has wellnigh become a lost art. The gauze bandages are more easily applied, are more comfortable, and are cheaper. For rougher work, unbleached muslin is generally employed. These materials have little elasticity, and if pressure is desired, a layer of cotton, preferably

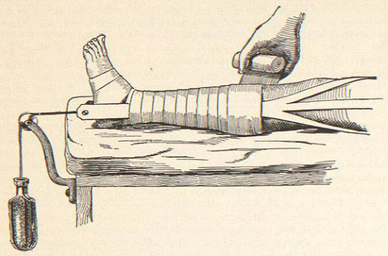

FIG. 1663.—The Use of Adhesive Plaster in Extension.

non-absorbent, is spread on the part before the bandage is applied. An all-wool flannel bandage, especially if cut on the bias, has a good deal of elasticity, so that it can be applied directly to the skin and made to exert a considerable pressure without discomfort, if care is taken to make the upper and lower edges of each turn of the bandage equally tight. Such a bandage applied every morning is especially serviceable to relieve chronic œdema of the feet and legs. A double or tubular stockinette bandage is also well adapted to this purpose and for use in the treatment of chronic ulcer of the lower extremity.

Gauze, muslin, and flannel bandages may serve to keep dressings in place or to apply pressure; but if strong pressure is desired for a short time a rubber bandage is preferable, since its great elasticity will make and keep a limb anæmic during an operation. Such a bandage is often called an Esmarch bandage, from the surgeon who so strongly advocated this method of bloodless operation. The directions for its use are as follows: elevate the limb, and then wind the bandage spirally, with a constant pressure, from the tip of the extremity to the middle of the arm or thigh. There should be no reverses nor figure-of-eight turns. Each turn should overlap its predecessor by one-half inch or less, so as to facilitate the removal of the bandage from below upward. The uppermost two or three turns should be left in place, to shut off the circulation, or a separate ligature may be applied for this purpose. The rest of the bandage is removed from below upward, and the limb will be found to be bloodless and will remain so until the ligature is loosened.

While a bandage of any sort of material may have the effect of limiting motion, this end is best achieved if some stiffening material is incorporated in the bandage or painted over it. Dextrin and soluble glass are applied on the outside of a completed muslin bandage,—starch and plaster of Paris are incorporated in a gauze bandage, which is wet immediately before it is put on. The best starch bandages are made of strips of the heaviest white crinoline, loosely rolled up. Muslin starch bandages do not wet through easily, and the turns do not lie as closely upon each other, nor adhere as well as the turns of a crinoline bandage. Crinoline is also the best basis for plaster-of-Paris bandages, as it wets more quickly, holds its shape better during its application, and presents a better appearance when applied than a plaster-of-Paris bandage made of plain gauze. It is important that the plaster be fresh so that it will set well and that the bandage be loosely rolled so that it will quickly wet through without being squeezed.

Plasters.—The three kinds of adhesive plasters in common use are the rubber adhesive plaster, the less known zinc oxide plaster, and the old diachylon plaster, now often called a "moleskin" plaster, because the adhesive is usually spread upon the smooth side of Canton flannel. Rubber plaster, as formerly made, was somewhat irritating. Now the quality of the plaster is such that irritation follows its use only upon very delicate skins. Even this slight irritating effect may be reduced if one employs, instead of the plain rubber adhesive, a rubber adhesive plaster which contains a certain amount of zinc oxide.

Moleskin plaster is chiefly used to enable the surgeon to make extension upon arm or leg (Fig. 1663). The adhesive spread upon the cloth is generally the diachylon plaster, and not a rubber adhesive. To make such plaster adhere to the skin it is necessary to heat it or to wipe its surface with chloroform.

Adhesive plaster may be so applied—either by strapping the edges together or by the ingenious method of lacing the plaster shown in the illustration (Fig. 1664)—that suturing the skin edges of a wound will not be necessary.

Plasters have long been a favorite means for the application of counter-irritants. Though ridiculed by some physicians, a cantharides or capsicum or mustard plaster will often relieve an aching back or side. One of the most efficient plasters for a sore back is a broad square of rubber adhesive plaster over which ground red pepper has been freely dusted.

Splints.—A splint should be light and rigid. If it has the third essential, the capability of being readily moulded to fit the part, it fulfils all demands. Unfortunately, no cheap material thus far found possesses these three requisites in a high degree. One has to think only of the various materials employed as splints to see that each fails in at least one of the three essentials. Wood, pasteboard, tin, iron, wire gauze, rubber, celluloid, felt, leather, and the various manufactured materials, such as wood pulp, papier maché, and cloth saturated with glue or varnish, are none of them easily moulded at a temperature which the body can bear. Plaster of Paris, freshly moistened, will fit any surface, and in a few minutes will set and dry so that it will retain its shape. But it has little strength unless in thick masses, and its weight is then prohibitive for most purposes as a splint. Hence the plaster is usually applied in the meshes of a gauze bandage, so that its rigidity may unite with the strength of the cloth, and thus avoid the great weight of a pure plaster cast. Applied in this manner plaster of Paris is easily the most satisfactory material for a rigid splint which must fit closely over irregular surfaces.

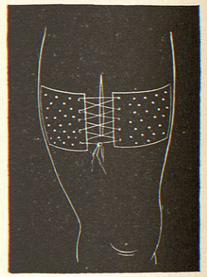

FIG. 1664.—The Use of Adhesive Plaster in Place of Sutures.

The woods ordinarily selected for splints are the softer deciduous woods, such as bass wood, soft maple, white wood, etc. They are sold in sheets of varying thickness, and the thinner ones can be made even more flexible by steaming or soaking in hot water for a few minutes. To give it an additional adaptability, a splint may be sliced lengthwise, while a strip of rubber plaster spread upon one side of it prevents the slices from falling apart. Such a splint, called a coaptation splint, is especially useful in fractures of the shaft of the humerus or femur.

Splints cut from tin with a pair of heavy shears are well adapted to holding immovable a finger or thumb in

case an infected wound of a joint or tendon requires repeated cleansing and perhaps a wet dressing. Such a splint like a gutter may partly surround the finger, while it spreads out over the palm or back of the hand. When

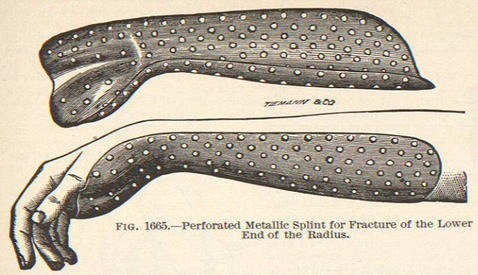

FIG. 1665.—Perforated Metallic Splint for Fracture of the Lower End of the Radius.

bandaged in position it fixes immovably the finger. The manufactured metallic splints which are made in the greatest variety of shapes and sizes are light and rigid, and can be bent somewhat to fit the limbs of the patient (Fig. 1665).

Splints made of felt, of leather, or of cloth saturated with glue and varnish are now seldom used. They are not sufficiently flexible when soaked in hot water to offset the disadvantages of expense and uncleanness. A fairly flexible splint material can be made of wood pulp in the centre of which is a coarse gauze to prevent the pulp from breaking. When dry this material is light and rigid. When thoroughly moistened it can be easily bent without breaking, and if bandaged in position it will when dry retain the shape given it. It will not, for example, fit an elbow bent at a right angle, and the fact that both splint and limb have to be kept in a correct position until the wood pulp dries is against its general adoption. However, such a splint, when dry, is very light and rigid, and it does not soil easily, so that a sheet of this material is a very handy thing in a doctor's office.

Every splint requires a certain amount of padding. Even if it is perfectly moulded to the limb, it will be more comfortable if it is lined with a few thicknesses of gauze or a layer of cotton. The ordinary board splints should be covered with a thick layer of cotton, which may be either bandaged on the splint or simply allowed to rest between the splint and the arm. In the latter case additional little pads of cotton can be disposed in such a manner as to fill up the hollows of the limb. Strips of adhesive plaster, two or more, are used to hold the splints in place and make pressure. The whole is covered by a bandage.

Lubricants.—The lubricants employed for the passage of urethral and rectal and other instruments, and for vaginal examinations, are usually mixtures of vaselin or lard, with antiseptic or bland substances. They are easily sterilized by heat, but they are objectionable because they are not easily removed from the surgeon, patient, or instruments. Glycerin is washed off easily since it mixes with water, but it is not a very good lubricant, and it is somewhat irritating. Soap may be used in the vagina, but not elsewhere. Preparations which are far superior to all these are those which closely resemble mucus in their physical properties. They are extremely slippery, can be diluted with water with which they mix readily, and they can be washed off as easily as a soap. One such a preparation, having as a base Irish moss, is called by the awkward name of Lubrichondrin. Like many other lubricants, it is sold sterile in collapsible tubes, so that what remains in the container does not become contaminated.

Handkerchief Dressings.—Handkerchief dressings are those in which a "triangular" or "Esmarch" bandage is employed. Such a bandage is made by folding a large handkerchief diagonally, or by cutting a piece of muslin forty inches square into two triangular halves. The name of Professor Esmarch is sometimes given to the triangular bandage because he popularized its use in Germany, in a society for giving instruction in first aid to the injured. It has been adopted by similar organizations in England and America. The triangular bandage is especially suited to emergencies, because it can be quickly torn from some part of the clothing, if a sufficiently large handkerchief is not at hand, and the methods of applying it are simple and easily learned. A roller bandage, on the other hand, is not readily improvised, its application requires considerable skill, and an ignorant person is more likely to exert injurious pressure with a roller bandage than with the looser triangular bandage.

The bandage is an isosceles right-angled triangle, the hypothenuse being called the "lower border," the right angle the "point," and the acute angles the "ends." The size of the bandage may be reduced by folding the lower border over once or twice so as to make a hem two inches wide, or the bandage may be reduced in size one-half by folding the two ends together. It may be changed in shape from a triangular to a long straight bandage by bringing the point to the centre of the lower border, and thus folding the bandage lengthwise once or twice.

The triangular bandage is applied to control hemorrhage, to hold dressings on wounds, to support different parts of the body, and to fix splints. The Society for Instruction in First Aid to the Injured of New York City, which since its incorporation in 1883 has given practical individual instruction to more than ten thousand men and women, teaches some twenty different methods of applying the bandage, the most important of which are here illustrated. (Figs. 1666–1669.)

In its triangular shape the handkerchief may be used to cover the scalp, shoulder, chest, back, hand or foot, and the hip. It may also be employed as a sling. Folded as a straight bandage, the handkerchief may be used upon the head (three positions), neck, arm, hand, waist, leg, and also as a sling and tourniquet.

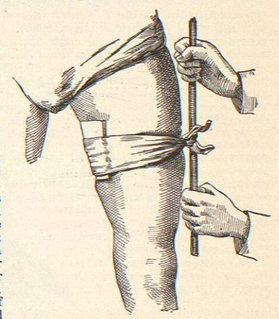

FIG. 1666.

To Cover the Scalp.—Fold a two-inch hem along the lower border, and lay the centre of the hem on the forehead, the point of the bandage reaching over the head to the nape of the neck. Carry the two ends above the ears and cross them at the back of the head; then bring them forward and tie or pin them together on the forehead. Carry point of bandage upward and pin at top of head.

To Cover the Shoulder.—Place the point of the bandage upward, carry the two ends around the arm and tie them together, fasten the point of the bandage under a second bandage used as a sling.

To Cover the Chest.—Place the point of the bandage upward on the shoulder of the side most affected. Tie or pin the two ends and point of the bandage at the back.

To Cover the Hip.—Place the point of the bandage upward and secure it under a second bandage folded long and used as a girdle. Tie the two ends of the triangular bandage around the thigh.

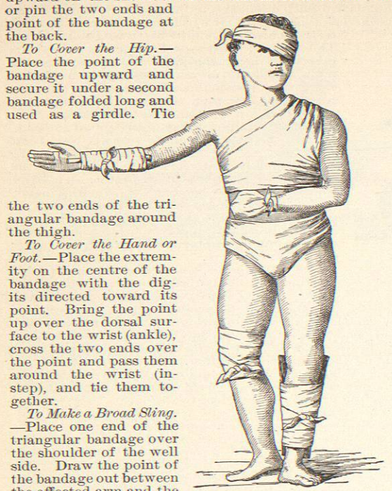

FIG. 1667.

To Cover the Hand or Foot.—Place the extremity on the centre of the bandage with the digits directed toward its point. Bring the point up over the dorsal surface to the wrist (ankle), cross the two ends over the point and pass them around the wrist (instep), and tie them together.

To Make a Broad Sling.—Place one end of the triangular bandage over the shoulder of the well side. Draw the point of the bandage out between the affected arm and the body. Carry the other end up over the injured arm and tie at the back of the neck. Draw the point around the elbow and pin to the bandage.

To Make a Narrow Sling.—Fold the handkerchief into a long strip and knot at the back of the neck. In this form of the sling, as well as in the other, the part of the sling which lies between the arm and the chest passes over the well shoulder.

To Make a Tourniquet (Fig. 1666).—Tie a folded handkerchief loosely about the arm or leg, and wind up with a short stick.

Other simpler methods of applying a folded handkerchief are shown in the illustrations (Figs. 1667, 1668, and 1669).

Application of Plaster of Paris.—Plaster of Paris is used in bulk for making impressions of any part of the body. The plaster should be of fine quality, but above all fresh so that it will set quickly. The dry plaster should be stirred into the required quantity of water until a thick paste results. This should be held for a few minutes against the part of the body of which an impression is desired. When the plaster has set it is removed as one piece, its inner surface smeared with vaseline and used as a mould, into which a freshly made plaster-of-Paris paste can be poured or pressed. In this manner an exact reproduction of the body can be made. In such a manner a model of the instep is taken for the fitting of a flat-foot brace. In order to avoid holes in the casting the outside plaster mould should be moistened before the plaster paste is poured into it.

If a mould of a round object is desired, such as the arm or the whole foot, two strings may be fastened along the limb on opposite sides with collodion, and pulled out through the plaster-of-Paris casing before that has set too hard to prevent it; or the limb may be placed horizontally in a basin and the plaster-of-Paris paste piled up around it to the middle and allowed to set. The upper surface is then smeared with vaseline and the limb is entirely covered with a new lot of paste. In this manner two separate moulds, each of which will halfway surround the limb, may be obtained. For use they may be tied together. A little vaseline rubbed over the skin facilitates the removal of the limb from the uninjured mould.

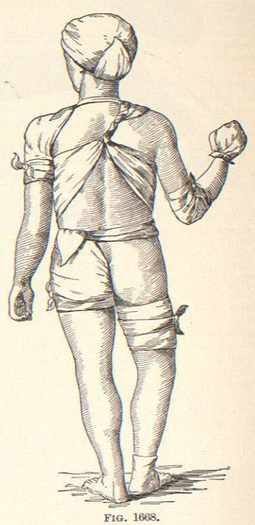

FIG. 1668.

To immobilize a limb plaster of Paris is not used alone, but is rubbed into the meshes of a gauze, or, better, crinoline bandage. In this manner the rigidity of the plaster is added to the strength of the cloth, and there is a great saving in weight. The crinoline is torn into strips three or five inches wide and six yards long. These are loosely rolled up by hand; during the process the meshes of the crinoline are filled with fresh dry plaster of Paris, by scraping the powder over the strip of crinoline, as it lies on the table, with a spoon or knife. To put on a good plaster splint one needs an assistant to steady the part, make traction, etc., thin strips of cotton rolled up, a gauze bandage, a pail of warm water, and the requisite number of plaster-of-Paris bandages of a width suited to the part; for example, four to six three-inch bandages for a fractured leg, six to eight five-inch bandages

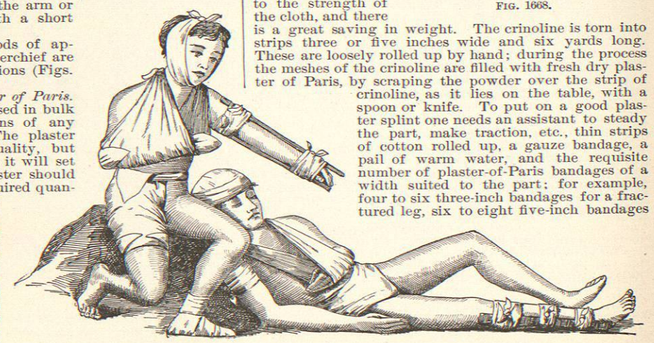

FIG. 1669.

for a plaster jacket, etc. The assistant holds the limb in the correct position. The surgeon covers it entirely with the thin cotton as with a bandage. The glazed cotton batting used by dressmakers is excellent for this purpose. If absorbent or non-absorbent cotton is used, a gauze bandage is next applied so that all shall be smooth before the plaster is put on. One plaster bandage is sunk slowly into the water until it stands on end on the bottom of the pail. The water must cover its upper end. When the air bubbles have ceased to rise it is lifted out, squeezed dry with as little loss of plaster as possible, and quickly and evenly applied. The bandage should be put on regularly from the toes up. No reverses should be made, nor figure-of-eight, nor other fancy turns. Each time the bandage should ascend sharply, pass behind the limb and descend sharply, crossing the ascending turn at right angles. The slack of the distal or lower edge of the bandage should be taken up while the descending turn is being made, pressed smoothly backward, and be folded behind the limb where it will be covered in by subsequent turns. If a bandage is applied in this manner it will be perfectly smooth, have a uniform thickness throughout, and the crossing of the ascending and descending turns nearly at right angles will obviate ridges in the bandage and give it a maximum strength for the amount of material employed. As the turns are applied they should be slicked with the hand from above downward to insure their lying in close apposition so that the completed splint shall be one piece. For the same reason it is better to make each bandage cover a considerable portion of the limb, making each ascending turn an inch above the preceding one, and starting the second bandage far below where the first one ends, than it is to place each ascending turn but a fraction of an inch higher than the preceding one in order to complete the bandage as far as that particular bandage will go. When the last bandage has been applied, the whole should be rubbed down smooth with the hand or a cloth, and if a smooth surface is desired a little plaster paste can be smeared over the surface. This is of help in strengthening a weak part, and it can also be used to obscure the turns of the bandage if they have been carelessly applied.

If the bandage is to be used as a splint which can be taken on or off, it should be cut from end to end before it gets very hard, but should not be removed, or if so, should be reapplied and bandaged to the limb with a gauze bandage until it is thoroughly dry.

If the splint is intended to reach only part way around the limb, the edges may be cut away as far as desired. In this manner a light rigid splint may be secured which will exactly fit any part of the body.

Plaster-of-Paris bandages may also be used to make splints by wetting them, and running them back and forth on a table until eight or twelve thicknesses of material have been placed one on another in a long strip. Additional plaster-of-Paris paste should be rubbed into them if necessary. These are well rubbed together, and the flexible splint is applied. It can be trimmed with shears, and when properly fitted it is bandaged in position with gauze. Two such strips have been much used by Stimson in the treatment of Pott's fracture.

To remove an old plaster splint numerous saws and shears have been devised, which are for the most part unsatisfactory. Nothing is needed but a sharp knife, a little absorbent cotton, and a few drops of water. Draw the knife lightly along the line of incision, follow it with a wet cotton swab. Repeat these two steps many times. As the cut grows deeper the knife should be inclined first to the right then to the left, so as to cut out a V-shaped gutter. This will keep the knife from catching in the cut. If this plan is followed a plaster jacket can be removed with a penknife in a few minutes. A stronger knife is preferable, such as a pruning knife, but keenness of edge is more important than size. When the plaster has been cut through the underlying cotton can be easily cut with bandage scissors. *Edward Milton Foote.*

DROP FINGER. See *Hand and Fingers.*

DROPSY. See *Ascites* and *Œdema.*

DROSERACEÆ.—(*Sundew Family.*) From a biological point of view, this is one of the most interesting families of plants, owing to its carnivorous properties, as typified in the much celebrated Venus' fly-trap. Since this tendency to secrete flesh-digesting fluids is shared, to a greater or less extent, by other plants in the family, questions have been prominent as to whether they might not be utilized as digestants. The use which has been made of those species which are utilized in medicine has, however, not been chiefly in this direction, but as pectorals of an anodyne character. The species so used are of the genus *Drosera*, or sundew. To some extent they have been utilized as carminatives and gastric anodynes. The dose is 0.3 to 2 gm. (gr. v. to xxx.).

Henry H. Rusby.

DROWNING. See *Artificial Respiration.*

DROWSINESS is the manifestation of the desire for sleep, and is ordinarily shown by heaviness of the eyelids, by difficulty in keeping the attention fixed, and often by yawning. Still these indications of approaching sleep are not always present, for many persons pass almost at once from a condition of mental and physical activity into sleep, especially when in familiar surroundings, or when relieved from responsibilities which may have been long continued and sufficiently great to act as a stimulant while they lasted. Nurses and sailors furnish illustrations of this fact. The phenomena of normal or physiological drowsiness need little attention in this place, for every one is familiar with them. Siemens classes as normal the sleepiness of sucklings and children, of convalescents, of the exhausted, and of those who have been exposed to extreme cold. Still it behooves the physician to be on his guard not to confound an unusual though healthy manifestation of sleepiness with a pathological state, nor, on the other hand, to fail to recognize and distinguish the relations of a drowsiness of pathological origin. Before considering the various forms of morbid drowsiness it will be necessary to give some attention to the causes of normal sleep. This subject has long been a favorite one with physiologists, and many theories have been advanced to explain the phenomena. It would be foreign to our subject to attempt a résumé of all these efforts to explain this act of nature. In the course of the last forty years, however, an agreement seems to have been reached on certain points, such as the following, viz: 1. That a period of rest is a requisite for the healthy maintenance and normal functional activity common to all parts of the animal system, even of those the almost constant activity of which is essential to the continuance of life. Sleep affords this rest and an opportunity for regenerating the energies of the brain cells. 2. The nutrition of the nervous elements is believed by some to be favored by the less active circulation of the blood during sleep, which latter condition is now recognized as a fact, although it is not agreed whether this anæmia is to be considered a direct cause of sleep or an incident of other conditions leading to it. 3. A relation between the activity of function in other organs, such as the stomach or the skin, and the circulation in the brain has been observed and recognized too long to be ignored as being one of the conditions favoring sleep; but when we come to consider the influences attributable to changes in the composition of the blood, whether from the presence of carbon dioxide, of an excess of the normal results of digestion, or of the products of the functional activity of the brain cells themselves, we find ourselves again upon debatable ground.

With a view to presenting a summing up of the most recent and accepted views I cite from Howell, who says that sleep is required in order to recover from fatigue; that the cessation of stimuli, decreased responsiveness of the active tissues, a change in the composition of the blood, and a diminution of the blood supply to the brain are the preliminaries to sleep. He regards the fatigue of