tiions *of* the feet are generally owing to the curvature of the bones of the leg. By removing the curvature of theſe, the foot will commonly regain its natural situation, and the ſplint above mentioned will for the most part be ſufficient for the purpoſe. But in caſes where the ſole of the foot is turned much out of its natural direction, it may be neceſſary to fix the ſplint and ſhoe to a frame (fig. 114.), which will render the cure still more effectual.

Beſides the inſtrument already mentioned, ſome have uſed a kind of boot, cut lengthwise, made of hardened leather or of metal, &c. which may in some caſes sufficiently anſwer the purpoſe.

In caſes of club-foot, where the diſtortion is in the middle of the foot, a pair of shoes, such as are repreſented in fig. 115. have been found useful. After the feet are fixed in the ſhoes, the fore part of the feet may be ſeperated by means of a ſcrew in two plates, which are fixed to the ſole.

Chap. XXXIV. *Of Amputation.*

Sect. I. *Of imputation in general.*

In amputation, which in ſurgery ſignifies cutting off a limb, the great end to be aimed at is, the procuring of a handsome ſtump, in which the bone may not protrude, but be well covered with fleſh ; ſo that no excoriation or rawneſs may be apt to take place. As long ago as the year 1679, it was proposed by Jacob Young, an Engliſh ſurgeon, in a treatiſe intitled *Currus Triumphalis ex Terebinthino,* to preſerve a flap of fleſh and ſkin, which was to be folded over the bone, and which, uniting to the parts of the wound after amputation, would effectually cover the bone, and prevent the inconveniences above mentioned. No traces of the ſucceſs of this method, however, can be found till the year 1696 ; when a Latin diſſertation was publiſhed upon it by P. Adrians Verduin, an eminent ſurgeon in Amſterdam. The moſt ſanguine expectations were formed of its ſucceſs ; and it was even thought that the flap would prevent the neccessity of tying up the blood-vessels. However, it does not appear that the method as at that time practiſed either did or could succeed ; and accordingly it was entirely laid aſide ; but it has been lately revived with conſiderabſe im­provements.

Amputation may be rendered neceſſary when a member is ſo much diſeaſed as to be uſeleſs, or when it puts life in danger.

The cauſes in general rendering this operation neceſſary are, bad compound fractures ; extenſive lacerated and contuſed wounds ; part of the limb being carried off by a can­non ball or otherwiſe, the bones being unequally broken and not properly covered ; extenſive mortification ; white swellings of the joints ; large exoſtoſes ; ulcers attended with extensive caries; cancer or other incurable ulcers; varicose kinds *of* tumors ; particular diſtortions of the bones.

Amputation may alſo be ſometimes necessary from violent hemorrhagies of some principal artery during the cure of a fractured limb, or from ſuch a profuſe diſcharge of matter taking place that the ſtrength of the patient is exhauſted. Lacerated and contused wounds may require amputation, on account of hemorrhagy enſuing which cannot be stop­ped. Extenſive mortification may take place, and ſuch large quantities of matter be formed, that the patient will be un­able to bear up under the diſcharge

Where part of the limb is carried off, it is neceſſary to amputate higher up, to as to cut the bone, as well as the ſoft parts, in ſuch a manner as may admit of a much speedier and ſafer cure. When mortification occurs, every thing ought to be done for the ſupport of the patient till the diſeaſe be stopped ; the first ſign of which is, the appearance of an inflamed circle between the diſeaſed and ſound parts. As ſoon as the diſeaſed begin to ſeparate from tlne found parts, amputation of the limb ought to be performed, and no time ought now to be lost, loſt the patient ſuffer from the abſorption of putreſcent matter.

No part of ſurgery is brought to greater perfection than the manner of performing amputation. Before the inven­tion of the tourniquet, and the method of ſecuring the veſels by ligature, the operation was ſeldom undertaken ; and a great proportion of thoſe upon whom it was performed died ſoon after. In the preſent improved method, one death does not happen in twenty, or even thirty caſes. In per­forming the operation, particular attention is to be paid to the ſpot where the inciſion is to be made ; the quantity of ſkin and cellular ſubſtance neceſſary to be ſaved, ſo as to cover the muſcles and bone completely, without being ſtretched ; cutting the muſcles in ſuch a manner that they nay unite with each other and entirely cover the end of the bone; the prevention of hemorrhagies during the operation ; the tying of the arteries alone, without including the nerves or any of the contiguous parts ; ſecuring the integuments ſo as to prevent them from retracting after the operation ; and a proper ſubſequent treatment of the caſe.

The following are the general ſteps of the operation : The patient being properly placed, with aſſiſtants to attend, and the apparatus in proper order, the flow of the blood to the limb is to be stopped by the tourniquet (fig. 16. ). The first inciſion is to be made through the ſkin and cellular subſtance by one, or rather by two, ſtrokes of the amputating knife repreſented in fig. 116. Theſe are next to be separated from the muſcles, as far as may appear ſufficient for covering the ſtump. The ſeparated ſkin or flap ſhould be ſtrongly drawn up, or what perhaps anſwers better, turned up all round the limb, leaving this part of the muscles quite bare. The flap is to be kept in this ſituation by an asſiſtant, while the operator makes the next inciſion at tlhe edge of the reflected ſkin, and cuts till he comes to the bone. This inciſion ſhould be begun on the lower side of the limb, that the blood may not prevent the eye from readily follow­ing the edge of the knife during the whole cut. The muſeles are now to be separated from the bone as high as may enable them afterwards completely to cover it. The soft parts in general are then to be drawn up by retractors, which may be either of leather, as in fig. 117. or metal, as in fig 118 a and *b.* The perioſteum is to be divided at the place where the saw is to be applied ; but no part of the bone is to be denuded of this membrane, which is afterwards to cover the ſtump, otherwiſe trubleſome exfoliations may enſue. At this place the ſaw (fig. 119. ) is to be applied, and the bone divided with long ſteady ſtrokes. In this part of the operation a good deal depends upon the steadiness of the aſſiſtant who holds the limb ; for if it be held too high, the motion of the ſaw will be impeded ; while the bone may be ſplintered if it be not ſufficiently raised. Any points or ſplinters which may be left ſhould be immediately removed with the pincers (fig. 120.). The retractors are now to be laid aſide, and the principal arteries ſeparated from the nerves, and ſecured by the tenaculum (fig. 17.), or forceps (fig. 120. a), and ligatures.

The tourniquet ſhould next be a little ſlackened, to allow the different branches to be diſcovered : The clotted blood is to be cleared away with a warm sponge. The patient ſhould get ſome warm cordial drink, and all the arterial branches which can be diſcovered ought to be taken up. The ends of the ligatures are then to be cut of ſuch a length as to allow them to hang without the lips of the wound. The muſcles and ſkin are now to be drawn down, and brought