

place) are sutured, and the whole is covered with sterilized vaseline and bichloride gauze, and bandaged. The bandage is not to be removed for two days, after which it should be removed daily for a week, when the stitches can be taken out and the dressing discontinued. The epithelium of the flap becomes macerated and exfoliates, and the true skin unites with the under surface of the bridge, of which it becomes a part, or perhaps disappears.

It is not well to make the flap too narrow; it may even be made to include more than the middle third of the lid. Its length should vary with the degree of ptosis to be

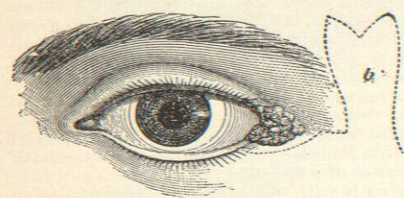


FIG. 2074.

overcome. Sometimes after the operation the eyelids may not close in sleep, but this is only temporary. Another point to be considered is the tendency of the bridge to curl, causing a scar in the brow. This can be avoided by including the upper edge of the bridge in the sutures which unite the flap to the skin of the brow. The epithelial surface of the flap may also be scarified slightly, to hasten its union with the under surface of the bridge.

This modification differs from the original operation of Panas in that the lines of incision are straight, and extend only through the integument, whereas Panas recommends that they extend down to the periosteum, which must necessitate a longer time in healing, and adds to the operation the danger of wounding deeper tissues, as, for example, the supra-orbital nerve.

The object of this operation is to make the occipito-frontalis muscle take the place, or do the work, of the levator of the lid; the flap, uniting by first intention with the upper edge of the incision in the brow, becomes a part of the skin controlled by the contractions of the occipito-frontalis, quite as much as it would if the incisions were deeper. The two lateral sutures advised by Panas to prevent ectropion are not necessary in the modified operation (see Figs. 2066 and 2067).

Blepharospasm is a spasmodic contraction of the orbicularis muscle, present in inflammatory conditions of the eye or the conjunctiva. Occasionally, when it persists and interferes with the treatment of the underlying inflammatory condition, it may be necessary to perform the operation known as canthotomy, which we have already mentioned. Blepharospasm may also be associated with the affection known as tic douloureux. If the cause of the tic can be ascertained, the treatment will suggest itself. In some cases nothing seems to afford relief, and we are compelled to resort to operative procedure, namely, stretching or dividing the trigeminus, or even extirpation of the Gasserian ganglion. Even these extreme measures often fail to give relief. The writer now has a patient under observation who has facial tic with blepharospasm, and who has become an opium victim, whose ganglion was removed many years ago. When last seen this patient was taking sixteen grains of morphine sulphate daily to relieve the pain.

Nictitation, or winking of the eyelids, is due often to local troubles, as conjunctivitis and trachoma. Even uncorrected errors of refraction may be the cause. When due to these conditions, the removal of the cause will effect the cure. At times a general nervous derangement seems to be the cause, when tonics are indicated. One must not expect, however, to cure all these cases, especially when the patients are markedly neurasthenic.

Echymosis of the eyelids occurs as the result of traumatism or of paroxysms of coughing, as in whooping-

cough in children and in chronic bronchitis in older persons, or it may occur without apparent cause.

When echymosis of the eyelids occurs in elderly people without apparent cause, we should be suspicious of atheroma of the blood-vessels, and the interior of the eye should be examined for hemorrhages. We should also bear in mind that a hemorrhage of this character may be the precursor of cerebral hemorrhage. Extremely hot applications are recommended by some authorities as giving the best results in echymoses due to traumatism, while others recommend iced applications. The writer

prefers the ice for the reason that it is easier to apply, and is therefore likely to be more efficiently applied than hot applications. Either very hot or very cold applications, if resorted to as soon as the traumatism is received, will prevent extensive discoloration of the skin, but neither will accomplish much if the application is delayed. Warm fomentations are not to be advised.

Aside from painting the integument of the eyelid to hide the discoloration, time is the best remedy.

Almost every conceivable injury which can happen to the integument of the body elsewhere can occur about the eyelids. The writer has seen a patient whose eyelid was nearly torn off in a street fracas, and has also seen an eyelid split by the branch of a tree, and by being caught on a butcher hook. Any of these injuries can be repaired while still fresh by carefully cleansing the parts and bringing them together, retaining their apposition with sutures. Larger and older wounds may require extensive plastic operations, the extent and nature of which will depend on the wound.

Burns of the eyelids are not uncommon, and especially gunpowder burns. It is well in powder burns to remove, as thoroughly as possible, all particles of powder which may be in the skin. The only way in which this can be accomplished is to pick the particles out, one at a time, with a forceps or spud. It may take hours of patient work to do this, but the result amply repays the time so spent.

In many, perhaps most, powder burns, only the epithelium of the lid will be injured. When this is the case, it is only necessary, after the powder specks have been removed, to apply a bichloride vaseline, bandage the parts, and keep them clean.

Where more than the epithelium has been injured, it may be necessary to stitch the lids together and resort to skin grafting in order to prevent the deformity which the cicatricial contraction will produce. The method of

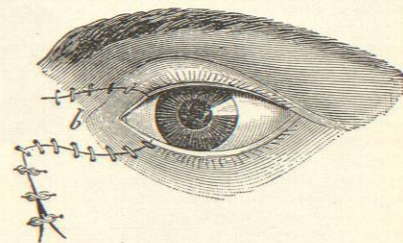


FIG. 2076.

skin grafting which gives the best results is the Thiersch method.

The repair of damages to injured eyelids, and the relief of deformities occasioned by cicatricial contraction of wounds caused by injuries and burns, will give opportunity for the display of all the ingenuity and skill an operator may possess.

It is impossible to lay down definite rules as to when deformities are to be remedied by skin grafting, and when it may be necessary to resort to extensive plastic opera-

tions and the transplantation of large pieces of skin from the forehead and face. As a rule, it is better to reserve the Thiersch method for those cases in which the damage is so extensive that it is impossible to secure enough sound skin from the face or forehead to repair the damage—a condition sometimes found after scalds and burns. There may be times when both the transplantation of skin and the Thiersch method may be employed.

An eyelid, or both eyelids, on one or both sides, may be required to be replaced by skin taken from the forehead or cheek, or even from some other part of the body, as the arm. The necessity for taking a flap from the arm happens infrequently, and can be considered only when a cicatricial condition of the face or forehead makes it impossible to secure it from these parts. To remove a large piece of skin in toto and transplant it on some other part of the body would result, as a rule, in the speedy death of the part so transplanted, unless it remained attached to its original situation by a pedicle. In order to transplant a flap of skin from the forearm to the eyelid, and still retain the attachment of the flap to the forearm by a pedicle, would necessitate bandaging the arm to the head in a firm, immovable position for at least forty-eight hours. This has been done,—indeed, such a transplantation has been successful without a pedicle,—the pedicle being severed when the flap has united. Generally, however, it is possible to obtain enough sound skin from the face, except, as we said above, when there is extensive cicatricial contraction. A few general rules are necessary in order to secure a good result in plastic operations. When the margins of the lids are widely separated or everted, by cicatricial contraction, the first step must be to divide the cicatrices and bring the lids together, holding them in proper position with sutures. Every contraction which draws in any way on the margins of the lids should be freely loosened. We shall then have exposed the whole denuded surface which it is necessary to repair.

The next step must be to secure the flap with which to cover this denuded surface. Undoubtedly we have selected the spot from which this is to come before we began our operation, and have been influenced in our choice by the necessity of obtaining a strip of skin large enough to fill in the denuded surface, from a place where it is possible to secure also a healthy pedicle. The flap should be as nearly as possible devoid of cicatricial tissue, and it is even more important to have the pedicle of healthy skin. We have seen transplanted flaps thrive when they included superficial cicatrices, but when it is possible to utilize only healthy skin it is better to do so.

The flap should be large enough to prevent any tension on it or the parts to which it is sutured, when *in situ*, and it should be as free as possible from adipose tissue. The pedicle by which it retains its continuity with the surrounding tissues should be as broad as it is possible to make it, and should lie as flat as possible. A slight twist in the pedicle is not fatal to a good result, but any twist which is likely to interfere with the circulation of blood in the flap is to be avoided. In attaching the flap to the skin with which it is desired to secure union, fine ironed black silk is to be preferred. The sutures should be close together, should not be very deep, and should not be tied too tightly. The writer does not recommend the use of harelip pins, believing that when they are necessary there is apt to be too great a tension on the flap to permit of union by first intention. A fatal mistake in plastic operations is to unite the parts before all bleeding has ceased. Severed arteries which persist in bleeding despite torsion should be tied with catgut ligatures, and the oozing of capillaries can be arrested by the application of hot water, or by gentle pressure; we must not use so much hot water that we destroy tissues and cause sloughs. The writer believes in the frequent washing of the parts with a weak bichloride solution during the operation.

After the parts are stitched in place, the spot from which the flap was taken must be repaired. This can be easily accomplished anywhere about the face, because of

the looseness with which the integument is applied, by freely undermining the edges and bringing them together. Here is a consideration which must be taken into account when choosing a site from which to take a flap. We must be sure that the bringing of the parts together after the flap has been removed will not create a tension on the edges to which the flap is stitched after it is in its new position.

Flaps should not be taken from the cheek of a man whose beard is heavy and placed on the eyelid. The writer has seen this done, the flap producing a thick growth of hair which was annoying as well as disfiguring.

When the flap has been stitched in place, and the parts have all been adjusted to our satisfaction, a dressing of bichloride gauze should be placed over the wounds and a bandage loosely applied. This can be removed in two or three days, the parts cleansed if necessary, and the dressings reapplied. It is desirable to disturb the wounds after plastic operations as little as possible. The stitches can be removed, a few at a time, in from three days to a week. (Figs. 2068-2076.)

Epicanthus is a congenital defect characterized by a flatness of the bridge of the nose, and by the presence of crescentic folds of skin over the inner canthi. The defect is remedied by removing an elliptical piece of skin from the bridge of the nose and bringing the parts together. (Fig. 2077.)

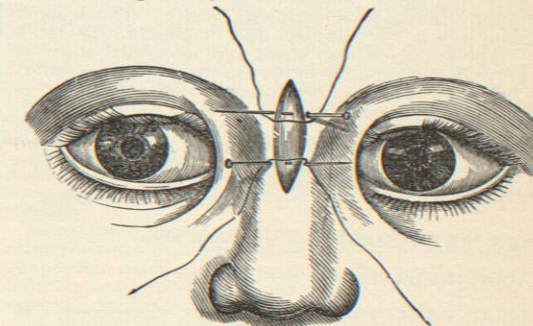


FIG. 2077.

Coloboma of the eyelid may also be congenital, and is remedied by paring the edges of the coloboma and sewing them together.

Nevus, another congenital defect, assumes a variety of forms. A simple reddened spot which varies in the intensity of its hue, often is seen in the eyelids of the newborn infant. Frequently these spots disappear in the first few months of life. Sometimes an intensely livid spot may cover the whole lid, or even the whole side of the face as well; when marked, these spots do not disappear, and very little can be done for them. Sometimes the distorted and enlarged blood-vessels may form distinct and irregular tumors. Treatment will be excision by means of the knife, or destruction of the blood-vessels by means of hot needles plunged into them. At times it may be possible to destroy a telangiectatic tumor by tying of the blood-vessels. The variety of these tumors renders it impossible to go into their treatment in detail in this article. Sometimes the results obtained are very satisfactory, and at other times, unfortunately, they are not satisfactory. Frank Van Fleet.

**EYE-STONES.**—The opercula of certain species of gastropod mollusks. These organs are horny or calcareous valves, situated in the so-called foot of the mollusks, and serving to close the apertures of their shells when the animals withdraw themselves into them. They are of different shapes and variously developed in different species—in many species they are absent altogether. Those which are used as eye-stones are hard, stony, plano-convex bodies, about as large as split peas, 0.005



to 0.01 metre in diameter ( $\frac{1}{8}$  to  $\frac{1}{4}$  inch), rather longer than broad, with a smooth but rather dull plane, and a very smooth and shining, convex surface. The former has an excentric white nucleus, from which a brown, right-handed, spiral line reaches the edge in about two turns; the outer portion of this surface is variegated with light-brown markings, and finely striated with numerous lines running in the opposite direction. The convex surface is slightly asymmetrical, the thickest point being nearly opposite the nucleus of the spiral just mentioned. It is brownish flesh-colored in the centre, shading to white at the margin. Many specimens are much worn by the action of the sea; these are white as coral, and the spiral structure is difficult to make out. Eye-stones are composed mostly of lime carbonate, and perform entertaining movements occasioned by the discharge of carbonic acid from the surface when placed with the flat side down, in a vessel containing dilute acids. They have long been a popular resource in treating foreign bodies in the eye, for which one is placed under the lid, where it is carried around by the movements of the eye. When it comes in contact with the mote, this is carried along with the "stone" by capillary attraction, and is finally expelled with it. They are a clumsy means of doing what a small amount of skill will accomplish with far more certainty, and are deservedly nearly obsolete. The belief that they are alive and move themselves about in the eye, until they "find" the mote, is a popular fallacy. The demand for them now is very limited, and confined to the ignorant. The supply is also small and uncertain, those of this port (Boston) coming mostly in little lots from sailors who bring them from the Bahamas and elsewhere, as curiosities or private ventures. "Crab's-Eyes," lenticular concretions found in the lining membrane of the stomach of the crawfish, look much like eye-stones, and are described for them by several authors. The description just given will easily distinguish them.

W. P. Bolles.

EYES, ARTIFICIAL. See *Artificial Eyes*.

FACIAL NEURALGIA. See *Neuralgia*.

**FACIAL PARALYSIS** (Bell's Palsy).—**ETIOLOGY**.—In a large proportion of cases, peripheral facial paralysis is the result of so-called rheumatic influences, such as exposure of one side of the face to a draught, working in a damp room, or sudden chilling of the body while in a state of perspiration.

The disease may also be produced by a large number of organic lesions, which may be situated in the cranial cavity, in the course of the nerve through the Fallopiian canal, or after its exit from the mastoid foramen.

The lesions within the cranial cavity which may give rise to this disease include basilar meningitis, tumors or exostoses situated at the base of the brain, syphilitic lesions in this situation, and aneurisms of the vessels of the base of the brain.

Within the Fallopiian canal the paralysis may be the result of caries of the petrous portion of the temporal bone, otitis media, tumors which extend into the canal from adjacent parts, fracture of the base of the skull extending through the temporal bone, syphilitic deposits within or near the nerve, or an accumulation of wax in the external auditory canal.

After the exit of the nerve from the mastoid foramen, the paralysis may be produced by direct violence to the nerve (a slap on the face, fall, etc.), pressure upon the nerve, for example, the pressure of the forceps during parturition (a few cases have also been reported in which facial paralysis occurred during difficult and tedious labor, although the forceps had not been used), extension of inflammation to the nerve from adjacent parts (tuberculous abscesses of the glands situated near the angle of the jaw, parotitis, incised wounds during operations in this region, etc.). A case has also been reported in which the disease was produced by leukæmic infiltration of the nerve.

In comparatively rare cases facial paralysis follows certain of the infectious diseases, such as diphtheria, smallpox, erysipelas, typhoid fever. Gowers and others report cases of facial paralysis after tonsillitis, and Halschek has seen a case of double facial paralysis after mumps. This symptom has also been observed as a part of multiple neuritis. Many writers regard the disease as usually infectious in its origin. Several cases have also been reported in which the disease occurred during the secondary stage of syphilis, and was attributed to the direct action of the syphilitic virus. von Bur-ski reports two cases in which the paralysis developed ten weeks after syphilitic infection, during the roseola.

The disease is more frequent in males than in females. It occurs very rarely during childhood and infancy.

Some writers believe that there may be a neuropathic predisposition to the disease. Browning reports the following case which bears on this point: A girl had facial paralysis after a cold; a few years later an older sister had a similar attack. The younger sister had two daughters; one of these had facial palsy after a cold, the other had a similar attack during childhood, from sleeping at an open window.

**CLINICAL HISTORY**.—Facial paralysis is almost always confined to one side of the face. In very rare cases it is bilateral (diplegia facialis), and in such cases the paralysis sometimes appears on the two sides at different times. Sometimes a similar cause operates upon both facial nerves (usually the so-called rheumatic influences); sometimes one lesion acts upon one nerve, an entirely different lesion upon the other nerve. Diplegia facialis is also a symptom of certain bulbar affections, but the consideration of the symptoms which distinguish the peripheral from the central variety will be reserved for the section on diagnosis.

Ordinary peripheral facial paralysis may begin suddenly, or it may be preceded for some time by a feeling of fullness and puffiness in the face, and by peculiar gustatory sensations on the affected half of the tongue. Rare prodromes consist of tinnitus aurium, dizziness, and pain in the face. Gowers has observed fever and temporary albuminuria. In Hoffman's case the paralysis was preceded by severe pains in the right side of the neck and face, and was attended by unconsciousness. Hence this writer believed that the attack was constitutional in origin. The paralysis may occur suddenly and completely in all branches (in rheumatic cases from a couple of hours to one or two days from the action of the exciting cause), or it may spread from one group of muscles to another (when it is the result of compression by a slowly growing external tumor or other lesion which acts in a similar manner). In the majority of cases all the muscles are affected in an approximately equal degree.

The appearance of the face is well shown in Fig. 2078. The patient, whose photograph is here shown, was directed to contract all the muscles of the face, but, as is evident from the illustration, power over the left facial muscles is entirely lost. The left eyebrow is slightly elevated, the palpebral fissure is enlarged, the naso-labial fold is effaced, the angle of the mouth droops slightly and is drawn nearer to the median line (this is observed even when the face is in repose), the mouth is kept a little open on this side, and the tip of the nose deviates slightly to the healthy side.

A patient suffering from complete facial paralysis is unable to wrinkle or corrugate the brow, on account of the paralysis of the frontalis and corrugator supercilii muscles. On making a vigorous effort to close the eyelid the globe is rolled upward and inward (or rarely outward), so that often only the sclera remains visible. But the upper lid descends a little, even when the nerve appears to be completely paralyzed. The descent of the eyelid has been attributed to a partial relaxation of the levator labii superioris, but it must be confessed that this explanation is not very satisfactory. On account of the paralysis of the orbicularis palpebrarum the puncta lachrymalia are no longer kept applied to the globe, and consequently the tears cannot make their way into the

lachrymal canal and nasal cavity. Hence, the patients suffer from overflow of tears. The paralysis of the orbicularis also prevents winking and the closure of the eye during sleep. The consequent irritation of the eyeball may give rise to conjunctivitis and keratitis, though this does not happen very often. The lower lid may become everted.

The ala nasi on the paralyzed side cannot be distended so vigorously as on the healthy side, and hence smell is somewhat impaired. This impairment of smell is increased still further owing to the fact that diversion of the tears from the nasal cavity causes dryness of the Schneiderian mucous membrane.

The angle of the mouth droops a little, and is drawn slightly toward the median line. This phenomenon is increased upon bringing into play the muscles which are inserted into the opposite angle of the mouth, as in the act of laughing. The lips cannot be closed on the af-



FIG. 2078.—Well-marked Facial Paralysis of the Left Side. (From a photograph taken at the moment when the patient was told to contract all the muscles of his face.)

ected side, and hence whistling is rendered impossible. The pronunciation of labials may be interfered with, but in many cases articulation is undisturbed. The cheek on the paralyzed side flaps loosely when the patient attempts to puff it out. Mastication is also interfered with to a certain extent, on account of the paralysis of the buccinator muscle. The food is apt to accumulate between the cheek and teeth, and must be dislodged frequently by the patient's finger. In a considerable proportion, perhaps the majority, of cases taste is impaired upon the anterior third of the tongue on the paralyzed side, and sometimes the patient complains of peculiar subjective sensations in this locality. This is owing to the fact that the chorda tympani nerve, which supplies the anterior third of the tongue with gustatory fibres, joins with the seventh nerve during its course through the Fallopiian canal. Some doubt still attaches, however, to the anatomical and physiological relations of this nerve.

The tongue is protruded in a straight line, but, on account of the displacement of the oral fissure toward the healthy side, there is an apparent deviation of the organ toward the paralyzed side.

In certain cases (*vide* the section on diagnosis) the palate and uvula are found to be paralyzed. Upon inspection the paralyzed velum palati is seen to hang lower than on the opposite side, and the uvula may be deflected to one or the other side (the latter phenomenon is sometimes observed in healthy individuals). These parts also remain almost motionless during phonation, or when re-

flex action is excited by irritation of the fauces. Deglutition is also interfered with to a certain extent, so that the patients often swallow the wrong way. Some writers deny the occurrence of an affection of the velum during facial paralysis. Lermoyez comes to the conclusion that the velum is innervated almost entirely by the pneumogastric.

As a rule, the sensibility of the integument remains unaffected, but in a few cases the patients complain of a feeling of numbness of the skin. In these cases, however, we have never been able to detect any objective evidences of disturbed sensation. The symptom in question is probably the result of an implication of some of the recurrent fibres of the trigeminus in their course along the facial nerve.

Hearing may be affected, sometimes as the result of the lesion which gave rise to the paralysis, sometimes as the result of the paralysis itself. In the latter event the patient suffers from hyperacusis (also called oxykoia), *i. e.*, increased sensitiveness to auditory impressions. This has been explained by the paralysis of the stapedius muscle (which is supplied by the facial nerve), and the consequent predominance of the action of the tensor tympani (supplied by the fifth nerve). Herpes zoster is sometimes seen. Klippel distinguishes febrile zoster (infectious disease) combined with facial paralysis from the accidental herpes eruptions, which, like the accompanying facial paralysis, are due to definite lesions of central parts or of the peripheral nerve. In the former event, the eruption may be present only on the paralyzed side of the face or also in other parts, or it may not be located in the face at all. Remak reported a case, complicated with zoster of the anterior two-thirds of the tongue on the paralyzed side. The zoster recovered during the first week of the paralysis.

In some cases the muscular and nerve irritability remains normal throughout the course of the disease. Such cases usually recover spontaneously and with great rapidity.

Many cases present various stages of transition from normal electrical excitability to the complete form of degeneration reaction. Indeed, we find not infrequently that one case presents various conditions of electrical excitability in different muscles and branches of the nerve.

If the patient does not recover from the disease, the electrical irritability of the muscles gradually diminishes, and is finally abolished.

Experimental investigations have shown that the degeneration reaction is the result of certain lesions of the paralyzed nerve and muscles. When the degeneration reaction is at its height, it is found that the axis cylinder has disappeared, the medullary substance has undergone fatty degeneration, and the nuclei of the sheath of Schwann are increased in number; the interstitial connective tissue and nuclei undergo proliferation. At the same time the muscular fibrillæ are diminished in size and their nuclei increased in number; the transverse striæ are less distinct or absent, and the interstitial connective tissue is increased in amount. If recovery ensues all these changes gradually disappear.

Flatau reports a case of left facial paralysis due to chronic tuberculous otitis media, with total degeneration reaction (D.R.). Death occurred within a year from tuberculosis. The central portion of the nerve was found degenerated in its intramedullary and basal course; the cells of the left facial nucleus were swollen, misshapen, etc. The degeneration extended to the intranuclear facial fibres, the left ascending root, the efferent root, etc. These findings show that Waller's law of degeneration is no longer tenable as first laid down. The peripheral motor nerve is dependent on the cell, but is only part of a coherent, indivisible entity (the neuron), and the destruction of any part of this unit leads to changes in the entire neuron.

In another case of paralysis from middle-ear disease, Darkschewitsch and Tichonow found, on autopsy, the neurilemma unaffected; the lesions were those of purely parenchymatous neuritis.