TRANSACTIONS
OF THE
PHILADELPHIA ACADEMY OF SURGERY

*Stated Meeting held October* 1, 1917

The President, Dr. Charles H. Frazier, in the Chair

## CONGENITAL CLEFTS OF THE FACE

Dr. John B. Roberts presented a boy, three years of age, who was born with a unilateral cleft of the mouth at the right side, with minor vertical clefts of the upper lip and lower eyelids (Fig. 1).

The lateral cleft of the cheek at mouth is now closed by two operations done during the last few weeks (Fig. 2). The scar has not as yet become entirely smooth because the last stitches were taken out only yesterday. In closing these fissures from the corner of the mouth he had found it very important to take deep sutures a considerable distance from the edge of the cleft, because it is almost impossible to prevent infection from the saliva; and feeding and crying tend to tear out the sutures.

The first operation was done by simply paring off the mucous membrane of the cleft and inserting copper wire sutures from skin into mouth. About two-thirds of the cleft healed, leaving the mouth still a little prolonged and its corner turned up, giving the appearance of risibility. By a second operation at the corner, the tissues were so displaced as to make the two ends of the mouth almost the same in appearance. When the scar fades, his mouth will be quite symmetrical. The partial clefts in jaw of right side, and in the upper lip on left side, and the clefts in the lower eyelids are conspicuous. The mouth on the right side showed a lateral cleft before operation about one-third of an inch long. There was a slight atrophy of the right side of the face. This caused the cleft at the right side of the mouth to be directed a little obliquely upward.

From the end of the right cleft there is a shallow groove running upward and outward toward the outer canthus. This corresponds to a want of development in the right maxilla, in which a groove can be felt by pressure through the cheek. Inspection of the mouth shows a corresponding groove in the alveolus in front of the first molar, which is just coming through the gum.

The upper jaw on left side has a nodule below the orbital ridge just outside the usual exit of the infra-orbital nerve. Just above this nodule and corresponding with the position of the imperfection of the upper jaw is a notch in the lower lid about one-sixth of an inch from the inner canthus. Here the skin lines the floor of the notch and is continued as a band over the mucosa until it reaches the conjunctiva covering the sclera. There is then an extension of the band, triangular in shape, running up to the cornea upon the conjunctiva and an attachment within the anterior chamber to the edge of the iris at the pupil. The jaw on the left side appears to be normal. The cleft on the right side gave the child a laughing expression because the lower

lip extended around and upward and showed more mucous membrane than the uper lip. The two lips did not come quite together, exposing some of the upper teeth, giving the child a snarling expression and the mouth an oblique appearance, partly due to a want of development of the right side. The roof of the mouth shows an anteroposterior elevation running from front to back, corresponding to the curious fissure in the right maxilla. There is no cleft of uvula or palate. The uncomely expression has been much improved by the mouth operation.

The upper lip shows on its edge to the left of the median line a slight notch in the vermilion border and a groove in the muscle under the skin which runs up to the left nostril. The skin is normal. This congenital condition is due to an imperfect coalescence of the tissues in the embryo, the same in nature as, but less complete than, harelip. The boy's ears, penis and skull are normal, except that as already stated the maxillæ have some peculiarities.

Dr. Roberts also showed a wet specimen from the Mütter Surgical Museum, being an infant with bilateral cleft of the mouth. In this case Dr. Roberts operated soon after birth, on the right side, but the sutures had not sufficient hold to prevent them being torn out when the infant cried, because the suppuration occurring softened the tissues. Thus a very great strain occurred, particularly as only one side was operated upon. The result was that no union occurred. He should have taken a larger grasp of tissue in the sutures and have operated on both sides at the same time. While waiting for the general condition of the baby to improve it died from debility. The specimen shows the great gaping mouth stretching on both sides far out toward the ears.

He also showed the photograph of a child, three months old, with a facial cleft involving the left side of nose and the inner end of the left lower eyelid. The left ala of nose, part, if not all, of the lachrymal bone, and the intervening structures are congenitally absent. The lower border of the lachrymal lake and its floor are absent, though the orifice of the inferior canaliculus is seen at the angle of the part of the lower eyelid which exists. The tears run directly down into the cavity of the nose, because there is no upper part of the nasal duct. The absence of a lachrymal bony wall, made normally by the lachrymal bone, deprives the child of a bony channel at the orbital end.

To close this gap in the nose, he cut a flap from the left cheek with its pedicle just below the lower margin of the mandible, containing, he hoped, the facial artery uninjured. It was an error of judgment, perhaps, to try to close the whole opening at one operation, for the flap which was slid toward the median line and stitched to the rawed edge of the cleft sloughed. Had he transferred a shorter flap with its pedicle near the angle of the mouth and closed first only the lower two-thirds of the opening, possibly this anæmic gangrene would not have occurred.

Akin to these vertical fissures in the face, due to non-closure of the embryonic fronto-oral bud with the lateral buds, are the congenital clefts in the upper lip and palate. These may leave the lip incomplete on one or both

sides of the median line, or divide alveolus and hard and soft palate. The extent and combinations of these orolabial fissures vary greatly. He once saw the bony palate incomplete at or near the middle line of the roof of the mouth, though the fissure was covered with normal mucous membrane. It showed plainly when the patient took a deep inhalation, through an open mouth, by the mucosa sinking into an anteroposterior furrow in the bone. He has now under observation a girl of about ten years, who has the flattened nostril and a notch in the edge of the lower lip sometimes seen after imperfectly repaired complete harelip and cleft alveolus. There is even a little continuation of red mucosa running up the lip on one side of the notch, similar to that seen occasionally after inaccurate adjustment of the edge by the operator. The photograph of this girl (Fig. 6) looks as if she had complete cleft of hard and soft palate, but the deformity is caused by the deep triangular arch of the palate shutting out the light and giving a black shadow.

There is no opening through the palate for even a probe. There exists a coalescence of two incisors, a curious deformity of both clavicles and a duplex great toe on one foot. The impression of the mouth made by Dr. J. V. Mershon shows well the curious anomaly. The child keeps the mouth open constantly, due to mouth-breathing and the impossibility now of closing her mouth because the posterior teeth strike. The lower jaw is not contracted. She also has defective vision and some nystagmus. Adenoid tissue on the nasopharynx and the tonsils has recently been removed.

The wide nostril and flattened nose of complete cleft of palate, alveolus and lip before operation are well illustrated in Figs. 8 and 9, taken before treatment, when the babies were a few weeks old. The projection of the intermaxilla occurring in some patients with bilateral cleft of palate, alveolus, and lip is shown in Fig. 10.

The ten-year-old girl (Fig. 6) looks as though the early fetal structures of palate, lip and alveolus had failed to unite until much later than usual; and then Nature had found it too late to make a good repair of the separated bones and undeveloped parts. Dental and surgical methods will be required for several years.

In Fig. 11 will be seen in a boy, 14 months old, who had cleft-lip and moderate cleft of palate, a notched appearance where the lip did not entirely unite, when operated upon a few weeks before the photograph was taken. The suture punctures have not yet become inconspicuous. This notch somewhat resembles the congenital deficiency in the upper lip of the little boy with bilateral cleft of the cheeks, shown in Fig. 1.

## OPERATIVE SUGGESTION FOR WIDE BILATERAL CLEFT PALATE

Dr. John B. Roberts remarked that wide bilateral clefts of the hard palate, in mouths with low arch, present unusual operative difficulty. Mucoperiosteal flaps, to be united across the gap without dangerous tension, and yet with the necessary broad contact of raw surfaces, may be unobtainable by the usual procedures. He recently had employed, in a very troublesome instance of complete double palatolabial fissure in an infant, a modification of

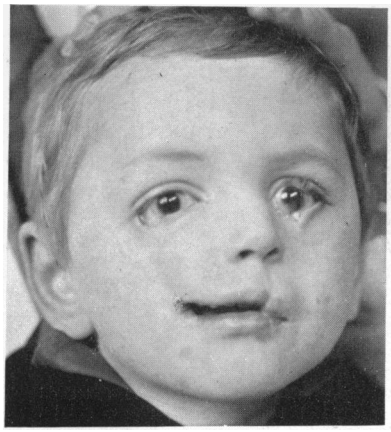

FIG. 1.—Lateral cleft of cheek and vertical cleft of upper lip and of lower eyelid.

FIG. 2.—Operative result in the case shown in Fig. 1.

FIG. 3.—Macrostoma bilateral cleft cheeks, congenital. Front view.

FIG. 4.—Bilateral cleft of cheeks. Lateral view of Fig. 3.

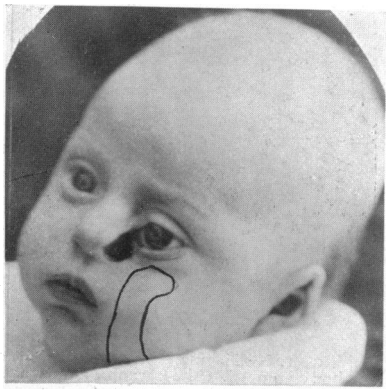

FIG. 5.—Facial cleft involving nose and eyelid. Outline of flap shown.

FIG. 6.—Congenital deformity with fused incisors and very high arch of palate.

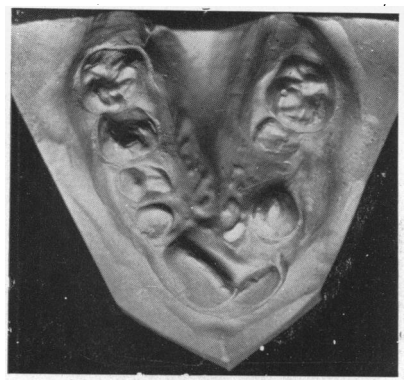

FIG. 7.—Plastic cast of palate of case shown in Fig. 6.

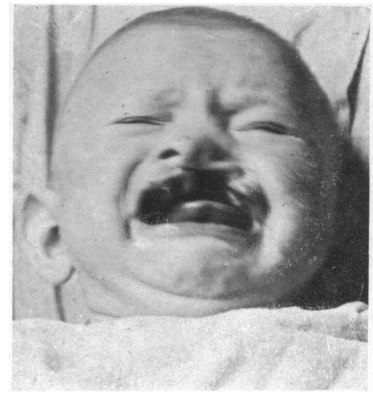

FIG. 8.—Wide nostril and flattened nose in unilateral complete cleft of palate, alveolus and lip.

FIG. 9.—Wide nostrils and flattened nose in bilateral complete cleft of palate, alveolus and lip.

FIG. 10.—Projecting intermaxillary bone in cleft of palate, alveolus and lip (bilateral).

FIG. 11.—Notch in upper lip left after imperfect operation for closing a cleft of lip with cleft of palate on one side.

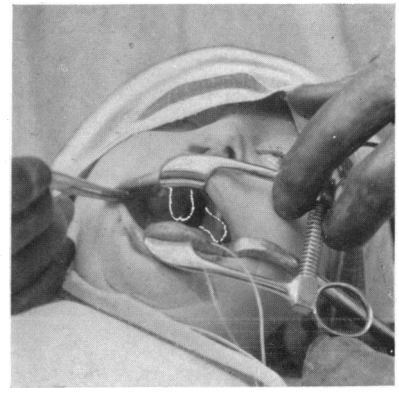

FIG. 12.—Diagrammatic illustration of method employed. (Photograph was not taken from patient who was treated by the method.) The flap outlined on the patient's left is upset towards the median line, the other flap is turned across the gap in the roof of the mouth and its end is sutured on top of the end of the upset flap.

FIG. 13.—Tie beams through cheeks to approximate the separated palatal masses in bilateral clefts of palate, alveolus and lip. Pads of gauze are shown under wires carried through cheeks.

FIG. 14.—Showing result secured of lip in the case shown in Fig. 12.

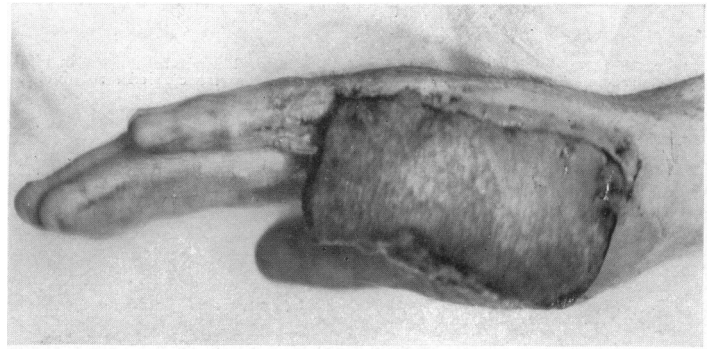

FIG. 15.—Plastic transplantation of cellulocutaneous flap from thigh or abdomen to face in plastic repair of nose, lips or chin. Hand showing skin surface of flap taken from thigh and satisfactorily used in rhinoplasty for syphilitic deformity of nose (Polyclinic patient). Note suture scars where flap has grown fast to ulnar side of hand. Opposite edge of flap shows thick pad of adipose tissue under skin. This border was sewed against raw surface of face, and the band cut loose from other border of flap two weeks later.

the usual methods, which, so far as he knew, had not been employed by operators, with whose uranoplastic work he was familiar. It is a sort of combination of Lane's method with the Davies-Colley principle.

On the left side, he dissected up a tongue-shaped flap from the top of the alveolus and the adjoining palatal surface, with its pedicle containing the posterior palatine vessels. The median incision extended along the margin of the cleft backwards to a point a little beyond the posterior edge of the palate plate of the palate bone. The external incision, somewhat parallel to this, was made between the outer surface of the alveolus and the cheek. These two cuts were joined by a transverse cut across the gum and palate not far from the anterior end of the cleft alveolus on the same side. The long flap so outlined was raised by peeling, with a dull raspatory, the mucosa and periosteum from the top of the bony structures, leaving the unirrupted teeth and bared bone exposed. By carrying the buccal cut further backward than the median one, the mucoperiosteal flap torn up from the underlying bones was upset, as in Lane's operation, to present its mucous surface toward the cavity of the mouth. On the right side of the mouth a flap, similar in shape, was raised from alveolar and palatal structures, with its pedicle, however, in front, so as to include the blood supply from the anterior vessels of the palate external to the right side of the cleft. This flap, as was the left flap, was torn from the top of the alveolus and palate and included both mucosa and periosteum. Care was taken to lift both these flaps without using an edged tool under them. So-called palate knives with sharp edge or point are a delusion and a snare in raising flaps in uranoplasty. Curved or angular instruments without cutting edges are necessary to avoid dividing the vessels by which blood supply of the flaps is maintained.

The end of the second flap was slipped or drawn obliquely across the bilateral cleft in the roof of the mouth and laid upon the upset flap from the other side of the gap. Four or five mattress sutures of silver wire brought the raw surfaces in close contact over a considerable extent of surface. The eversion of the posterior flap required the incision on its outer side to be carried further backward than the median cut. It may be carried inward a little at its back, to facilitate the turning over of the flap. The anterior flap may need its external incision carried forwards a little to permit rotation at its base. In both instances care must be observed to put no tension on the pedicle which may compress the vessels and cut off the circulation in the flaps. The free ends of both flaps should be made broad, to give wide contact when sutures are inserted in the overlapping ends of the flaps. An oblique bridge is made across the wide gap in the roof of the mouth by this operation, which gives a start for further operative plastic work.

The case in which he used this method a few weeks ago has now a substantial bridge. The child had double cleft of the soft and hard palate, alveolus and lip, with projection of the intermaxillary bone. When he was about two weeks old, Dr. Roberts had pushed back the intermaxillary protrusion, after excising a V-shaped piece of the nasal septum, and wired the alveolus on both sides to the intermaxilla. The tension caused the wire to

cut out and the accompanying closure of the two clefts in the upper lip was followed by suppuration and absolute failure. Twice more an endeavor was made to remedy the lip clefts by plastic operation. On one of these occasions the child developed erysipelas, which spread over head and back and was accompanied by double otitis media. The boy at the time of the final operation was about five months old.

His general condition is now good and it is Dr. Roberts' intention to operate for further closure of the anterior part of the palate in about two weeks. This he shall probably do by the method described to the Academy about a year ago; that is to carry wire sutures through the skin of the cheeks to perforate the two maxillæ and draw the soft bones together in front by twisting the wires on the cheek, much as Brophy does, with intra-oral tie-beams and lead plates within the cheeks (see Figs. 13 and 14).

In great absence of tissue in lips or nose the surgeon may obtain tissue from abdomen or thigh by using hand as transporting agent (see Fig. 15).

## PEDICLED ABDOMINAL TRANSPLANT FOR CONTRACTURE OF FINGER

Dr. P. G. Skillern, Jr., presented a boy, aged twelve years, who was admitted to the Polyclinic Hospital (Case Record No. 31562), service of Dr. G. P. Müller, on June 26, 1917. Two months before admission he picked at a callus on the palmar aspect of the base of the right middle finger. Infection followed. The abscess was incised by another surgeon, the incision extending in the midline from the middle of the second phalanx across the two proximal flexion creases of the finger to its root. After healing had taken place contraction of the scar followed and went on until the finger was drawn down toward the palm, preventing forcible extension. This median scar was ridge-like and consisted of keloid cicatricial tissue.

June 27, 1917, under local novocaine anæsthesia, Dr. Skillern excised the scar in a rectangular manner, exposing unopened sheath of flexor tendons; the raw surface was covered by an abdominal flap which was stitched to the edges of the wound in the finger. Dressing applied. Limb bound to side.

July 9, 1917, the base of the flap was severed and the flap tacked down into the proximal portion of the skin wound. The abdominal wound was closed. The transplant healed soundly in place; at first redundant it is now growing smaller and adapting itself to the size of the finger. It forms a soft cushion covering the front of the proximal phalanx. It in no way incommodes the patient. The patient has recovered complete function, with the exception of the power of hyperextension.

Dr. Skillern remarked that this case illustrates the teaching of the late Dr. John B. Murphy, that an incision should never be made across a flexion crease. Progressive contraction is the inevitable result. It also shows the method of effectively correcting the deformity, namely, by a pedicled transplant. A copious blood-supply to this graft was insured by aiming to have the superficial epigastric artery in the middle of the pedicled transplant during the twelve days the latter was "taking."

Dr. A. Bruce Gill said that about four months ago he had a case some-

what similar to that reported by Dr. Skillern. A man, forty-seven years old, a leather-worker, had cut the middle finger on his left hand on a fence twelve years previously. The finger had become contracted so that it interfered seriously with his work. Dr. Gill excised the scar tissue which extended from the palmar crease to beyond the proximal interphalangeal joint. It was then found that the flexor tendons were contracted. They were lengthened. The proximal interphalangeal joint could now be extended and flexed by force, but it moved with a snap, as all the soft structures about the joint were contractured. Therefore, about three-eighths to one-half inch was removed from the distal end of the proximal phalanx to allow free motion in the joint.

The pouch of skin behind this joint was used in part to cover the joint in front. The remaining area of the wound was covered with a pedicled skin graft from the thigh. The hand was held to the thigh in a comfortable position by a light plaster case in which a window was cut for the dressing of the wound. Union had taken place at the end of two weeks and the graft was then cut loose from the thigh.

Contraction and thickening of such a graft always occurs. This makes a thick pad of skin on the hand which may interfere with the work of the patient and which is unsightly. In time the thickness of the graft becomes much less. In the case here reported he proposed to perform a second plastic operation to reduce the thickness of the graft.

Dr. John B. Roberts said that he had used the pedicled flap in the hand after excising Dupuytren's contraction. A cushion of skin and fascia remains somewhat as in this case. It would be easy to excise a piece and lessen the bulk as suggested by Dr. Gill. He had used in partial rhinoplasty the method of obtaining the flap described by Dr. Skillern. An abdominal or femoral flap is fastened to the ulnar edge of the hand, on which the surgeon has made an incision and laid the edges apart, so as to expose the underlying tissues for a half inch in width and two or three inches in length. After two weeks the thick flap of skin and superficial fascia is cut loose from the thigh or abdomen (Fig. 14). Then the hand is placed close to the face and the free edge of the cellulocutaneous flap stitched to the border of the rawed surface previously prepared in the nasal or oral region. Two weeks later the hand is cut loose from the flap which remains fastened to the face, and later is modelled to repair nose, lip, or chin. One can also obtain in this way tissue for plastic repair of the lip or chin by attaching a flap to hand and later applying it to face. Many amputations of fingers can be avoided by taking skin from the abdominal wall to cover the bones in the manner so well described by Dr. Skillern. He was convinced that many fingers have been needlessly sacrificed.

## THE TRANSVERSE (DAVIS) INCISION FOR ACUTE APPENDICITIS, WITH SPECIAL REFERENCE TO THE APPENDIX CHAMBER

Dr. P. G. Skillern, Jr., reported the following cases:

Case I is a boy, twelve years of age, who had perforative appendicitis, for which the entire operation was done under novocaine anæsthesia, using a ½

per cent. solution without adrenalin. The boy had been sick for five days with pain (at first referred to navel, soon localizing in right iliac fossa) followed by nausea and vomiting, fever ($99^{2}/_{5}$° F.) and leukocytosis (16,500). There were moderate rigidity of the right rectus and right flank muscles, acute tenderness on pressure between spinonavel line and Poupart's ligament, and induration in pelvis as revealed by rectal palpation. The incision began ¼ inch to inner side of anterior superior iliac spine and passed horizontally across to the midline—a distance of about 4 inches. The anterior sheath of the rectus muscle was cut across and the muscle retracted inward. The linea semilunaris and the posterior sheath of the rectus (close to Douglas's semilunar fold) were divided. The external oblique aponeurosis and the internal oblique and transversalis muscle aponeuroses and muscular fibres were separated with the fingers out to the iliac spine. The transversalis fascia and peritoneum were divided transversely between forceps. The anterior wall of the cæcum presented itself and prolapsed through the wound. With the finger the appendix was traced to its tip, which lay in the pelvis amidst coils of ileum, which formed the left wall of the abscess cavity, as well as the upper wall, the right wall being formed by the cæcum and side of the pelvis. The appendix was perforated near its tip. The appendiceal vein was the seat of thrombophlebitis, feeling like a match-stick. Drainage consisted of one Mikulicz and one rubber tube: these drains were brought out through the lateral angle of the incision close to the anterior superior iliac spine, and between the pelvis and their point of emergence were bounded above by the cæcum and below by the iliac fossa. Wound sutured in tiers up to drainage.

Owing to the thrombophlebitis of the appendiceal vein, which was found at operation, this patient was kept in bed until the danger of ascending infection of the portal venous system or detachment of an embolus from the thrombus had passed. This thrombophlebitis process maintained an irregular fever for three weeks, and when the fever finally abated and the leukocyte count fell to normal, it was presumed that the thrombus had become organized, so that the patient was allowed out of bed at the end of the fourth week. The wound is firmly healed; there is not the slightest suggestion of a weak spot in the scar.

In Cases II and III, when relaxed by ether, a definite mass the size of a plum could be felt in both just above the outer half of Poupart's ligament. The transverse incision in its outer portion gave a very satisfactory free exposure of the mass, which in each instance proved to be the acutely inflamed and distended appendix surrounded by fresh plastic lymph exudate and wrapped by the acutely inflamed and hyperplastic omental edge. This mass was contained in a little chamber bounded in front by the anterior abdominal wall; behind by the iliac fossa; externally by the lateral abdominal wall; internally by the terminal coil of ileum and meso-appendix; below by Poupart's ligament; and above and in front by the towering cæcum, which is usually covered by the omentum.

This *appendix chamber* as it should be called—just as Birmingham in

Cunningham's " Anatomy " speaks of the " stomach chamber "—adds a very forceful argument in favor of the transverse incision for acute appendicitis. The danger zones of this appendix chamber are the upper wall and the inner wall. The upper wall is usually—except in children and in those with thin, short and poorly developed omental aprons—effectively sealed by the omentum, whose edge swells up with an army of phagocytes and offers an impenetrable front to the spread of infection in the upward and forward direction. The inner wall is the most vulnerable because unreliably sealed by the hyperplastic meso-appendix and the terminal and other coils of ileum: the pelvic cavity, too, forms a safety outlet or sewer for toxic exudates, and to this extent compensates for the deficiency of the inner wall. In the usual case of appendicitis with abscess, therefore, the safest approach to the appendix chamber is from below, in front, and externally, and this zone corresponds to the safest and most effective drainage outlet for the appendix chamber. This drainage track extends from the bottom of Douglas's culde-sac outward between the cæcum above and Poupart's ligament below to near the anterior superior iliac spine, just below and to the inner side of which it emerges. When operating under local anæsthesia one can see the internal oblique muscle by its contractions grasp the drainage material snugly with a soft pad of muscle tissue, and here at the very close of the operation one sees inaugurated that very effective mechanism that prevents post-operative hernia and that forms the principles upon which McBurney's gridiron incision is based, namely, to separate the muscles in the direction of their fibres and to push aside without injury the motor nerves.

The vertical incision through the right rectus is objectionable in the first instance because it necessitates approaching the appendix chamber from within outward, thus entering the chamber by breaking through its inner defensive wall, thereby exposing the general peritoneal cavity to diffuse infection. Drainage through a right rectus incision is by no means ideal: it occupies an undesirable relationship with both the appendix chamber and the general peritoneal cavity. Again, the vertical incision is objectionable because it violates the McBurney incision principles: it cuts across the muscles and cuts across the nerves. Strictly speaking it does not divide the muscle fibres, but it divides the tendon fibres, which form the rectus sheaths. These aponeurotic tendon sheets are formed by minute tendon units which run transversely, and as a practical surgical proposition it is just as noxious to cut across tendons as it is to cut across muscle fibres. When the operator comes to sew up the vertical wound he may notice when closing the posterior rectus sheath that the sutures tend to cut through and pull out toward the incision in the sheath. Post-operative intestinal distention puts an immediate strain upon the posterior rectus sheath, causing a little gap between every pair of suture holes, and forcing through each gap a pellet of subperitoneal fat—a condition that gives rise to much of the scar discomfort which is often erroneously attributed to the presence of adhesions. This undesirable feature of the vertical incision can be obviated by imbricating the posterior rectus

sheath, but this is technically difficult and time-consuming. With the vertical incision it is impossible to avoid contusing, lacerating, or even dividing the motor nerves, unless one can work through a very short vertical incision, in which case the nerve or two exposed in the field may be gently drawn aside. It must be acknowledged, however, that division of these nerves so close to their termination is not so damaging as their more external division, for in the former instance the inner strip of the rectus is all that can be paralyzed. Drainage through a vertical incision is more liable to result in post-operative ventral hernia than drainage through a transverse incision. From the cosmetic standpoint the vertical incision scar is liable to become unsightly, while on the other hand—unless keloid change supervenes—the transverse incision scar eventually becomes almost imperceptible, for the natural tendency of the superficial layers of the abdominal wall is to fall into transverse creases, just as is the case with the skin covering the neck.

In concluding these observations he again called attention to the appendix chamber which he had described, feeling that its consideration from the surgical standpoint forms a basis not only for the rational method of dealing with the usual case of acute appendicitis with abscess, but also for one of the arguments favoring the transverse incision. In addition, the transverse incision is anatomically, physiologically, pathologically and cosmetically far superior to the vertical incision. In closing up the transverse incision it will be noted that the undivided rectus muscle falls across the inner half of the wound, forming a perfect barrier against hernia through this portion. Finally, the treacherous deep epigastric artery can be freely exposed and retracted inward out of harm's way when the transverse incision is employed, whereas with the vertical incision it is neither so easily revealed nor so readily avoided, and when divided it is capable of giving rise to very troublesome bleeding and even to death from post-operative hemorrhage (see article by the reporter in ANNALS OF SURGERY, April, 1917, 451).

DR. GEORGE P. MÜLLER agreed with Dr. Skillern in objecting to the vertical right rectus incision in acute appendicitis, and for the same reason. He used the McBurney incision almost entirely and had no difficulty in handling the pathology within the abdomen. The opening can be made as small or as large as wished, and if the suggestion of Judd is followed and the rectus muscle exposed, it can be so pulled inwards as to give a very large exposure. He did not see that there was anything materially different in the transverse incision from the McBurney incision because it does not matter which way the skin is cut. He never used the McBurney incision in chronic cases where there might be duodenal ulcer above or pelvic disease below.

DR. GWILYM G. DAVIS said that he was interested at the time this incision was proposed to find out what was the favorite incision in appendicitis. From the fact that in this neighborhood the longitudinal incision alongside the rectus was used so much he assumed that that might be the favorite incision everywhere. He found, however, upon inquiry, that the favorite incision was that of McBurney. At a surgical meeting he once saw a demonstration of McBurney's operation in which a surgeon thought the case was

not a suppurative one, but in which it turned out to be such. The exposure which he obtained on that occasion did not impress him favorably. He even yet could hardly see why the McBurney incision for suppurative cases is considered a really desirable one. He had always preferred the method which Dr. Skillern had described. The incision for the subacute cases can be made quite small. If, however, a supposedly mild appendicitis turn out to be otherwise, presenting adhesions or other difficulties, unless one has a good exposure one may perforate and tear the intestines. The small incision can then be enlarged by splitting the sheath of the rectus transversely over the muscle fibres clear across. It may be split to the median line, giving then an incision extending from the median line over to the anterior superior spine. If necessary it can be carried still along the crest of the ilium. With such an incision the surgeon can insert the hand and reach into the pelvis. If an operation on the gall-bladder is required, personally, he preferred to close the transverse incision opposite the anterior superior spine and make a separate incision above rather than to make one extremely long cut to expose both localities.

Dr. Edward Martin said that this muscle-splitting operation which Dr. Skillern describes, he, together with many other surgeons, had been using for many years. The advantage of the transverse skin cut is, of course, incident to the fact that changes in custom are constantly occurring and there may come a day when a scar in this region may be conspicuously disfiguring. The method of approach is satisfactory in nearly all cases.

## FACIAL CARBUNCLE, SINUS THROMBOSIS

Dr. Wm. J. Ryan said that the cavernous sinus, though less frequently affected with thrombosis than the other large sinuses, may become infected through the veins even though the seat of the trouble is apparently far removed. Such infection occurs by way of the extra-orbital connections of the ophthalmic veins, the superior and inferior, from cancrum oris, alveolodental periostitis, etc., which are also in communication with the facial veins.[1] Thus carbuncle of the face may be followed by cavernous sinus thrombosis. In the presence of thrombosis of the cavernous sinus two groups of pressure symptoms may be present: (*a*) venous, causing exophthalmos, œdema of the lids and of the corresponding side of the root of the nose, and chemosis; (*b*) nervous, causing ptosis, strabismus and variations of the pupil, pain, etc.

In illustration he reported a case taken from the records of the service of Dr. George P. Müller in the St. Agnes Hospital. The patient was a girl, nineteen years of age, who was admitted on February 7, 1917, with swelling and redness of the upper lip, swelling and œdema of both cheeks and of the right submaxillary region.

Five days before admission she noticed a pimple on the skin surface of the upper lip. She did not remember picking it. The lip became greatly swollen, but not very tender.

[1] Piersol: Human Anatomy.

When admitted the upper lip was hard and swollen and was the seat of numerous pustules. Both eyes and lids were swollen. Both cheeks, especially the right, and the right submaxillary region were hard and brawny. There was also a moderate submaxillary lymphadenitis. Temperature was 102°; pulse 108; respiration 23.

Under ether anæsthesia an incision was made on each side of the midline of the skin surface, and corresponding incisions on the external mucous membrane. No free pus was seen, but the whole lip was a mass of sloughing tissue, with here and there a typical core. The lip was curetted through the four incisions and drained with rubber dam. A rubber coffer-dam was placed between the upper lip and the upper jaw, and allowed to extend over the lower lip so as to prevent any drainage running into the mouth. The whole face, except the eyes, was dressed with saturated magnesium sulphate dressings. The eyes were covered with wet boric acid compresses. The swelling of the face and submaxillary region was markedly reduced in twenty-four hours and had all disappeared the morning of the third day. The lip did not drain much but reduced in size daily until almost normal in contour. At the end of the second day she was somewhat restless. By this time there was some ptosis of the upper right eyelid, but no apparent exophthalmos. During the next day her restlessness did not abate, and that night she became very excitable, so much so as to necessitate the administration of morphine. On February 10, the second day after operation, all external swelling had practically gone, but the right eye was bulging considerably and the inferior palpebral conjunctiva began to avert. Ptosis of the upper lid was not very marked. She responded to conversation and had control of her sphincters (at this time). The next day the patient suddenly became very delirious; she vomited, and voided urine and fæces involuntarily. The dressings were removed from the face and the rubber dam removed from the mouth. The right exophthalmos was greatly increased. The eyelids could not be closed over the eyeballs. About 2 P.M. the patient became unconscious and died at 8.30 that evening.

It is to be regretted that autopsy was not allowed by her family.

## THE USE OF DICHLORAMINE-T IN THE TREATMENT OF INFECTIONS AND WOUNDS

DR. WALTER E. LEE read a paper with the above title for which see page 14.

DR. PAUL A. LEWIS demonstrated an experiment improvised to emphasize the fact that the Dichloramine-T solution in oil gives off chlorine to water continuously over a number of hours, by taking a solution of starch and potassium iodide and floating the oil solution of Dichloramine-T on its surface. The test for free chlorine is dependent on the exhibition of free iodine; chlorine replaces the iodine in potassium iodine and sets iodine free, which free iodine gives the blue reaction with starch. If one mixes a watery solution containing free chlorine with this it will give immediately and completely the starch reaction for free iodine. It shows that the decomposition

is very gradual and continues for a long time. By adjusting these solutions a little differently one can show that the solution will become progressively more intense in its color during 24 hours.

Early in the spring Dr. Lewis visited Dr. Lee's surgical clinic where he had begun to use Dichloramine-T. The contrast between the condition of his patients and those seen in surgical dispensaries 10 or 15 years ago was so striking that he was convinced that unless some very radical change in surgical technic had taken place there must be something very good in Dichloramine-T. Visits to other clinics showed conclusively that no general advance in methods had taken place. This influenced him to try to oblige first Dr. Lee and Dr. Sweet in a very small way and to try to supply this solution for their use both here and abroad. The requests have increased in number gradually and it has seemed a duty, under the circumstances, for the Phipps Institute to supply what was needed to give a fair and extended trial to the material.

Laboratory men years ago had gradually come to the conclusion that what we know as a general antiseptic could be of little value in the treatment of infectious diseases or infected wounds. They had therefore been turning their attention to what they termed specific or partially specific disinfectants. Salvarsan is the outcome of that general idea. It is really revolutionary from the laboratory man's point of view that chlorine in any form should be found to be applicable in this way because chlorine is a general disinfectant and as such would have been expected to be a general protoplasmic poison; fully as destructive to tissue as to bacteria. It is an agent which destroys everything with which it comes in contact unless carefully controlled. The method of its control had never been developed until Dakin's studies led to the modified Labarraque's solution now known under his name. So adjusted, it has a certain disinfectant value in concentrations which do not destroy tissue. Dichloramine-T is a further advance in the direction of the controlled use of chlorine.

In another respect Dichloramine has been revolutionary. Koch thought that disinfectants in oil were useless. The fact is that this idea was based upon correct observation but it has no general application. Koch found that phenol, a strong disinfectant in water, was much reduced in activity by solution in a vegetable oil. These experiments were used as the basis of the generalization that disinfectants in oil were quite useless. Dichloramine-T shows that this generalization was incorrect and that oily solutions can be expected not only in the instance of Dichloramine-T but in other instances to do a great deal that water solutions will not do. Observations by Professor A. N. Richards and Mr. McMaster, during the past summer, have shown that phenol itself is less active as a disinfectant if dissolved in water than in a mineral oil. The whole question of disinfectants which are soluble in oil will have to be gone over again. We have made only the barest beginning of that work this summer.

Some have said that the Dichloramine-T is not a disinfectant, that all its value is due to the eucalyptol. It is easy to understand that in the present

chaotic condition of the question some one may have done an experiment which has led with more or less propriety to this conclusion. On the other hand, the experiments of Richards and McMaster do not lead to any such conclusion. He did not, however, consider that these experiments are by any means final or conclusive in the particular figures mentioned.

Phenol in a good grade of paraffin oil kills in 0.3 per cent.; eucalyptol fails to kill in 10 per cent. Chlorinated eucalyptol gives no killing in 100 per cent. in 24 hours; it is less active than eucalyptol. Dichloramine-T in solution has given very variable results; dissolved in chlorinated eucalyptol 0.3 per cent. has killed in 24 hours—equivalent to phenol. Dissolved in eucalyptol and paraffin oil in the hands of Richards and McMaster concentrations of from 0.03 per cent. to 0.002 per cent. have killed cultures. There can be no question that Dichloramine-T is a very strong disinfectant.

There is one other question which should be raised. We have no method really of contrasting properly or of stating on the basis of any of our laboratory tests what the therapeutic value of a disinfectant is going to be. The relative activities in test-tube as expressed in phenol coefficient, of course, mean nothing. We should know the relation between the disinfectant value and the amount that can be applied to the tissues, but have no satisfactory way of determining or expressing this. In this respect, without being able to be very precise either as to its exact disinfectant action or its exact ability to affect the tissues, we can say without question that Dichloramine-T is in a practical sense by all odds the strongest disinfectant that we have. We can apply to tissue at least once, and probably twice or three times, a 20 per cent. solution of Dichloramine-T in strong chlorinated eucalyptol. The solution is thus far stronger than phenol in the surgical sense because it is well known that a 5 per cent. solution of phenol cannot be safely applied and that a 1 per cent. solution may lead to gangrene if frequently applied.

CAPT. WM. H. FURNESS, M.R.C., said that for the use of Dichloramine-T in the treatment of contaminated and of infected wounds, the technic which Lieut. E. Lee devised, in contrast to the elaborate technic employed by Dr. Carrel in the use of Dakin's hypochlorite solution, is simplicity itself. The technic embodies, of course, the fundamental principles of surgery and of asepsis; beyond these there is but little required other than a knowledge of the chemical actions and reactions of the dichloramine, which Dr. Paul Lewis has so clearly and concisely demonstrated.

In surgical dispensary work, where all the cases are ambulatory, the treatment with Dichloramine-T can be carried out with such simplicity and system that the time required for a given number of dressings is less than one-third that required for the usual dressings with any of the other antiseptics, and the amount of gauze and of absorbent cotton and the number of bandages necessary is one-eighth of that ordinarily used.

The system consists of dividing up the work into three stages: the patients themselves remove the outer layers of bandage or of adhesive strips before coming up to the dressing table, but they leave in place the innermost dressing which covers the wound. The surgeon removes the inner dressing with

sterile forceps and then gives to the wound whatever attention it may require, such as removing sutures, blotting up excess of secretions, or oozing of blood, etc., and then the nurse, who attends to the sterilization of the instruments also, sprays the oil over the wound from an atomizer; the surgeon renews the four layers of gauze (all that is necessary) over the wound and the patient passes on to an assistant to have the dressing held in place by the fewest possible turns of a gauze bandage. Or the dressing may be held in place by means of short strips of rubber adhesive plaster provided with eyelet-hooks on one end. These strips are placed on either side of the dressing and a light rubber ring is laced across; this not only holds the gauze in place but allows free ventilation to the wounded surface—an important requisite in dichloramine dressings.

With such a system the average time required for the third or fourth day's dressing of the ordinary dispensary wounds is about thirty-five or forty seconds; the whole treatment of the wound is, however, performed with strict attention to asepsis, the surgeon's rubber-gloved hands touching nothing but sterilized instruments, and everything that comes in direct contact with the wounds has been carefully sterilized.

The articles required on the dispensary dressing table are as follows. This number of instruments is found to be necessary in order to keep up a constant rotation between the sterilizer and the trays for sterile and soiled instruments: A small electric or a gas sterilizer. Tray for sterile instruments. Tray for soiled instruments. Instruments: 6 pairs of dissecting forceps, 4 pairs of scissors (2 pairs of sharp points, 2 pairs curved), 2 pairs of hæmostats, 4 grooved directors, 1 Luer syringe with glass pipette, 1 pair sterilizer forceps. A glass atomizer, preferably one with a small reservoir attached directly to the spraying tube. Gauze dressings cut and folded in the following sizes: one and a half by two inches; two and a half by three and a half; and four by six inches. Cotton sponges; these should be, for convenience, about the size of a hickory-nut and wrapped in a single layer of gauze to prevent the cotton fibres from sticking in the wound. Small cotton applicators (on wooden sticks). A small medicine glass. An amber glass, glass-stoppered stock bottle of Dichloramine-T.

Dr. George M. Dorrance said that in his service at St. Agnes Hospital, they had had great difficulty in carrying out the Carrel method of treatment on account of the frequent changes in their nursing force, and the changes of residents and assistants. Their results, therefore, with the Carrel treatment have not been the results that Dr. Carrel reports. Their technic with the Dichloramine-T has not necessitated this refinement of technic and they have therefore been able to obtain more satisfactory results. Several cases stand out prominent in his mind: First, a knee-joint where half the outer surface of the joint was exposed and the joint was filled with street dirt. The wound was cleansed and a 20 per cent. oil used. The joint now is closed and a limited amount of motion is present. Case II, a stab wound of the pleura, was injected by the interne. This closed by primary union. In skin grafts they had been able to obtain takes in 85 per cent. of the grafts. Burns have

healed more rapidly and with less constitutional symptoms. Compound fractures which were infected and dirty from street dirt have healed more rapidly, and usually without any suppuration. In the smaller wounds, infections are seldom seen and the amount of dressings and dressing time have been greatly diminished.

In the use of this oil, one must not forget to adhere to the usual surgical principles and particularly stop all hemorrhage. A number of patients have complained of the amount of pain, but he does not think it is any greater than one experiences with the average dressing.

## BIRTH INJURIES OF THE SHOULDER

DR. A. P. C. ASHHURST read a paper with the above title, for which see page 25.

## GALL-STONE ILEUS

DR. E. J. KLOPP presented a gall-bladder and duodenum, with the following history:

The specimen is from a patient of sixty, who was admitted to the medical wards of the Jefferson Hospital December 15, 1915. She was jaundiced at ten years of age. No history of biliary colic. Has had a good deal of constipation. On December 12, three days prior to admission, she began to have anorexia, followed the next day by severe epigastric cramps which were intensified each time she took food. A high enema was effectual. She vomited frequently. Several purgatives were taken without result. On the day of admission the abdomen was rotund and obese but not distended, slight tenderness in the midline over the epigastrium. Vomiting ceased for five days. Nine days after admission she vomited again and rapidly became worse. She was transferred to the service of Dr. Stewart, to whom he was indebted for the privilege of operating. The abdomen was opened by an incision through the right rectus. A calculus was found in the mid-portion of the jejunum, which was removed through a linear incision of the bowel. The gut above the calculus was distended and dark in color, below it was collapsed and empty. Owing to the grave condition of the patient not much attention was given to the gall-bladder, which was imbedded in a mass of dense adhesions. The abdomen was closed without drainage. The patient died 18 hours after operation. At autopsy the coils of intestine were matted together, but were easily separated. The mid-portion of jejunum showed a neatly approximated suture line 4 cm. extending in long axis of bowel and covered with plastic exudate. Below this point the intestines were collapsed, above it they were distended, lustreless, purplish blue and friable. In the region of the gall-bladder was a mass of adhesions binding the lower surface of the liver, the pylorus and the duodenum together. At the junction of the first and second portions of the duodenum is an opening 3 cm. in diameter from which intestinal contents escape. On the under surface of the liver is a piece of gall-bladder 2 cm. in diameter bound up in adhesions; it has a thick fibrous wall and is empty.