtained by carefully watching the patient, so as to prevent diarrhœa, and keep the impression upon the system within the bounds which I have mentioned.

In some situations we have the opportunity of employing other more direct means, which are found to have some influence in promoting the absorption of effused lymph, such as the local application of stimulants. The application of weak solutions of sulphate of zinc, nitrate of silver, &c., facilitates the removal of a nebulous opacity of the cornea, and a blister on the skin will sometimes lead to the absorption of lymph from the indurated cellular tissue beneath. The employment of uniform moderate pressure is also alike serviceable in reducing inflammation, and in promoting the removal of solid effusions resulting from it. You will be surprised at the rapidity with which the indurated swelling of the epididymis, remaining after inflammation, may be reduced, by well-applied pressure with adhesive plaster; and the induration of the skin, and subcutaneous cellular tissue around a chronic ulcer of the leg is most quickly and effectually removed in this way.

It is not easy to form an opinion in each particular case, as to the probability of a deposit of lymph undergoing absorption, in consequence of the employment of those measures which we know to be beneficial in some instances; we are often uncertain respecting the advantage to be expected from the administration of mercury, when a recent attack of inflammation has left the pupil irregular, and the iris adherent, or from the application of stimulants, when an opacity of the cornea has existed for a month or two. I suppose that after the lymph has become fairly organized and supplied with vessels, so as to become a constituent part of the body, no impression is likely to be made upon it by stimulants or mercury, unless they be employed with severity, which would act injuriously upon the other tissues. The operation of pressure no doubt extends over a longer range of time, for if the natural tissues are not proof against its destructive effects, when they are subjected to it for a considerable

period, as in the case of an aneurism, which makes its way to the surface in consequence of the absorption of the surrounding parts occasioned by its pressure, much less can these new and morbid products resist its influence.

With reference to the last remark, it may be well to mention that the effects of each of the above modes of treatment in promoting the absorption of lymph formations, depends upon the low vitality of the new products, and their inability to withstand certain disturbing influences, which fail to effect the original or natural tissues. The mercury, the stimulants, and the pressure, are in each case necessarily applied to the new and old structures alike; the solution of sulphate of zinc produces its immediate effect upon the other parts of the eye, as well as upon the opacity of the cornea, and the bandage compresses the healthy no less than the morbid components of the limb, but the new formation yields and undergoes absorption under conditions which the healthy or natural parts are able to bear. For the same reason the influence of mercury, taken by the mouth, is generally manifest upon the disease before its peculiar effects upon the system are observed.

When lymph is effused into the substance, or upon the surface of an internal organ, we have no means at our command whereby we can in any way prevent or remove the injurious effects of its disposition to contract; but when it is situated within reach of mechanical appliances, we can sometimes interfere to prevent the contraction, or to stretch the new product after its contraction has taken place. A cicatrix at the bend of the elbow may be kept extended till it has lost the disposition to contract, and I have related to you an instance in which there is every reason to suppose that the cicatrix was stretched, after it had ceased to contract. It rarely happens, however, that we are able by mechanical means to obviate this disposition of cicatrices, which, though on the whole a happy provision, is occasionally productive of very disastrous results.

It is in the treatment of strictures, caused by contraction of lymph effused into the substance of mucous membranes and the submucous tissues, that our mechanical appliances are attended with the greatest benefit, and they operate, for the most part, in a curative rather than a preventive, manner. The usual treatment of stricture consists in the dilatation of the narrowed channel by means of bougies, which have the effect of stretching the contracted false membrane causing the stricture, at the same time that by the pressure they exert, they promote its absorption, and by the slight stimulus they impart, facilitate that absorption. The passage of the instrument is repeated from time to time, a larger size being introduced as often as admissible, till the new product has been absorbed or stretched to a sufficient extent, and has lost the disposition to contract again. In order to ensure the permanence of the cure, it is well occasionally to introduce as large an instrument as the canal will admit, for a considerable time after the full dilatation of the stricture.

The treatment of strictures consists, therefore, in

exerting slight pressure and gradual extension for a lengthened period, and you can easily understand how injurious rough and unskilful management of the disease is likely to prove. If too great force be employed, the lining membrane of the canal may be lacerated or inflammation induced, leading to cicatrization or the further effusion of lymph, and the consequent more complete narrowing of the tube. The patient pains-taking gentle surgeon is in the long run most successful in the treatment of these cases. If the instrument selected, which on first trial should be of such size as nearly to fill the canal, does not pass readily, try a smaller one, endeavour to press it on gradually and gently, expending time rather than force upon it. If it passes, allow it to remain for a quarter of an hour, more or less, and repeat the operation in a few days with the same instrument or with one of a size larger. If you do not succeed by gentle pressure continued for a few minutes in dilating the stricture so as to allow the instrument to pass, it is well to allow the patient to keep the instrument pressed against the stricture for an hour or so, and after this proceeding has been repeated a few times, the difficulty is generally overcome and the instrument passes on. I find the plan of pressing upon the stricture with a moderate sized bougie to answer better on the whole, than the attempts to pass it with small instruments, which are likely to injure the membrane and become entangled in its folds. Patience, perseverance and gentleness, are the great requisites to ensure success, and you will find few strictures which do not yield to them. In a few instances, where the stricture is of long continuance, and has been reduced to a mere thread-like constriction of the tube, its laceration by the forcible introduction of an instrument may be followed by permanent cure, but these cases are not common, and we cannot very well be apprized of the existence of such a condition.

The division of strictures by the knife is less likely to be attended with permanent benefit than their dilatation with bougies, because the wound soon heals and the contracted condition of the tube returns as bad as before.

Excision presents the only means with which I am acquainted for getting rid of the melon seed-like bodies in bursæ, and of loose cartilages in joints; the latter may sometimes be kept fixed by bandage in one part of the joint, till they acquire adhesions to the synovial membrane, and cease to occasion trouble. I know one case in which this fortunate result appeared to take place; the supposed foreign body was by a circular bandage retained in the synovial *cul de sac* above the patella, and gave rise to no annoyance during the two years in which I was acquainted with the patient after the bandage was discontinued.