TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY

STATED MEETING HELD DECEMBER 5, 1932

The President, DR. JOHN SPEESE, in the Chair
CALVIN M. SMYTH, JR. M.D., Recorder

BURN-SCAR CONTRACTURES OF UPPER EXTREMITY

DR. ROBERT H. IVY and DR. LAWRENCE CURTIS presented two patients, showing correction of burn-scar contractures of the upper extremity.

CASE I.—A girl, aged eleven years, was admitted to the Graduate Hospital September 3, 1931, with severe burn scars of the left arm and axilla, extending over the pectoral and scapular regions. The left wrist and elbow were fixed in flexion and the arm from the shoulder to the elbow was bound to the side of the chest by a continuous band of scar tissue. The skin about the elbow showed desquamation, and was ulcerating in several areas with granulations. The burn had been sustained twenty-one months previously.

From September 4, 1931, to May 27, 1932, a series of operations was performed to correct these deformities. The first operation consisted in freeing the left arm from the side of the chest. The web of tissue joining the two was divided from the shoulder to the elbow, until free movement of the shoulder-joint was obtained. The remaining raw surfaces on the side of the chest and inner aspect of the arm were partly closed by undermining and bringing the edges of the wounds together. A gap high up in the axilla was filled with a full-thickness skin graft from the abdomen. Scarlet red ointment was helpful in healing remaining granulating surfaces. Ultraviolet radiation was also used twice weekly. On readmission to the hospital February 18, 1932, the axilla and arm having completely healed, and the patient being able to raise the arm above the level of the shoulder, attention was directed to the contracture of the elbow. February 19, 1932, a vertical tube of skin and subcutaneous tissue about twelve inches in length was made on the left side of the back. (Fig. 1.) April 1 an area of tissue connected with the lower end of the tube was outlined, partly raised and sutured back in position. April 15 the left elbow was straightened out after wide excision of adherent skin and scar tissue and lengthening of biceps tendon. The lower end of the tube-pedicled flap on the back was raised and carried over to be sutured to the edges of the raw surface on the flexor aspect of the elbow. May 27 the upper end of the tube was detached from the back, the whole tube opened out and sutured to cover the remaining raw surface about the elbow. June 6, 1932, patient was discharged from the hospital, wound nearly healed and with ability to almost fully extend left elbow. (Fig. 2.) Occupational therapy has brought about further improvement. The problem of the wrist and hand remains.

CASE II.—A girl, aged nine years, was admitted to the Graduate Hospital in October, 1931, with a band of dense scar tissue on the anterior aspect of the right axilla, resulting from a burn when three and a half years old. The scar restricted movement of the shoulder so that the arm could not be

raised farther than a horizontal position. This was corrected by the Z plastic operation described by McCurdy (McCurdy, S. L.: Surg., Gynec., and Obst., vol. xvi, p. 209, 1913), in which it is not necessary to resort to skin grafting. An incision was made along the edge of the scar band (not across it), and from the ends of this line incisions were made at about right angles to it, one being back across the arm and the other on the front of the chest. By undermining, two triangular flaps were formed and transposed. This procedure effectually obliterated the scar band and released the shoulder-joint so that after healing normal movement of the arm was restored.

DR. ROBERT IVY said both of these cases were treated in the acute stages of the burns with the limb extended in the hope of avoiding contracture. In spite of this, a few months after removal of the extension apparatus the contractures occurred.

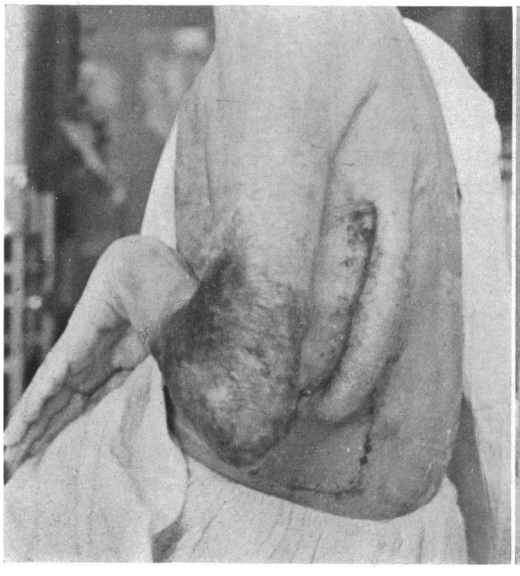

FIG. 1.—Burn scar at elbow and axilla, tubed pedicle at back.

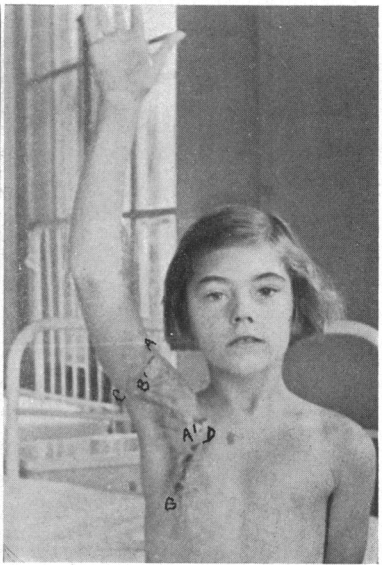

FIG. 2.—Result of series of plastic operations on the burn scar shown in Fig. 1.

DI-VINYL ETHER—A NEW ANÆSTHETIC

DRS. I. S. RAVDIN, GEORGE P. MULLER, and, by invitation, DRS. SAMUEL GOLDSCHMIDT, BALDWIN LUCKE and C. G. JOHNSTON presented a preliminary report on the results of a clinical and experimental study of Di-Vinyl ether, a new compound which is capable of producing surgical anæsthesia. The outstanding features of this preparation are the rapid induction, rapid recovery, and singular freedom from unpleasant after-effects. Regarding toxicity it appears to stand between ethyl ether and chloroform. The experimental studies are being carried out in the laboratories of Research Surgery and of Physiology at the University of Pennsylvania and to date have included observations of the effect upon the liver, the concentration in the blood required to maintain anæsthesia and the margin of safety between

anæsthetic and lethal doses. The experiments have all been conducted with careful controls.

Doctor Muller and Doctor Ravdin have administered or caused to be administered this anæsthetic to eighty-two patients varying in age from one to eighty-three years. The type of operation included practically all general surgical conditions except those of the biliary tract which were excluded on account of lack of accurate knowledge of the effect upon the liver.

The average time required to induce anæsthesia was forty seconds and most patients were able to answer questions intelligently in a few minutes after the administration was terminated.

Further studies are necessary before the investigators are ready to recommend this preparation to the profession, but it would appear to possess some of the features necessary for the long-sought "ideal anæsthetic."

REPAIR OF UNUNITED FRACTURES BY LATERAL APPOSITION AND INTERNAL FIXATION

Dr. A. Bruce Gill said that this principle is not new, but it may probably be applied with advantage more frequently than is now done.

When it is possible to convert an old ununited fracture into an oblique fracture, to secure a lateral apposition, and to fix the fragments securely together by screws union is more certain than by any other method of operation. Furthermore, the technique of the operation is easier and simpler than the various types of bone-grafting operations. While this method of operation applies particularly to fractures of the tibia, the femur, and the humerus, the same principle of operation with slight variation can be applied in cases of non-union of the bones of the forearm. A few years ago on examining his records to determine the end-results of operations for this condition the speaker learned that he had obtained union in only 50 per cent. of the cases by the use of intramedullary grafts, inlay grafts and osteoperiosteal grafts. About four years ago he began to employ a different method and since then has had no failures. The radius or the ulna is exposed. The periosteum is incised longitudinally and separated from both fragments for a distance of three inches from the site of the fracture. Both fragments are then split longitudinally with a motor saw along the narrow side of the bone. The superficial portion of the fragment, consisting of at least one-half the entire thickness of the bone, is removed. The entire piece, whether taken from the upper or the lower fragment, is then employed as a large, broad, bone graft. The fragments are brought into proper alignment and this bone plate is fastened to both fragments securely with metal screws. The portion of bone removed from the other fragment is discarded and in some instances in fractures near the lower end of the radius the superficial part of the lower fragment is elevated by making a green-stick fracture at its base and the bone plate is inserted beneath it. In such case the screws pass through three pieces of bone in the lower fragment. The periosteum is sutured over the bone plate. The arm is dressed in a plaster bandage. If

there is separation of the fragments in these cases of non-union due to absorption of the ends no attempt is made to bring the ends together. The large bone plate spans the gap between the two bones. Patients operated on in this manner have been able to return to hard work three months after the operation. Metal screws are used in preference to bone grafts because the latter are more fragile and apt to break. The screws remain permanently in place. They become completely covered with bone formed underneath the periosteum.

SPONTANEOUS PNEUMOTHORAX

DRS. GEORGE P. MULLER and FRANCESCO MOGAVERO read a paper with the above title.

BILATERAL EMPYÆMA

DOCTORS MULLER and MOGAVERO reported the case of a woman, aged thirty-one years, who was admitted May 21, 1931, to Misericordia Hospital in the service of Doctor Muller with the chief complaint of chills, fever, pain in right side of chest and cough with expectoration. She was apparently healthy until May 17, when she was taken ill with a "cold," cough, fever, headache and general malaise. She spent one day in bed and was up and around for several days, and then suffered a relapse and was taken suddenly with chills, fever, pain in right chest, cough with copious expectoration which was blood streaked.

When admitted she was markedly dyspnœic, suffering a great deal of pain with each respiratory movement. Respirations were rapid and shallow due to pain. Her lips were slightly cyanotic. The chest anteriorly revealed a lagging over the right side on expansion, impaired resonance in the right middle lobe, bronchial breathing and increased vocal fremitus. The upper right lobe showed numerous coarse râles. In the left lobe were found many scattered coarse râles.

Temperature, 101°; pulse, 140; respiration, 46.

Diagnosis.—Pneumonia involving the lower and middle right lobes. At the time of admission she was six months pregnant. On the third day thereafter she gave birth to a living child with intact membranes. The placenta came away spontaneously. The fœtus died shortly after delivery.

The patient's condition for the next ten days was poor. Examination showed a left empyæma present.

June 3, thoracentesis was performed and 275 cubic centimetres of pus removed from the left chest at the eighth interspace, posteriorly. The following day, the patient became very dyspnœic and thoracentesis was repeated with removal of 400 cubic centimetres of pus from the left chest with some relief. The existence of a bilateral effusion was determined. (Fig. 3.)

On June 5, left thoracotomy was performed. The drainage tube was attached to a Hart apparatus for tidal irrigation as modified by Overholt. The solution used for irrigation was normal salt solution.

After operation, the patient was improved sufficiently to permit right thoracotomy which was performed June 15. The tidal irrigation was stopped on the left side, closed drainage still carried out, placing end of tube under water in a bottle. Blood transfusion of 500 cubic centimetres of citrated blood given. The patient did well, closed irrigation was stopped and drainage into dressings permitted. She was discharged August 4, 1931, with a

final note that the wounds were healed, slight amount of fluid present as reported by last X-rays. Temperature was normal. (Fig. 4.)

Six months later the patient reported that she had been well since discharge from the hospital.

DOCTOR MOGAVERO added that bilateral empyæma is not an infrequent complication following pneumonia. Most authors agree that empyæma is bilateral in less than 5 per cent. of the non-fatal sporadic cases. In 603 autopsies of empyæma cases, Dunham found that 43 per cent. were bilateral, Hellen states that 7.7 per cent. of all empyæma cases are bilateral; Tod that 2.0 per cent. and Tholt 3 per cent. The majority of these occur, according to Curtis and Bowman, during the early decades of life, and males are affected in 65 per cent. of the cases. Graves reports that it is frequent in children under ten and in adults beyond middle life. He reports a series of twenty cases spread over the various age groups thus: Thirteen, or 65

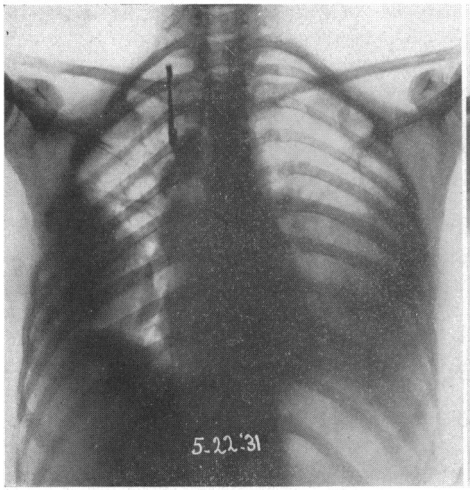

FIG. 3.—Showing bilateral empyæma.

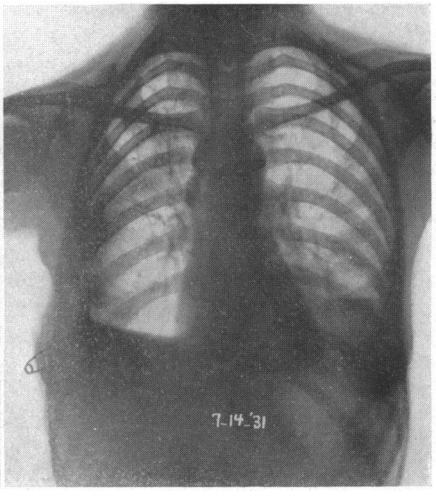

FIG. 4.—End-result.

per cent., in first decade. Three, or 10 per cent., in second decade. Two, or 10 per cent., in third decade. Three, or 15 per cent., in fourth decade.

Scanlan, in 1928, collected in the literature up to that time 248 cases, Graves reported in 1928 twenty cases, and Keyes forty-four cases, having a total of 312 cases. Graham states that bilateral empyæma occurs more frequently in the streptococcus cases (hemolytic) than in the pneumococcus. However, others disagree; Graves found that staphylococcus and pneumococcus were the predominating organisms. Keyes, in his series, found that the pneumococcus was most commonly present, Curtis and Bowman that the pneumococcus was found in 70 per cent., the streptococcus in 14 per cent. In 1917–1918 there was a reversal of these figures, 73 per cent. due to streptococcus and 23 per cent. to pneumococcus. Curtis and Bowman found that the staphylococcus was a rare offender and report a case of staphylococcus empyæma following a carbuncle of the neck.

Most writers found that three-fourths of the cases followed bronchopneumonia and that it may occur as a complication following influenza, measles, scarlet fever and puerperal sepsis. Bilateral empyæma occasionally follows when the pneumonia is demonstrable in but one lung. In Keyes' series of cases, the death rate was 19.5 per cent., and in Fabrikant's series of 118 cases, 37 per cent.

Treatment of bilateral empyæma varies with every writer and the following will give a general idea of methods employed: Hedbloom advocates bilateral simultaneous closed drainage; Auer, closed drainage, aspirating the largest one first, and then an open drainage of this side and a closed drainage of the other. Markley in his case did, first, bilateral aspiration and then bilateral rib resection; however, did not state whether open or closed type used. Scanlan in his case employed bilateral aspiration, then a bilateral thoracotomy, these at three-day intervals; Beck's case, bilateral thoracotomy. Ravnitzy and Bogia report two cases, in one a bilateral rib resection with a twenty-six-day interval and in the other, one side aspiration and other side rib resection thirty-seven days later. Matthews advocates aspiration and closed drainage; Graves, rib resection, open drainage type, interval of five days. Keyes advocates a high fluid and caloric intake, and simultaneous drainage. He states that the patient is not relieved a great deal after the first thoracotomy and tends to remain very little changed until after the second thoracotomy, that delay seems to accomplish little but weaken the powers of resistance. If delay must be carried out and empyæma of both sides is equal, operate on the left one first, thus relieving cardiac embarrassment; if empyæma is unequal, operate on the larger one first. The initial drainage is to be closed type to fixed things and then open type. Curtis and Bowman performed a bilateral interval closed drainage, later bilateral rib resection and unilateral phrenic exeresis; the interval between thoracotomies was nine days. Beck reports a case of bilateral empyæma complicated by childbirth during attack of influenza. The woman was thirty-four years old, pregnant eight months, giving birth to normal living child at the time. He states that nearly always the mother and child die. He advocated rib resection with closed drainage, stating that both sides should not be drained simultaneously, but to give the lung a chance to expand; the interval in his case was twenty-four days.

Dr. Damon B. Pfeiffer recalled two cases of acute pneumothorax, both of whom presented at the onset all the symptoms of abdominal catastrophe. The first patient was a young man who had suddenly developed epigastric and right-sided abdominal pain. The temperature and pulse were about normal and the respirations moderately elevated. The abdominal muscles were tense, particularly on the right side. The first impression was perforated ulcer. Percussion of the chest yielded a high-pitched, tympanitic note on the right side with a complete absence of breath sounds. The heart was shifted to the left. The patient was removed to the hospital. X-ray examination gave a characteristic picture of a small collapsed lung lying

tight against the hilum. The abdominal symptoms soon passed off, the patient made a complete recovery and has remained well for six years. The second case was more recent and presented a very similar picture. The origin of the pneumothorax in both cases has remained obscure. Neither patient has presented either clinical or X-ray evidence of tuberculous involvement of the lung. There was no strain or history of accident. About nine months ago an acute pneumothorax developed suddenly in another patient during convalescence from operation for carcinoma of the cæcum. This was accompanied by collapse, dyspnœa and severe epigastric pain. It was at first thought that obstruction or some other intra-abdominal complication was going on. Examination of the chest followed by X-ray cleared up the diagnosis. The patient went on to an uncomplicated recovery and has remained well.

It might be pertinent to call attention to the simulation of abdominal disease by certain anginoid heart attacks. The older clinicians recognized this and spoke of abdominal angina. Years ago Murphy called attention to mediastinal lesions as a cause of paralytic ileus simulating obstruction. It has been of interest to note that in the present wave of so-called grippe or influenza, symptoms in many cases have strongly suggested appendicitis or other intra-abdominal surgical lesions. The differentiation has often been extremely difficult or impossible. The rôle of certain forms of pneumonia and basal pleurisy in mimicking abdominal disease is, of course, well known.

Dr. George P. Muller remarked that when he examined the first patient on admission he was certain he had a perforated peptic ulcer. Some years ago he observed a patient with violent epigastric pain in whom acute pancreatitis was suspected. Operation was not done and twenty-four hours later pain recurred and the patient died. At autopsy a ruptured dissecting aneurism of the thoracic aorta was found with mediastinum and pleura full of blood. In the second case a tumor of the thymus had perforated or ruptured. The mediastinum at autopsy contained organized blood-clots but when seen by the speaker his symptoms were those of an acute epigastric lesion, possibly pancreatitis. An X-ray of the chest revealed the true nature of the lesion.

The case of bilateral empyæma was the first one he has seen for ten years. Possibly in a similar case he would be tempted to operate in two stages with only a few days' space between them.

TRAUMATIC RUPTURE OF STOMACH, COLON AND KIDNEY

Dr. William T. Lemmon reported the case of a boy, eleven years of age, who was admitted to the Philadelphia General Hospital June 15, 1932, in the surgical service of Dr. Hubley R. Owen, about twenty hours after a fall from a board fence. He struck the anterior right lateral surface of his abdomen, his body landing in a jack-knife position across the fence. He was knocked breathless but did not lose consciousness. After sitting on the

curb for about fifteen minutes, he started home, aided by his playmates. He made frequent stops on account of extreme weakness and dizziness. During the night, he was very restless and suffered pain. He asked constantly for ice and ice water. He vomited several times. He neither voided nor had a bowel movement during the night. The following morning at 9:30 he passed less than 100 cubic centimetres of bloody urine. He also passed fresh blood and blood-clots by bowel. Vomiting and thirst continued. On admission to the hospital the following afternoon, the abdomen was markedly distended, tender, and rigid. The rigidity was more marked over the entire right side of the abdomen and the right loin. The percussion note was tympanitic except in the flanks, where it was flat. Feeble peristaltic sounds were heard only over the left upper abdomen. There were no visible signs of injury to the surface of the abdomen, loins, or elsewhere on the body. Temperature, 100°; pulse, 148; respirations, 22 per minute. The urine examination showed blood grossly and microscopically. The blood count revealed 11,500 leucocytes, 3,120,000 red blood-cells, and hæmoglobin of 62 per cent.

Previous to operation, 5 per cent. glucose in 400 cubic centimetres of normal saline was given intravenously. Twenty-one and a half hours after the accident, under ether anæsthesia, a left paramedian incision was made. The left rectus incision was made because of the possibility of injury to the spleen. The peritoneum was dark in color and the peritoneal cavity contained approximately 1,200 cubic centimetres of bloody fluid, blood-clots, inflammatory lymph, which had a fecal odor. Blood was present in the greater peritoneal cavity, the lesser peritoneal cavity, and in the retroperitoneal tissues on the right side of the abdomen. A systematic examination of the abdominal organs revealed the liver, spleen, pancreas, left kidney, jejunum, descending colon, sigmoid, rectum, and bladder to be uninjured. The mesentery to the terminal ten inches of the ileum was torn and that part of the ileum was dark in color, cold to the touch, and did not respond when hot packs were applied. The circulation was so badly disturbed that resection of that portion was considered necessary. The cæcum had several small complete tears, each about one to two inches in length, extending through all the coats. These openings were plugged by the mucosa and blood-clots. The cæcum was also markedly distended, dark in color, and filled principally by blood and blood-clots. A similar but less marked condition was found in the ascending colon. The right half of the transverse colon was dark in color, cold to touch, and did not regain its color after hot pack applications. The mesocolon of that part of the colon was found to be torn and bleeding. A large, dark fluctuating mass was found in the anatomical position of the right kidney. This mass extended along the course of the right ureter to the brim of the true pelvis. There was a subperitoneal rupture of the posterior wall of the stomach with a hæmatoma about two inches in length. This bleeding was controlled by two Lembert sutures. The terminal ileum, appendix, cæcum, ascending, and the right half of the transverse colon were resected. When the peritoneum, lateral to the cæcum and ascending colon, was incised and reflected medially, there was profuse hæmorrhage from the right kidney. This delayed hæmorrhage was probably due to the release of pressure and the dislodgement of clots which served to check and lessen the renal bleeding. The clots were removed from the region of the right kidney and also the lateral half of the kidney. There was profuse bleeding from the remaining portion of the kidney. This hæmorrhage was checked by clamp and ligature. The remaining portion of the kidney was

then removed. A lateral isoperistaltic anastomosis was made between the terminal portion of the remaining ileum and the proximal portion of the remaining transverse colon. Complete hæmostasis was secured and all raw surfaces were peritonealized. The peritoneal cavity was irrigated with hot normal saline. Approximately one pint of this solution was left within the cavity. The abdomen was closed without drainage. During the operation the patient received 100 cubic centimetres of 5 per cent. glucose and 200 cubic centimetres of normal saline intravenously. At the conclusion of the operation, he was given 90 cubic centimetres of blood by transfusion with immediate improvement. During his convalescence, which was uneventful, he was given blood transfusions, glucose, and normal saline. July 22, he was discharged in good condition.

This boy, approximately five months after operation, is in perfect health. An X-ray examination made before discharge from the hospital showed the terminal ileum joined to the proximal end of the remaining portion of the transverse colon. The intestinal function was normal. The pathological report of the kidney showed an acute purulent exudate, in addition to traumatic rupture and hæmorrhage. The cæcum showed gangrene in addition to ruptures and hæmorrhage.

Aristotle's observation that the intestine of a deer is so fragile that a blow will cause it to rupture without injuring the skin, is perhaps the first record of injury to the intestine following abdominal contusion without external signs of trauma. It was not until the seventeenth century, when post-mortem examinations became more common, that traumatic intestinal perforation was given its due recognition as an important surgical condition.

Moynihan states that the first laparotomy for rupture of the intestine was performed by Bouilly, in 1833. The first successful case was operated upon by Croft in 1889. Examination of the literature shows that traumatic rupture of the large intestine is much less frequent than that of the small intestine but that both may be ruptured at the same time. The reporter had not found a recorded case of rupture of the kidney complicating rupture of the colon with recovery of the patient. According to Moynihan, emphysema is the only sign that is characteristic of lesions of those portions of the bowel which are not wholly covered by peritoneum (parts of the duodenum and the ascending and descending colon). If the usual symptoms of intestinal injury and emphysema in the right flank are present, a diagnosis of rupture of the ascending colon or of the duodenum may be made. Emphysema spreading from the descending colon may be noticed first in the left flank.

The large intestine is not so frequently injured as the small intestine. In a total of 221 cases collected from London hospitals, Berry records 177 injuries of the small intestine, twenty-nine of the duodenum, and fifteen of the large intestine. Other statistics give practically identical results.