

## STATED MEETING, HELD FEBRUARY 4, 1907.

The President, DR. JOHN B. ROBERTS, in the Chair.

### ENDOTHELIOMA OF THE PALATE.

DR. JOHN H. GIBBON presented a man, aged 26 years, who was admitted to the Pennsylvania Hospital on January 4, 1907. He stated that he first noticed a swelling on the left side of the roof of the mouth five years previous. This has gradually increased until there was a large tense apparently fluctuating mass extending over about one-half the hard palate and all of the soft palate on the left side. The entire tonsil and left side of the pharyngeal wall was hid by the growth, which extended down nearly to the base of the tongue. It interfered with the patient's eating, and when ether was given him interfered very greatly with his taking the anæsthetic. The mass appeared to be cystic. At one or two points there was a suspicious hard area. Because of the duration of the growth, however, and its apparently cystic character it was not thought to be malignant. The blood vessels over it stood out very clearly. There was no obstruction of the nares and no apparent involvement of the pharynx, as the finger could be passed easily behind the growth. After the patient was anæsthetized the tongue had to be drawn forward and pressed down with a tongue depressor in order that he could breathe. He was placed in the Rose position and an incision made over the prominent part of the growth. A quantity of material immediately escaped from the mass, which seemed to be undoubtedly sarcomatous. Practically all of the growth was shelled out with the finger. The hard palate was rough, as if its periosteum had been destroyed. Neither the hard nor the soft palate were perforated by the growth. Bleeding at this time was very profuse but was controlled by gauze packing and digital pressure. The case seemed a perfectly hopeless one and a prompt and rapid recurrence was expected. The pathologist also on inspection of the material-removed thought it was sarcomatous, but on later thorough examination pronounced it to be an endothelioma. This diagnosis has been fully borne out by the subsequent course of the case. The

packing was gradually removed, and although a small cavity still exists most of the induration has disappeared and the patient is entirely comfortable.

Dr. Gibbon is not sure that he removed all of the growth, but upon the slightest evidence of a recurrence he is prepared to again operate and freely remove it. He thinks that an endothelioma in this situation is rather rare. The most frequent site of such growth is the parotid gland. Many of the early cases reported of cure by excision of sarcoma of the parotid were undoubtedly cases of endothelioma.

Dr. J. T. RUGH said that some years ago a boy of 18, from Delaware, came to the Jefferson Hospital with a growth in the posterior nares of the right side. It appeared to be fibrous and was removed by means of a wire snare, removal being followed by almost fatal hæmorrhage. The growth recurred and was then diagnosed sarcoma. A second operation, however, resulted in complete cure. No pathologic report on the tumor was obtained, but as it did not recur a second time it was regarded as an endothelioma.

DR. JOHN B. ROBERTS described a case of endothelioma of the left nares, which was partially scooped out, and the patient then treated by the X-rays and by the injection of the toxins of erysipelas and prodigious. The tumor seemed to be lessened by this treatment. The patient later went to another Philadelphia hospital and was operated upon, it was stated after the principle of Dawbarn, attempts being made to plug the carotid and its branches with paraffin. Dr. Roberts had heard indirectly that the man died later of secondary hæmorrhage.

DR. W. M. L. COPLIN said that a few years ago he had the opportunity of presenting to the Association of American Pathologists a paper on endothelioma in which he collated all the cases that had been carefully studied—approximately 150. The great mass of these tumors involve the serosæ, particularly the meninges and pleuræ. Several observers have found similar tumors in the ovary, and a number of papers contain reports of endothelioma of the parotid, this being the basis of most of the so-called mixed tumors of that gland. The paper by Kelly is one of the best English productions on this subject; Borst, in his classic work on tumors, has made an exhaustive study of these tumors. They are interesting to the pathologist because of their histogenesis and peculiar position as to malignancy. In this respect

they bear the same relation to other tumors of the sarcoma group as does the flat-celled cancer to the more malignant epithelial neoplasms. They extend along the lymph channels usually without the detachment and transportation of cells seen in the more malignant tumors. During the routine examination of tumors at the Jefferson laboratories some unusual specimens have been seen. Among these are endotheliomata involving the fissural regions of the face. It is probable that many tumors regarded as originating in the antrum or other sinuses are really endotheliomata of the fissures of this region. A few endotheliomata of the mammary gland have also been observed, the diagnosis being confirmed by the subsequent relative benignancy after complete excision. Endothelioma of bone is less frequent than it is in other tissues. Here the tumor bears a striking resemblance to cancer, especially the flat-celled type, but the structure and location indicate the origin from endothelial elements. Vöorstmann suggested the classification into hemangio- and lymphangio-endothelioma, but we find groups of cases not properly classified as either—for example, those originating in serosæ, commonly the pleura or meninges, less frequently the peritoneum. The histogenic study of these tumors arising in the ovary, indicate their origin from the endothelial investment of the marginal genetic layers or connective tissue stroma of the organ.

#### RESECTION OF ILEOCÆCAL COIL FOR TUBERCULOSIS.

DR. JOHN H. GIBBON presented a negro, aged 40 years, upon whom he had operated in September, 1905, for tuberculosis of the ileum and mesenteric glands, resecting a portion of the ileum and cæcum. Two subsequent intestinal anastomoses were done.

The patient was admitted to the Pennsylvania Hospital in September, 1905. He stated that he had lost weight and had suffered from abdominal pain and indigestion for about seven months. The pain complained of was a general pain in the lower half of the abdomen which seemed from the description to be peristaltic. He was watched carefully for two weeks, a test meal being given and the stomach contents carefully examined. He vomited once or twice during this period, but was able to take full diet without much difficulty. His abdomen was always scaphoid and somewhat rigid. On two occasions a distinct movable mass could be felt in the right iliac region. This was thought to be an enlarged mesenteric gland. There was no fever

at any time, and no blood or mucus was passed in the bowel movements. Rectal examination showed some tenderness behind the bladder. No tuberculous lesion of the lung could be discovered. After observing the patient for some time it was finally concluded that he must have some tubercular intraperitoneal lesion, and it was thought that an exploratory operation was justifiable.

The abdomen was opened through the right rectus, and the ileum near its distal extremity was at once encountered. It showed two marked constrictions with a dilated portion of bowel between them, containing a large number of small bodies which felt not unlike gall-stones. These proved subsequently to be watermelon seeds. The patient stated afterwards that he had not eaten a watermelon for over a year. Numerous tubercles were found over the constricted portion of the ileum, and there was a mass of large mesenteric glands behind the ileocæcal juncture. Some of these were as large as hickory nuts. Small tubercles were found in other portions of the peritoneal coat of the bowel. There was no evidence of any tuberculous lesion elsewhere, and there was but a small amount of fluid in the cavity. The bowel was excised from a point some distance proximal to the first stricture to a point above the cæcum. This portion of bowel was removed with its mesentery containing a large number of glands. Other individual glands were then removed. Certainly all the diseased bowel, and apparently all of the involved glands were removed. The open ends of the bowel were then inverted and a lateral anastomosis made between the ileum and the ascending colon. Catgut and celluloid thread were used in making the anastomosis. A gauze drain was inserted down to the inverted ends of the bowel, but not to the point of anastomosis. The operation was a very long one, occupying two hours; this was partly due to the fact that after dividing the ileum and inverting the end it was found that in order to remove all the enlarged glands a higher division of the bowel would be required. The patient made a very satisfactory recovery after his operation, but on the fourth day he had considerable pain and vomited. Chloride of ethyl was administered, the gauze drain was removed, and there was an escape of considerable gas and some liquid fæcal matter. There was no other interference with convalescence but the fæcal fistula did not close, although the discharge grew much less.

The patient was readmitted to the hospital on January 14,

1906, complaining of painful peristalsis and with the fæcal fistula still open, although discharging but a small amount of fæcal matter. The peristaltic movement of the bowel could be distinctly observed through the abdominal wall, the bowel becoming greatly distended in the right iliac region near the wound. With the idea of removing whatever caused the obstruction to the small intestine, and of closing the fæcal fistula, the abdomen was opened on the outer side of the old scar. The adhesions were very extensive and it was discovered that the fistula opened probably at the point of anastomosis. The proximal portion of the ileum was enormously distended and hypertrophied. This extended up the ileum for probably two or three feet; the colon was quite collapsed. As the intestines were so matted together it was thought wise to make a new anastomosis between the ileum and the transverse colon. This was done without cutting off the ileum at the site of the previous anastomosis. The fistulous opening into the bowel was closed with sutures, but a drain introduced down to this point. The new anastomosis was surrounded by omentum and the abdomen closed, excepting at the point of drainage. The patient made a good recovery from this operation but the fæcal fistula continued to discharge.

He was operated upon again in March, 1906, by Dr. Le Conte, and an attempt made to close the fistula. This was not, however, successful, and a few months later the discharge was greater than it had ever been, although there was no longer any painful peristalsis.

The patient was again seen by Dr. Gibbon in December, 1906. He had gained 18 pounds and was able to do light work. He was greatly troubled, however, with the discharge of fæcal matter, and he was again admitted to the hospital. On January 11, 1907, Dr. Gibbon opened the abdomen through the left rectus, with the idea of dividing the ileum at the point of anastomosis to the transverse colon and anastomosing it with the sigmoid. The abdominal cavity was found in good condition excepting for numerous small tubercles over the bowel and mesentery; there was no fluid and there were no enlarged glands. The last anastomosis was in good condition and apparently working satisfactorily. There was no distention of the bowel. The ileum was divided near the anastomosis, the two ends inverted, and the proximal one anastomosed laterally to the upper portion of the

sigmoid. The abdomen was closed without drainage and without any attempt being made to close the fistula on the opposite side.

Since this operation the patient has progressed very satisfactorily. At first there was a free discharge of fæcal matter from the old fistula, but this stopped after a few days. The fistula was Y-shaped, having two external openings, and one of these closed over firmly after the operation, but the other is still discharging a small amount of mucus and pus. The patient's temperature is normal and he is able to move about and is quite comfortable.

The specimen removed at the original operation was exhibited. It is 38 cm. long, 34 cm. of ileum and 4 cm. of cæcum. The mesentery is attached to the intestine and contains a number of enlarged glands. There are two constrictions, one of 5 cm. from the ileocæcal juncture and the other 13 cm. above this one. The bowel between the two constrictions is very much distended and thickened; in this distended portion between the strictures there was found, when the specimen was examined, two or three ounces of watermelon seeds with one grape seed. The peritoneal covering of the bowel and mesentery is studded with small tubercles and numerous hard bodies can be felt in the intestinal wall. The mesentery is very thick and contains a number of large glands, the largest measuring 4 x 3.5 x 2 cm. These glands on section proved to be caseous. The appendix is tightly bound down to the cæcum by adhesions. The lower stricture is 3 cm. in length and the lumen of the bowel at this point .5 cm. The second stricture is 1 cm. in length and the lumen of the bowel 1.5 cm. The pathological diagnosis was tuberculosis of the intestine with chronic ulceration; tuberculosis of the mesenteric glands; and hypertrophy of the muscular wall of the intestine.

Dr. Gibbon stated that this case and another in which he had resected the colon from the hepatic flexure to the middle of the sigmoid and made a successful end-to-end anastomosis for tuberculosis, caused him to feel that patients afflicted with tuberculosis of the intestine stood extensive operation well, and that there was a chance for even the most apparently hopeless of these cases. The second case referred to was operated upon March 5, 1905, and is perfectly well at the present time. In this case an end-to-end anastomosis was made and a fæcal fistula persisted for some weeks, but finally closed. It is thought that a lateral anastomosis is better in resections of the large intestine than the end-to-end.

REPORT OF A CASE OF HÆMOPHILIC KNEE JOINT.  
OPERATION; RECOVERY UNDER THE USE  
OF THYROID EXTRACT

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N. G., a waiter, twenty-two years of age, was referred to me for trouble in his knee, by Dr. Geo. C. Clarke of this city. The family history is negative so far as bleeding is concerned. His mother died when he was an infant; his father and one brother are living and well.

His personal history is that at five years of age he had suppurating inguinal glands, but had none of the diseases of childhood. Cuts or injuries occasioned no greater hæmorrhage than occurs in the ordinary individual. He had during boyhood an attack of nose-bleed continuing daily for several weeks, but without any deleterious effects. Prior to my seeing him, he had two hæmorrhages following biting of the tongue, each of which lasted for about three weeks and left him much exhausted by the loss of blood. The last one of these occurred within the past two years and he was cared for by Drs. Clarke and Page at the German Hospital.

When first seen, in March, 1906, he was extremely anæmic and sallow. He had not had good health for several years and constantly suffered from pain and soreness in his left knee. This trouble began when he was twelve years of age, at which time he fell, injuring the part slightly. Little attention was given it until the third day after the injury, when, following a long walk, the knee became greatly swollen and very painful. After two weeks' confinement in bed, the knee recovered entirely, but at irregular intervals of from one month to one year the joint has been swollen and painful just as after the first injury. Any overuse of the part sufficed to relight the trouble until finally tenderness became constant in spots and more especially on the inner side of the patella. Marked enlargement finally occurred and function became impaired. Flexion beyond 60 degrees was

impossible but extension was normal and walking was not painful. A slight fall or forced flexion would cause an outbreak of pain and swelling severe enough to put him in bed for two or three weeks. As no history of bleeding was obtained at this time, the condition was considered a chronic synovitis of probable tubercular origin with thickening of the synovial fringes. Local applications of ung. ichthyol and similar remedies were used without benefit. Plaster of Paris was applied for six weeks and the use of the part much restricted, but without appreciable results. An X-ray plate made shortly after coming under observation showed thickening of the soft structures but no apparent alteration of the bony. The condition finally became so troublesome that he was unable to continue his vocation, and operation was advised for the removal of a supposed hypertrophy of the ligamenta alaria just below the patella. He had been taking the Syrupus Ferri Iodidi for several months with some improvement in appearance and general health. He entered the Methodist Hospital on July 17, 1906, and was prepared for operation which was done on the following day. Attention was directed to the attacks of lingual hæmorrhage, but on account of the absence of bleeding in any other portions of the body following cuts, etc., these were considered as due more to the condition of anæmia and the vascularity of the tongue.

The joint was opened by a straight incision on the inner side of the patella. The appearance of the tissues of the joint was striking and totally unlike any I had ever seen. The synovial fringes were found thickened and the ligamenta alaria below the patella were very much hypertrophied. The entire synovium was of a dirty brown or chocolate color. There was no evidence of recent hæmorrhage, but the fringes appeared as if about to undergo sloughing, a condition which is described as characteristic of the hæmophilic joint. The hypertrophied portions were thoroughly excised both on the lateral and on the infrapatellar surfaces. There was but an ordinary amount of bleeding at the time both in the skin incision and within the joint and no ligatures were used though two small vessels were cut in making the opening incision. Six strands of silk-worm gut were used for drainage of the joint and the incision was closed with the same material for sutures. One of the small vessels cut showed a tendency to bleed and was caught with a suture and easily con-

trolled. The leg was placed upon a posterior straight splint and an ice-cap ordered applied continuously.

July 19.—Wound dressed to-day. Considerable oozing but not more than is frequently seen after similar operation. The drainage was removed and there immediately occurred a gush of blood which continued to flow. The lower suture (which had caught a bleeding vessel) was removed and the vessel began to spurt blood. A pressure bandage was applied and an ice-cap kept on constantly. A few hours later, it was found that bleeding was still present and it was necessary to introduce two stitches to control it. Morph. sulph.,  $\frac{1}{6}$  gr., and atrop. sulph.,  $\frac{1}{150}$  gr., were administered hypodermically several times during the day to control pain and hæmorrhage.

July 20.—Patient had a bad night. Was very restless and complained much of pain in the knee, describing it as a *pressure*. The knee was greatly distended and very painful. It was surrounded by ice-bags and no bleeding was perceptible from without. He had one grain of codein during the night without benefit. Strych. sulph.,  $\frac{1}{30}$  gr., was given every three hours and iron in the form of Basham's mixture was begun. He also received a high enema of whiskey 1 ounce, ammon. carb., 20 grs., and normal salt solution 6 ounces, because of the exhaustion and weakness. Gradual improvement followed and the leg was not dressed until the twenty-fourth. Calcium chloride, 15 grs., every three hours was begun on the twenty-third and continued for three days and on this date his temperature rose to above 101 degrees.

When the dressings were removed on the twenty-fourth, bleeding began immediately. A probe was gently inserted into the lower end of the incision and the hæmorrhage became profuse. Pressure with the bandage controlled it completely and the ice-bags were continued. On the twenty-sixth the stitches were cut but not removed, and even this caused bleeding which could not be controlled by pressure and it became necessary to introduce two sutures. There was severe and constant pain in the knee and extending to the foot. Sleep was impossible without codein or morphin.

On the twenty-seventh, he was given by mouth 6 ounces of a 10 per cent. solution of gelatin twice daily and on the twenty-eighth the leg and foot were encased in an interrupted plaster

splint. Adrenalin solution (1-1000) in 8 minim doses was given every four hours but with no effect upon the hæmorrhage. The influence of the plaster splint was noticeable in the temperature which fell gradually during the following week. The effects of the gelatin upon the clotting of the blood were most marked, the resultant clot forming very rapidly and proving the most firm and elastic that I have ever seen. The escaping blood formed in a clot under the dressings and this could be lifted from its position with ease and handled very freely without breaking. It had much the consistence of gelatin but was slightly more elastic. The gelatin and adrenalin were continued until August 5, and constant oozing was present. The lips of the wound had separated and exposed an unhealthy granulating and bleeding surface. The entire knee was much swollen and the patient's condition was far from encouraging. On this date, thyroid extract in 5 gr. doses three times daily was begun. Immediate benefit resulted, the temperature dropping still further and the bleeding lessening. By the eighth, bleeding had entirely ceased, though there remained serous oozing from the necrotic area of the wound. Pain lessened and the patient began to eat. A blood count made on the eleventh, showed red cells, 4,310,000, white cells 6,720, hæmoglobin 60 per cent. The records of examinations made previously have been lost, but my personal recollection is that the hæmoglobin was as low as 30 per cent. a week after the operation.

From this time on the progress was rather rapid and in two weeks the wound had entirely healed and he was walking about on crutches. Strength quickly returned, color became better and he continued to take the thyroid and that alone. On August 27, while eating dinner, he accidentally bit his tongue and free oozing of blood began. Monsel's solution was immediately applied and the bleeding ceased. Repeated hæmorrhages occurred during the ensuing week, but were temporarily checked with Monsel's solution. Aside from this, the patient looked and felt well and had no pain or trouble in the knee. He left the hospital on September 8, seemingly in perfect health. The cast was removed from the knee a few weeks later and he was warned against using the leg in walking. A small clot or magma was still adherent to the tongue from the action of the Monsel solution, but there was absolutely no bleeding. A short stay at the seashore proved

extremely beneficial and he is now following his work as a waiter with perfect comfort to himself. He has not yet regained full use of the joint, though movements to increase flexion have been advised. He is extremely cautious of motion of the part so as not to injure it in any way. Since he was twelve years of age, he has also had slight "rheumatic" pains in his right hip with trifling impairment of function, but as there is no actual disability or interference with his work, nothing has been done for it. The thyroid extract is still continued twice daily and the changed color and appearance furnish the best evidence of its beneficial effects. Two weeks ago, while descending a stairway, he slipped and wrenched the knee, but experienced absolutely no ill-effects from it, which is in marked contrast to the results of a similar injury prior to the time of operation.

An examination of the eye-grounds was made by Dr. C. A. Veasey to determine any possible evidence of change in the vessels of the fundus or the optic nerve. His report is as follows: "Vision, pupillary reactions, fundi, fields and external muscle rotations are normal. No abnormality whatever can be observed in the vessels of the fundi."

The two most widely accredited theories of the location of the cause of hæmophilia are (*a*) that it concerns the coagulability of the blood, and (*b*) that it lies in the tissues of the vessels. Many researches have been instituted to determine if possible which is correct, but failure has attended them thus far. Weil (*La Tribune Médicale*, Jan., 1907) believes that in hereditary hæmophilia there exist incoagulable substances in the blood which may have their origin in various organs, one of which is the liver (Delezenne). Sahli (*Zeitschrift f. klin. Med.*, 1904, vol. lvi, Nr. 3 and 4) believes the coagulation of the blood is at fault, but the cause of it lies in the vessel structures themselves, chiefly the endothelial lining. Weil (*loc. cit.*) publishes the effects of the use of normal serum when injected into a "bleeder." He says, "The treatment with injections of fresh serum, efficient though it may be, has no value in the permanent cure of the affection. It does not attack the cause and is but an appropriate symptomatic medication. The dose . . . should be from ten to twenty cc. Human serum or the

serum of a horse should be taken as they . . . do not give rise to accidents." This is an admission contrary to what he has endeavored to prove and points very strongly to the tissues as the parts at fault. The use of the thyroid extract also adds to this view, as it appears to supply some vital substance to the tissues which is lacking either totally or in part in these cases.

In the case just detailed, the marked change in the appearance of the wound, the healthy color of the granulations, etc., is in thorough accord with the observed action of the thyroid in other conditions. We are forced to admit, however, our ignorance of its mode of action, and until this is known all theories must remain as such, though it is thoroughly justifiable to venture the opinion that the blood is at fault in some instances and the tissues in others, while in still others both are affected.

DR. WILLIAM J. TAYLOR said Dr. Rugh's results in this case confirmed his observations regarding the control of hæmorrhage, though he has had no experience with joints. The use of thyroid extract diminishes the coagulation time of the blood, though as yet we do not understand its action. In these cases two conditions must be considered: first, the coagulation time of the blood; second, the condition of the tissues. Dr. Sajous advances the theory that the pituitary body governs the adrenals and that coagulability is kept up by the thyroid stimulating the pituitary. This has a practical value when the coagulation time is lengthened, as in some cases of jaundice. In a number of the latter the time is not lengthened, hence thyroid extract will in them have no value. Murphy and Gould in a study of fifteen cases of jaundice from all causes—cancer, obstruction, etc.—did not find in one a change in the coagulation time. In one case of obstructive jaundice from malignant disease, under the care of Dr. Harte, the coagulation time was lengthened. Wiel has used for this condition injections of beef soup, practically bouillon, into the veins with good results. Dr. Taylor is confident regarding the value of thyroid extract when the coagulation time is lengthened. In one case its administration for a few days brought the time down from thirteen minutes to two minutes and six seconds. The individual making the test must be taken into account, as methods for deter-

mining the coagulation time are not well worked out. There are sources of error in Wright's instrument. In another appliance the blood is kept in motion by a current of air. A practical method is to place a drop of blood on a slide and determine by position of the latter when coagulation has occurred. The personal equation is great and all the tests should be made by one man. The subject is one that should be investigated more carefully. Dr. Taylor now uses thyroid extract whenever bleeding is a probability. He has employed it in operations upon the kidney, bone, for the extraction of teeth and in the case of removing glands of the neck from a boy whose grandfather was a terrific bleeder. In the last case the coagulation time was lowered from eight to three minutes in forty-eight hours and the operation site was perfectly dry.

Dr. W. M. L. COPLIN said we know something of the basis of thyroid therapy in cases of hæmophilia. Women escape the affection, hence we look for organs in the female which possibly by an internal secretion combat any tendency to this diathesis. For such organotherapy ovarian extract has been suggested and in some cases has been of value. Hyperthyroidism is more common in the female, the relation between the thyroid metabolism and the general economy being more intimate in this sex. This is shown by the changes in the gland during menstruation and gestation; its relation to myxœdema and exophthalmic goitre is well known. If we are correct in the assumption that activity of the thyroid and parathyroid glands enable the female to escape hæmophilia, the basis of employing thyroid extract to counteract the manifestations of the disease becomes plain. Dr. Taylor referred to the exact cause of hæmophilia. Of the two theories, Dr. Coplin's inclination is toward the histogenous, the hæmatogenous not appealing to him as possessing a sound basis. There is no specific relation between coagulation time of the blood and hæmophilia, the relation being the same as in any anæmia. This diminished coagulability was shown at autopsy upon a case of pernicious anæmia in which the blood clotted in a basin some time after it had been removed from the body, yet there is no necessary relation between secondary anæmia and bleeding. Loeb's studies concerning the relation between tissue juices and the blood indicate that in coagulation there is necessary a certain element which is supplied by the tissues. He suggested as the source of this

element the endothelium of the capillaries. Such element is not supplied when metabolism is deficient, and on this basis may be explained the occurrence of periods when hæmophiliacs are not hæmophiliacs,—that is, when they do not bleed excessively. Wright's studies on the calcium content of the blood show that the explanation based upon its lowered quantity applies in some cases; in others the calcium is entirely within the normal limits, and therefore this cannot be the cause of the condition.

Dr. Rugh's case is an instance of the cryptogenic or latent type of hæmophilia. These cases are well known, there being at least the gastric, intestinal, biliary, arthritic, and renal types; possibly there is a meningeal form. In the renal type the kidney may show no microscopic lesion though hæmorrhage had been severe. It is also to be remembered that paranephric hæmorrhage may follow trifling injuries. König, Broca, and also Poillet, have studied particularly the joint manifestations of hæmophilia, Poillet analyzing 252 cases. In about 50 per cent. of cases the knee is involved and in 25 per cent. the elbow. In none of Poillet's cases was the operative result so good as in Dr. Rugh's case. None was diagnosed before operation. The findings in these joints were well described by Dr. Rugh. Chondroid erosion is marked, in some instances this process extending even into the marrow. Spongy articular cartilages are produced in some cases. Lipping of the articular cartilages at their margins is more marked in operative cases and may become so prominent as to lead to fixation of the joint. This is due to chondroplastic proliferation of the marginal genetic layers of the cartilages, hyperplasia of the serosa not being anatomically important in the locking. These joint lesions are not the result of primary changes in the bone. There has been reported an instance of hæmophilia with separation of the epiphysis due to hæmorrhage between the epiphysis and shaft, with resulting formation of a flail joint. Dr. Rugh's case illustrates the muscular wasting which often accompanies the joint lesion. This remains unexplained, as it is not a question of fixation as in tuberculosis. Sometimes even the tendons wither. This wasting suggests in a way the exploded theory of the neurogenous origin of hæmophilia. A practical point regarding these cases is the almost certain recrudescence of the hæmophiliac lesion. The age of Dr. Rugh's patient is against this, as the great majority of cases occur in boys of from four to six. A diagnostic

point in hæmophilic hæmarthrosis is para-articular hæmorrhage. This is sometimes shown as a faint hazy bluing of the sulcus on each side of the patella. At times distinct hæmorrhage is present. This ought to constitute an important diagnostic feature.

PLASTIC RECONSTRUCTION OF THE EYE-BROW AND UPPER EYE-LID FROM THE TISSUES OF THE SCALP.

DR. JOHN B. ROBERTS reported this case with presentation of the patient. The child had a large arteriovenous angioma of the forehead and upper eye-lid, which he treated successfully by strangulation, excision, injection of boiling water and other methods. Its removal left the eye-ball exposed and a corneal ulcer developed. A pedunculated flap from the scalp was brought down to make the upper lid. Subsequently this was split horizontally and the hairy part transferred to the superciliary region to make the eye-brow. Later a portion of this soft hair will be shaved to cause it to become coarser, and probably some of the superfluous hair will be removed by the electric needle.

EXCISION OF BRANCHIAL FISTULA.

DR. JAMES W. MACINTOSH presented a boy of twelve years. A small opening in the skin at the lower and inner border of the right sternomastoid muscle was noticed when the boy was two weeks old. This had remained open and discharged mucus except for a period of one and one-half years some time between the age of two and five. From the location of the opening and the fact that it was congenital a diagnosis of branchial fistula was made. Through the fistula a solution of quassia could be injected into the mouth, proof that the fistula was complete. A silkworm gut suture was at first inserted and finally a small lachrymal probe was passed. This enabled dissection and removal of the entire tube. The inner end was pulled down and a chromicized catgut ligature applied. Before it was tightened the ligature was carried to the pharyngeal wall by means of two pairs of curved hæmostats and a second knot then made. The stump was then twisted four times and allowed to retract. The lower end of the external wound is not yet healed because of the eczematous condition of the skin caused by the discharge from the fistula.

DR. JOHN H. GIBBON remarked on the difficulty with which these fistulæ are excised. He never before saw one removed so

entirely as was the specimen shown. Only time will tell if the cure is permanent. Surgeons often feel that the fistula has been completely removed and yet it reforms. If a slight amount of the mucous lining be left, recurrence will follow.

DR. W. W. KEEN regards the use of quassia as an ingenious plan well worthy of repetition in future cases of such fistulæ. He agrees with previous speakers as to the difficulty of excising the fistulous tract in its entirety. Branchial fistulæ are rare, the similar condition of the thyroglossal duct being more common. The latter he has almost never succeeded in curing by one operation.

INTRALOBULAR ABSCESS OF LUNG.

DR. CHARLES F. NASSAU presented a man, aged thirty-eight years, who was first seen by him, with Dr. M. T. Prendergast, October 7, 1906. He had then been ill for ten weeks. The patient was dreadfully emaciated, extremely weak, with a rapid pulse, in the neighborhood of 120 per minute. He had very little cough and that was of a hard brassy character. There was constant pain at the base of the right lung. Puncture of the chest made in the mid-axillary line in the fifth interspace and in three different directions revealed no fluid of any kind.

October 19, 1906, he was seen again in consultation with Dr. Prendergast and Dr. Alfred Stengel at St. Joseph's Hospital. A preliminary puncture through the fourth interspace gave vent to abundant pus. About 3 inches of the fourth rib was then excised and through the adherent layers of the pleura an intralobular abscess of the upper lobe of the lung was broken into, evacuating somewhat less than a pint of pus. Light general anæsthesia by ethyl chloride, the patient almost dying on the table.

Following this operation the wound did very well, the walls of the abscess collapsed rapidly and the temperature fell immediately to normal. The patient was discharged from the hospital on November 13, 1906. The wound at this time was entirely superficial. The patient continued to do well for one week at his home, when he had a chill followed by high fever, sweating and general prostration. On November 23, 1906, after a second consultation with Dr. Prendergast and Dr. Stengel, it was determined that he probably had an empyema below the site of the previous incision into the lung, so a second operation was done, con-



sisting in still further excision of the rib previously operated upon, together with a wide excision of the rib below. About two pints of bad smelling bloody fluid, with here and there streaks of pus, was evacuated. In addition to the above the site of the primary operation, two encysted abscesses were encountered and evacuated. The patient's condition was so desperate that in order to give some support to the violent and wide excursions of the partially collapsed lung, a large quantity, about 7 square yards, of gauze was rapidly packed through the wound on the side of the chest. The patient's pulse at this stage was scarcely perceptible, his pupils were widely dilated, lips were purple, respirations could not be counted, his hands, feet and nose were cold. However, sufficient hypodermatic injections of camphorated oil began to bring about reaction. At the end of twenty-four hours one could say that they hoped he would recover.

From this time on convalescence was uninterrupted, although after the removal of the gauze packing introduced at the time of operation one could almost thrust one's whole hand into the patient's pleural cavity. Now the wound has entirely healed except a small granulating area in the skin, hardly an inch in length and less than a quarter of an inch in width. The lung has descended almost to its normal level and the breath sounds on the right side of the chest are quite normal.

#### RUPTURE OF KIDNEY AND LIVER.

DR. CHARLES F. NASSAU reported the following case: A man was admitted to the Frankford Hospital, October 27, 1906, with a history of having been kicked in the right side along the lower margin of the ribs by a horse. When first admitted he was in a state of shock, with rapid shallow respiration which was largely due to the fracture of four ribs on the right side. His temperature, which on admission was subnormal, reacted and rose rapidly. His pulse on admission, while rapid, was of good tension. There were no external marks of violence. The abdominal muscles were rigid, particularly on the right side.

The resident within an hour after his admission noted increasing power with a rapidly rising pulse rate and temperature. Respiration also became more shallow and of a slight sighing type. When seen by the reporter, about three hours after the injury, there was distinct dulness in the right flank. He passed

bloody urine, and on account of his increasing weakness since admission an internal hæmorrhage due to injury of the kidney was suspected. He was immediately etherized and prepared for operation on the table.

An incision was made along the right costal margin, beginning at a point about three inches to the right of the median line and ending well out in the right loin. As the peritoneum was approached it seemed to be infiltrated with blood, in fact so disorganized as to hardly require incision. Blood welled up rapidly out of the abdominal cavity and, as the intestines upon superficial examination seemed to be uninjured, they were packed out of the way and the region of the kidney exposed. The right kidney was found torn practically entirely in half. The whole organ lay free in the abdominal cavity, the peritoneal covering over the kidney not being recognizable. The hæmorrhage was furious. As quickly as possible the renal vessels were clamped and the kidney cut away.

After ligation of the renal pedicle blood continued to ooze from the direction of the liver. Investigation discovered a tear in the liver substance on the posterior edge, extending well up towards the vault of the diaphragm. This was firmly packed and the abdominal wound was then closed except for a point of generous gauze drainage. The man was put back to bed apparently very little worse off for the operative procedure.

During the first 24 hours he passed 15 ounces of urine. Day by day the kidney secretion increased, the urine being quite normal, until on the fourth day he passed 36 ounces of urine. On the fourth day his temperature shot up, he developed an annoying cough and examination of the right lung disclosed a wide spread pneumonia. He died in about three days after the development of the lung condition.

This man at no time had any symptoms that would lead one to suspect a peritonitis; his bowels moved naturally and post-mortem the peritoneal cavity was found well sealed off and appeared to be quite free from any evidence of inflammation.

## STAB WOUNDS OF THE HEART.

WITH REPORT OF A CASE.

BY RICHARD H. HARTE, M.D.,

OF PHILADELPHIA,

Surgeon to the Pennsylvania Hospital; Adjunct Professor of Surgery in the University of Pennsylvania.

IT has been the general impression on the part of the world at large that in all wounds of the heart, no matter how trifling, so long as the pericardium was injured, the injury must necessarily be fatal. This was the accepted opinion of all of the older surgical writers. Hallerius appears to be the first to differ from this old accepted theory, and to assert that heart wounds were not necessarily fatal. It would seem as though these conclusions might have been arrived at long before, especially when hand-to-hand combat was so common, and, from the very nature of the arms employed, punctured wounds of the heart must have been very frequent. Many non-penetrating wounds of the heart must have recovered, and persons sustaining penetrating wounds must have often lived for some time, and were capable of making considerable exertion. To bear out this statement I recall a case which occurred when I was a resident at the Pennsylvania Hospital, in which a sailor was stabbed on board ship with a sailor's sheath knife (an ordinary butcher knife) which inflicted a penetrating wound from  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches in length in the left ventricle. The patient lived about two hours, but died shortly after his admission to the ward, apparently from the loss of blood and embarrassment of the heart's action due to a pericardium distended with blood clots.

Wolf, as long ago as 1642, gave the first reliable account of the healing of a heart wound. Later Desoult described the steps of an operation for the relief of pericardial empyema. In 1798 many cases were reported of heart wounds in which pro-

tracted periods intervened between the receipt of the injury and death. Up to the end of the nineteenth century the treatment of heart wounds was purely expectant, consisting of rest, ice, cardiac sedatives, blisters, etc., etc.

In 1881 Dr. John B. Roberts suggested the propriety of attempting to suture the heart muscle in cases of stab-wounds. This idea, however, did not meet with much encouragement, as so distinguished a surgeon as Billroth declared that a surgeon who wished to retain the respect of his confrères would not attempt such a procedure.

Again, as the result of experimental research much light has been thrown upon the future of heart surgery, which may be voiced by the statements of Elsberg, quoted by Stewart in his classic paper on this subject.

The consensus of opinion among experimenters is, that the heart after being exposed can be grasped with the hands or forceps and gently compressed with no appreciable effect on its action; that punctures with needle or knife produce only a temporary irregularity in the heart's action; that wounds produced during systole bleed more than those occurring during diastole; that wounds of the ventricle produced during systole are larger than those produced during diastole; that oblique wounds bleed more than perpendicular wounds; that wounds of the right ventricle are more dangerous, because of the thin ventricular wall and because the blood in the right heart coagulates more slowly; that wounds of the heart heal kindly, and that the cicatrix is complete in two weeks; that interrupted sutures are better than continuous ones; that the material enclosed in the grasp of the sutures causes atrophy and is replaced by scar tissue; that superficial stitches are less liable to tear out than deeper ones, and that the stitches should be inserted and tied during diastole, because of the danger of tearing out during systole.

It will be seen that some of these opinions are of practical importance, while others are theoretical and impossible to carry into effect.

With this much learned as the result of experimental

research, two unsuccessful attempts were made in 1896 at cardiorrhaphy, and a year later Rehn published the report of the first successful operation. Since that time a number of successful cases have been reported, two by Fellows of this Academy, Dr. Stewart and Dr. Gibbon.

The heart may be wounded by all kinds of vulnerating bodies producing punctured, incised, lacerated and gunshot wounds, all of which may be received in a great variety of ways. In a large percentage of cases the pleura will be wounded. In a number of cases carefully analyzed by Stewart, it was found that the pleura was wounded. Gibbon, however, was fortunate in his two cases not to have the pleura injured, which is of great advantage, preventing much of the danger from infection.

The symptoms following a penetrating wound of the heart vary greatly under different conditions. There are always varying degrees of shock which depend largely upon the size and character of the wound. If the pleura is opened and the wound is sufficiently large extensive hemorrhage may take place into the pleural cavity. Or, on the other hand, blood may pour out into the pericardium or externally. Auscultation produces a variety of symptoms, such as a splashing sound, indicating air and blood in the pericardium: sometimes a friction sound will be noticed, and in other instances a bruit, as though an aneurism existed. The heart's action is irregular and often very labored. The pulse may be less than 100. If the blood is confined to the pericardium the præcordial dulness will be greatly increased on percussion. (Upon these facts I based my diagnosis in the case which I here report.) The pulse will be very feeble and the apex-beat can be neither felt nor heard. The pressure manifests itself first on the auricles and the origin of the great veins, causing venous stasis, which may manifest itself by dyspnoea and cyanosis, the ventricles having a tendency to pump themselves dry, and the heart finally ceasing to act. Without surgical intervention the individual will die from anæmia, compression of the heart, or, later, from sepsis or functional incompetence.

From what has been surmised it would appear that the diagnosis of wounds of the heart could be made without much difficulty. But at times a positive diagnosis can only be determined upon by an exploratory operation. For instance, in punctured wounds involving the præcordium where the internal mammary and intercostal arteries are injured a violent hæmorrhage may ensue which may confuse the condition with that of a penetrating wound of the heart. The size of the wound of entrance is no index to the size of the wound in the heart, which may be greatly increased either owing to the heart's action or to the position and movement of the wounding instrument.

Stewart quotes Fisher, who analyzed 452 heart wounds, and says that from 7 to 10 per cent. of these cases recover spontaneously. This estimate seems high, but even if it were positive it should not deter one from prompt surgical intervention if the patient's condition warrants it. The prognosis in these injuries depends upon the kind and extent of the wound inflicted, and last, but in no wise least, upon whether or not there is infection, especially of the pleural cavity. Gibbon, in an unpublished paper, is disposed to think from an analysis of the reported cases that gunshot wounds of the heart would give a higher recovery rate than stab-wounds, if it were not for the injury of other viscera which nearly always accompanies gunshot wounds, especially injury to the lung and pleura. There are 19 cases on record where bullets have lodged either in the heart muscle or cavity, and in which the patients have lived for varying periods after receipt of the injury. It may be fair to presume that an individual who lives a couple of hours after the receipt of a heart wound has a fair chance to recover with an operation. Many cases which succumb in a short time, would recover if they could have prompt surgical intervention.

In operating on these cases an anæsthetic seems imperative. Except when the patient is unconscious ether is unquestionably the anæsthetic to be preferred. Time is an important factor, and every provision should be made beforehand so that the steps of the operation may go on without any interruption.

As to the incision for the exposure of the heart, this depends in a measure on the exigency of the case. If possible the incision should be so planned as not to involve the pleura. It is questionable, however, if any operative technique will ever be established for dealing satisfactorily with these cases. The formal osteoplastic flap, as employed by the Continental surgeons for exposing the heart, is liable to result in injury to the pleura, and is not to be classed with the simple suprapleural operation where two or more costal cartilages, and if necessary, a portion of the rib, can be divided and reflected back over the sternum. With care the pleura and pericardium are easily separated from the overlapping tissues, giving the operator every facility to open the pericardium without involving the pleura. In my own case I erred by following the course of the wound through the pleura, thus causing immediate collapse of the lung, and forming later a favorable field for infection. After a satisfactory exposure of the pericardium it should be opened with a blunt pair of scissors, after carefully raising the pericardium from the heart with forceps, as the latter will be floated or pushed forward if much hæmorrhage has taken place, into the pericardium. Loose blood and clots should be quickly sponged out, when usually the bleeding spot can be felt or seen, and controlled by pressure until sutures can be introduced.

The best suturing material is chromicized catgut, reasonably fine, introduced on a sharply curved needle. Each stitch should be left long after tying, as the ends materially assist as tractors and enable the more accurate introduction of the subsequent stitches. It will be found in many cases that the heart's action is very rapid and erratic, and that the introduction of the first suture is like attempting to perform the same operation in the back of a fish which has just been taken from the water and is still impaled on the hook. In ventricular wounds the sutures should be inserted deeply, even to entering the endocardium, as only by this means can accurate approximation be procured. In wounds of the auricle through-and-through sutures are imperative, as well as several superficial ones, as bleeding sometimes takes place through the suture wound, as experienced

in my case. This, however, can be easily controlled by a few superficial stitches inserted at the bleeding point. In introducing the sutures everything should be sacrificed in order to obtain accurate approximation of the wound. If the line of suture should involve the coronary artery little harm is likely to result if it is caught in the suture. This occurred in Gibbon's case without ill effect. Ricketts also showed in experimental work on the dog that either coronary artery could be tied without harm.

In wounds where the lung is also injured considerable bleeding may take place from the lung substance, but when there is an opening of any size in the pleura the lung invariably collapses. This in itself may be sufficient to control the bleeding point. This failing, however, several deep sutures may be inserted into the lung substance at the bleeding point and firmly tied. The pericardium should be closed with a continuous catgut suture without drainage, as this cavity is much less apt to become infected than the pleura, and it is the best practice to close the pericardium in this way, although it is just the reverse with the pleura. If the lung is collapsed, the pleural cavity if possible should be cleansed of all free blood and clots, and if the patient's condition admits, provision should be made for drainage by an opening in a dependent part of the chest. No power can prevent infection in a wound where air is drawn into the pleura with each inspiratory act.

It will be also noticed that when the heart has lost its natural support by the surrounding lung, owing to its collapsing, it will immediately begin to become more erratic in its action and to race in a most excited manner. This can, in a great measure, be overcome by loosely packing the large space with liberal pads of gauze wet with salt solution. This was very noticeable in my case, and it seemed as though the heart would almost jump out of the chest until surrounded and supported by the moist packs of gauze.

The after-treatment of these cases is simply routine, in which small doses of morphia may be employed to advantage.

W. W., aged twenty-one, colored, longshoreman, was admitted to the Pennsylvania Hospital on June 9, 1906, with a stab-wound of the left chest, in third interspace to the left of the sternum, inflicted with a long-bladed pocket knife. The wound was about  $\frac{1}{2}$  inch in length. On admission the patient was somewhat shocked but did not complain much of pain. After being placed in bed reaction took place, and when seen by me two hours later the heart's action was fairly good; the pulse was about 120 and could be readily felt at the wrist. On auscultation, however, it could be seen that the heart was laboring very considerably, the sounds being very indistinct and muffled. The præcordial dulness had very much increased and had been gradually doing so since his admission, as noticed by Dr. Drayton, the resident physician, and it was very evident that the knife had entered the pericardium and wounded the heart. Operation was immediately decided upon. The patient was etherized and an incision about 4 inches long made to the left of the sternum, following the line of the wound, which had opened the pleura. The two ends of the fourth and fifth costal cartilages were removed from their attachment to the sternum, which, with the aid of a retractor, freely exposed the pericardium. It was noticed that the lung was partially collapsed, and the heart was laboring very much within the exposed pericardium. The pericardium was freely incised and found full of clot, which was rapidly removed and a wound about  $\frac{1}{2}$  inch in length found in the left auricle, from which a stream of blood squirted to a height of about 9 inches. The heart's action on the removal of the clot became fearfully rapid, and it was with the greatest difficulty that a number of sutures were introduced into the auricle, which was finally closed with chromicized gut. It was rather curious to note that immediately on the introduction of the first stitch the size of the blood stream from the auricle was reduced, but in place of one stream there were four, two small ones coming from the needle wounds. Two stitches were introduced through and through the auricle and these had to be fortified by a number of superficial stitches. In a few minutes all bleeding was permanently controlled. After thorough cleansing of the pericardium it was sutured. Apparently owing to the lack of support which the heart did not receive from the collapsed lung, its action was very violent and erratic. Two large section pads were placed

behind the pericardium saturated with normal salt solution, and the heart and respiration immediately became more normal. One pad was placed on top of the pericardium and brought out through the incision. The lower end of the incision was approximated with silk-worm gut. The patient reacted well from the operation. Subsequent to operation his pulse was of rapid but fair quality, about 120 to 140, and respirations ranged from 56 to 72.

The third day after operation the pads were removed and the patient's general condition was good. The following day the superficial drain was removed and another inserted; the left chest was strapped, which materially assisted the breathing. It was very evident that infection had taken place in the chest, as the discharge became very profuse and foul. On June 29 a rib was resected and a drainage tube inserted in the posterior axillary line. For some reason this did not drain satisfactorily. On July 3 another incision was made and the seventh and eighth ribs were resected in the postscapular line, and a tube inserted, but this did not in any way relieve the condition, and shortly after the removal of these two ribs the patient died.

The autopsy showed an empyema of the left chest, which drained badly. The left lung had collapsed, and was the seat of a bronchial pneumonia. The right chest contained 11 ounces of bloody fluid, and there was also a bronchial pneumonia of this side. There were extensive pericardial adhesions with no sign whatever of the stab-wound. The endocardium and valves were healthy.

DR. JOHN H. GIBBON said the fact that Dr. Harte's patient lived twenty-three days is an instance of what can be done in wounds of the auricle. Heretofore it has been thought by many that a wound of the auricle was necessarily fatal. This case is only another to show that a patient may recover from a stab wound of the auricle. Infection occurred here and proved fatal, as happens in many cases of heart wound.

DR. JOHN B. ROBERTS mentioned a case, which he previously had reported to the College of Physicians, of a suicidal wound of the heart, in which that organ was not perforated. He had not sutured the wound, but had been able to examine with his fingers the exposed heart. The patient died in twelve or fourteen days from infection, there being pleurisy on the left side and pneumonia of the opposite lung.

SEVERE BURN OF TOP OF HEAD AT SEVEN  
MONTHS OF AGE, FOLLOWED BY NECROSIS OF  
ENTIRE OSSEOUS CAP OF CRANIUM.

AT FOURTEEN YEARS OF AGE DETACHMENT OF THE ENTIRE CALVARIUM BY  
CIRCULAR CRANIOTOMY FOR EPILEPSY AND DEFECTIVE  
MENTAL DEVELOPMENT.

BY WILLIAM WILLIAMS KEEN, M.D.,  
OF PHILADELPHIA,  
Professor of Surgery in the Jefferson Medical College.

HARRY H. W., æt. fourteen, was admitted to the Jefferson Medical College Hospital, December 7, 1904, at the request of Dr. W. F. Haines of Seaford, Del., with the following history: At seven months of age his parents left him wrapped up in a shawl in a rocking chair in front of a wood fire, which then consisted chiefly of coals, while they went to attend to some farm work. They also left an older child, about two years of age, to take care of him. They were absent from the house for about forty-five minutes. Upon their return they found that the baby in the rocking chair had begun to cry and the two-year-old child had tried to climb into the rocking chair to comfort him. In doing so the chair was overturned forward and the baby thrown into the fire, so that the top of the head was in contact with the live coals. As nearly as can be ascertained by cross-questioning the two-year-old child, and knowing the length of their own absence, the baby's head lay in the coals not less than twenty and it may have been thirty minutes. As a result of this severe burn, the scalp being thoroughly charred, the whole top of the head sloughed off about six months later, including a large portion of both frontal bones, the two parietal bones in their entirety, and a part of the squamous portion of the right temporal bone. The piece of the squamous bone was lost, but a photograph (Fig. 1) shows the other four pieces of bone their natural size. The four pieces of bone which have been preserved can easily be identified. They are of a dark brown color, the result both of the burn and suppuration. Placing them in position, they measure from front to back 17 cm., and from side to

side 11 cm. When the bone sloughed away the dura was exposed, covered by that time with granulations. A year after the burn, the scalp was healed, and upon my recommendations (for Dr. Haines showed me the specimens and consulted me at that time) a tin cap covered with silk was made for the purpose of protecting the top of the head from blows, but it could not be used as it annoyed the child. Six months after cicatrix was complete, the scar broke down, and from that time till the present it has been alternately healed and open.

Soon after the accident he had nine convulsions. He was then free from them for over a year. Then he began to have distinct epileptic attacks. These have continued ever since and have increased in severity and frequency. They occur day and night regardless of any known influence, such as excitement, the direct sun's rays, etc. On an average, his father thinks he has about 400 attacks every year. Sometimes he goes several days without a spasm.

He began to go to school at seven years of age and appeared to learn rapidly. His memory was excellent till he was about eleven years old, when his epileptic attacks became more frequent and he became stupid. He was, therefore, removed from school, and he has forgotten most of what he learned and is becoming more and more deficient mentally. While at school he learned to read and write, but in the last three years he has lost the ability to do either.

*Physical Examination on Admission.*—He seems to be physically a well-developed boy of average height and weight, but his face presents a dull and stupid appearance. He responds rather indifferently to questions and talks, but can hardly be said to converse.

His heart, lungs, and abdominal viscera are, apparently, normal. The deformity of his skull is very marked (Fig. 2), showing a deep furrow a little to the right of the middle line, running obliquely from behind forward and to the right. On the top of the head there is a very large scar (Fig. 3). The oval line in this photograph is an ink line showing the present area under which there is no bone. This measures only 8 by 5 cm. Corresponding to this oval line the margin of the bones can be felt quite distinctly; under the scar, pulsation of the brain can be seen; pressure on the area where there is no bone causes pain.

There is also a scab at two or three ulcerated points. The scalp is as tense as a drum head over the entire top of the head.

His convulsions as observed in the hospital were at times chiefly manifested in the left leg and arm, at other times in all four extremities. There was no localization of the convulsions.

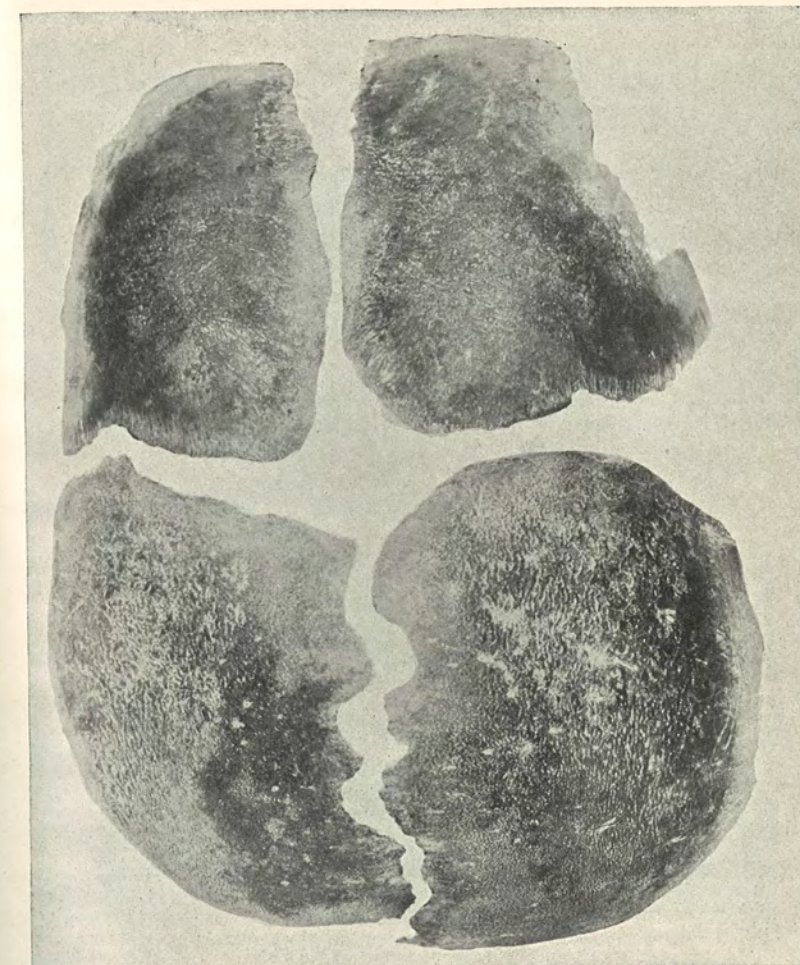
Urine: turbid, straw-colored, 1017, reaction acid, no albumin or sugar was found, urea 1.6 per cent.; no crystals, but amorphous urates, squamous epithelium, and a few leucocytes; no blood or pus. Dr. Wm. M. Sweet examined his eyes and reported as follows: Normal pupils; normal ocular movements. Optic nerves good color, vertically oval. Arteries and veins normal; smaller twigs tortuous. The arteries in the right eye-ground are a trifle small in proportion to the veins.

Dr. Bochrach examined him from the neurological standpoint and reported as follows. Knee jerks are equal; no asteriognosis; no Babinski; no ankle clonus; no impairment of sensation below the knees and no impairment of the muscle sense. No trophic ulcers; he stands equally well on both legs. There are ecchymotic spots on the arms, impeded circulation, cold sweaty hands; the radial arteries suggest hardening. The left hand, which was also burnt, is smaller than the right. The grasp is equally good in both. No atrophy of shoulder girdle muscles. No thermal anæsthesia. Pupils respond to light and accommodation. High arched palate; fairly good dentition. Hears the ticking of a quiet watch at about ten inches. Tendency to nystagmus laterally with the pupils turned to the right. No impairment of the sensation of taste.

After considering the possibility of doing any operation on the top of the head, I decided that that held out little hope of relief from the pressure, and as the covering of the top of the head consisted of the dura and scar tissue intimately adherent together, it would be very dangerous and probably fatal to attempt any operation there. Moreover, I supposed that probably the superior longitudinal sinus might be blocked as a result of the burn.\* I decided, therefore, to do a complete linear craniotomy, so as to separate the entire top of the skull from the lower portion. To do this by an open incision of the entire scalp would almost certainly produce gangrene of the scar tissue of the top of the head. I therefore decided to make several incisions, say 4 to

\*The operation showed that this was not the case.

FIG. 1.



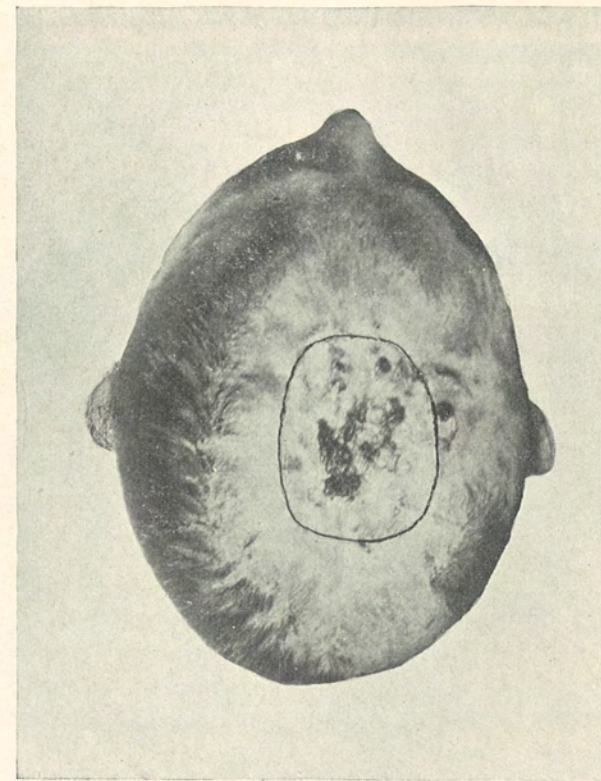
Photograph of the necrosed frontal and parietal bones, natural size, and measuring when approximated, 17 x 11 cm.

FIG. 2.



Photograph of the boy at 14 years of age.

FIG. 3.



Photograph of top of head. The dark line corresponds to the present opening in the bone and measures 8 x 5 cm. The original opening when the bones sloughed away at 13 months of age measured 17 x 11 cm. (see Fig. 1). While his head has increased in size with his growth, the defect in the skull has contracted 9 cm. antero-posteriorly, and 6 cm. transversely.



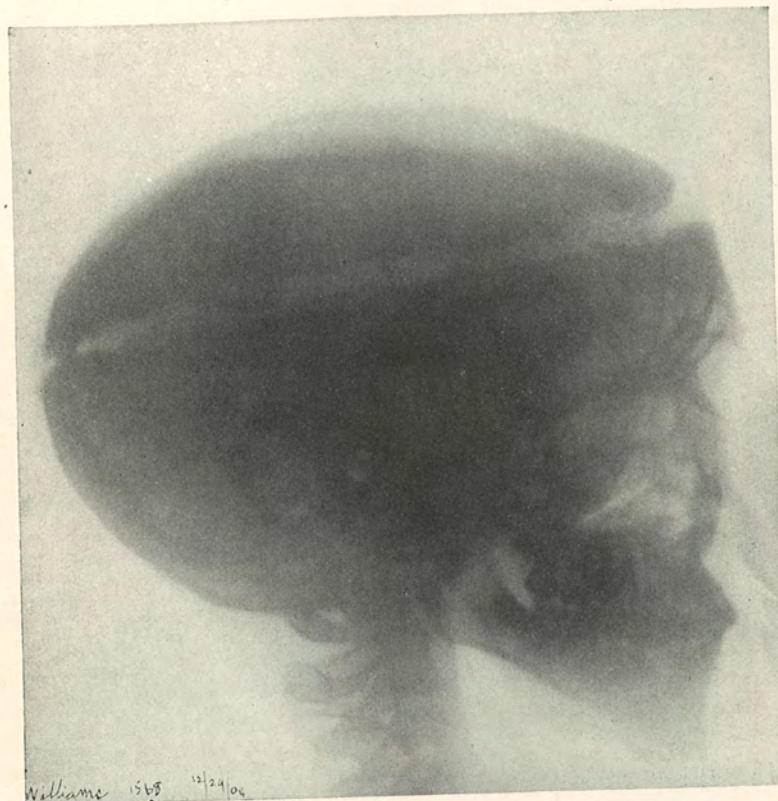
5 cm. above the ears, and then by my craniotomy forceps to gnaw away a portion of bone about 7 mm. in width. I found that the scalp moved loosely over the skull at about the level indicated all around the skull, excepting at a small area over the right temple. I could, therefore, by undermining it, detach the scalp from the skull through the small openings and then, having made a small trephine opening in the bone, could detach the dura from the bone and do the linear craniotomy.

*Operation, December 14, 1904.*—I carried out my plans as above described, making the first incision a little back of and above the left ear. I got along without trouble (excepting that it was tedious on account of having to do a large part of the operation without the aid of sight) till I reached the middle line of the forehead. Here, unfortunately, the superior longitudinal sinus was caught in the bite of my rongeur and torn. I immediately checked the quite violent hæmorrhage by some iodoform gauze, extended the incision somewhat across the forehead to the left, rapidly made a trephine opening at this point and gnawed away the bone till I reached the point of the tear. I was able then by my finger to check the flow of blood sufficiently to see the bone well, and complete the craniotomy in the middle line. I packed some iodoform gauze into the opening, which effectually checked the hæmorrhage, and then discontinued the operation, having completed nearly one-half of it, and determined to do the other half a few days later.

In thinking over the matter I feel quite clear that the tear of the sinus was due to the fact that I did not adopt the proper method of approaching this portion of the bone. I should have continued the gnawing away of the bone till I reached almost to the middle line, then have made a trephine opening on the left side and gnawed away the bone on that side nearly to the median line, have exposed the sinus, and then by guarding it with my forefinger or some other suitable shield, such as the handle of a knife, I am quite sure I could have removed this piece of bone which projected inward more deeply than usual, at least 4 or 5 mm., with safety and I would not have torn the sinus.

December 20, 1904.—He has done so well that I completed the craniotomy to-day. Warned by my former experience, I attacked the superior longitudinal sinus posteriorly first from one side and then from the other, as just described, gnawing away the

FIG. 4.



Skiagraph (Jan. 10, 1905) showing the gap left in the bone by the complete circular subcutaneous craniotomy. Note also the evidence of loss of bone on top of the skull.

bone over the sinus itself last and without any trouble. The hæmorrhage was not at all severe. Eight incisions were made in performing the complete craniotomy.

Two days after the first operation, and one day after the second, he was sitting up in bed with a backrest. In the interval between the two operations he had two convulsions, December 18 and 19, with but very little twitching. Before the second operation was done it was clearly noted by the resident, his father and several surgeons who had seen him repeatedly that his mental condition seemed to be distinctly improved even by the first operation. I hardly think that the wish was father to the thought, but, of course, it is difficult to express an unprejudiced judgment. The boy himself said that his head felt much better than before the operation. Very little pain followed either operation. His temperature after each operation only once exceeded 100 degrees.

January 9, 1905, a skiagraph was taken (Fig. 4). This shows well the absence of bone on top of the head and also the line of my linear craniotomy.

On January 10, 1905, just before his discharge, Dr. Bochrach again examined him and made the following report: The patient's face expresses apprehension and lack of intelligence. A considerable interval elapses between his answers to such questions as "Where do you live?" "How many brothers and sisters have you?" etc. There is apparently no paralysis of the muscles of the face; he is, however, unable to draw his cheek from either side in order to show his teeth. Most likely this is due to lack of understanding of what he is expected to do. The eye-balls have a tendency to twitching, or a slight jerky movement; possibly more marked in the right than the left eye. When following an object, especially toward the right side, lateral nystagmus is distinct. The pupils are somewhat dilated, but respond promptly to both light and accommodation. There is a fine tremor of the tongue; also a fine tremor of the hands, more marked in the right than in the left. Grasp good and equal. His walk suggests the "steppage gait;" this is exaggerated when walking with his eyes closed. During this test he always walks to the right. He has no Rombergism, but he stands with difficulty on either leg, with his eyes closed. The knee jerk on the right side is exaggerated, on the left side rather minus. No

Babinski or ankle clonus. The reflexes in the upper extremity, wrist, biceps and scapulo-humeral, are exaggerated. Tactile and thermal sense normal, though he occasionally gives evidence of paræsthesia. No asteriognosis.

He left the hospital on January 7 to visit an uncle in the neighborhood, but returned to the hospital on the tenth and then went home. His peculiar gait mentioned in Dr. Bochrach's last examination was improved, and his general and mental condition also were improved.

After the second operation, his convulsions were as follows: December 23, 5 minutes; December 24, 5 minutes; December 28, 7 minutes. They were chiefly on the right side and the mouth was drawn to the right. December 30, two attacks, 6 and 3 minutes long respectively, similar in type to the one on the twenty-eighth. December 31, one attack, duration 5 minutes. There were no movements on this occasion on the right side, but only a clonic spasm of the left arm and leg, and the face was strongly drawn to the left.

October 26, 1906.—He was shown to the Society of Clinical Surgery in a clinic which I held at the Jefferson Medical College Hospital. His father states that he has had fewer attacks and that his intelligence is slowly improving. The ulcers on the top of his head are rather worse than when I last saw him two years before and cover the central half of space where there is no bone.

A new skiagraph taken at this time shows persistence of the gap seen in the first skiagraph, but the edges of the gap are, of course, rounded off and less sharply defined. The width of the gap in the bone is the same as immediately after the operation. Dr. Haines writes me, January 25, 1907, that the top of the skull does not seem to him to be movable.

#### REMARKS.

That the baby did not die from the accident is extraordinary, but it is not a cause of astonishment that he should develop an abnormal shape of his head or an abnormal mental condition accompanied with epilepsy.

That popular myth, "pressure on the brain," is certainly realized in this case, as shown by the deep furrow on top of his head and by the measured contraction of the original defect in the skull. His head, though of very abnormal shape, is of

the average size for a boy of fourteen. Hence the head has enlarged very much since the bones exfoliated thirteen years before. But instead of the opening left by this exfoliation enlarging *pari passu* with the growing head, it has greatly contracted. Adjusting the necrosed bones accurately together and exclusive of the lost piece, the aperture left by their exfoliation must have been 17 by 11 cm. At fourteen years of age this opening had contracted to 8 by 5 cm. Not only had contraction taken place in the horizontal plane, but the deep furrow on top of the head shows that a marked contraction had taken place in the vertical plane.

That the epilepsy and mental dulness have been caused by the contraction and consequent pressure, and by the physical alteration in the structure of the cortex itself by the burn, I think there can be no doubt. The only wonder is that he is not wholly idiotic as well as epileptic.

While I had little hope of benefiting the boy by any operation, it seemed to me he ought at least to have the possible chance of benefit from the relief of pressure, provided such an operation would not be almost certainly fatal. As described in the notes, my idea was to make the entire calvaria movable so that it could be lifted like a lid on top of the head. If, then, the brain had any power of expansion it might lift the calvaria and so get more room.

The apparent immediate result seemed to promise considerable improvement, but after two years I fear that this will be slow in its progress and will not be as great as could be desired. Yet the lessened frequency of his epileptic attacks is a positive improvement and he is certainly somewhat less dull than he was when I first saw him.

### STATED MEETING, HELD MARCH 4, 1907.

The President, DR. JOHN B. ROBERTS, in the Chair.

- I. FRACTURE OF THE GREATER TUBEROSITY OF THE HUMERUS, WITH DISLOCATION OF THE HUMERUS INTO THE AXILLA. IMMEDIATE REDUCTION OF DISLOCATION. ON SEVENTH DAY NAILING OF FRAGMENT OF TUBEROSITY IN PLACE.
- II. FRACTURE AT THE ANATOMICAL NECK OF THE HUMERUS AND DISLOCATION OF THE HEAD INTO THE AXILLA, WITH FRACTURE OF THE SHAFT. DIFFICULT REMOVAL OF HEAD OF HUMERUS.

BY WILLIAM WILLIAMS KEEN, M.D.,  
OF PHILADELPHIA,  
Professor of Surgery, Jefferson Medical College.

#### I.

E. F. K., *æt.* fifty-nine, first consulted me January 29, 1907. Three days before, on January 26, in getting off a trolley car on the ice-covered street, he slipped and fell, striking his left shoulder,—he rather thinks upon the point of the shoulder, though he is not certain of this. He also thinks that when he found himself about to fall he threw up both arms violently in the air, as would be very natural, but he is also not quite sure of this.

The moment the accident occurred he felt great pain about the head of the humerus, and the whole arm was useless; he was scarcely able to even move his fingers. He was taken to the Pennsylvania Hospital. Here he was attended by Dr. William Drayton of the resident staff, and I owe to him and to Dr. Montgomery, the skiagrapher, the early history of the case and the skiagraph. A dislocation into the axilla was diagnosed and was reduced under ether. No crepitus was felt until after