THE AMERICAN

JOURNAL OF OBSTETRICS

AND

DISEASES OF WOMEN AND CHILDREN.

VOL. XXIII. MARCH, 1890. No. 3.

ORIGINAL COMMUNICATIONS.

A CONSIDERATION OF THREE SUCCESSFUL CESAREAN SECTIONS IN PHILADELPHIA.[1]

BY

HOWARD A. KELLY,

Gynecologist and Obstetrician to Johns Hopkins Hospital.

(With six woodcuts.)

Before entering upon a practical discussion of this greatest of all obstetric operations, I will conduct the Society through a hasty retrospect involving a few great leaps even into the prehistoric era, and we will briefly touch here and there upon the luminous points which remain as landmarks in the centuries of the misty past until we come into the clear light of the more certain present.

HOW OLD IS CESAREAN SECTION?

The only possible criterion is *inference; strengthened, however, by probabilities which multiply until they assume the proportions of certainty.*

I will exhibit the value of this method of inference by a brief digression.

[1] April 17th, 1888; May 30th, 1888; and May 10th, 1889. Read before the Clinical Society of Baltimore, December, 1889.

It was after long years of patient research among the remains of prehistoric man that the anthropologist was finally able to establish certain broad characters distinguishing a stone, an iron, and a bronze age, and further specific traits of the peoples were worked out after most painstaking investigations.

Later observation revealed the fact that a much easier, quicker method had always lain close at hand, inasmuch as it is a fact that some members of the human race have never differentiated into the higher types, and there are actually now existing upon the earth the descendants and representatives of prehistoric man.

The Lake-dwellers of Maracaibo of to-day find their prototypes in the Lacustrines of Neuchatel, and the habits of the Australian and the Bosjesman throw a flood of light upon the remote races they represent.

In geology, the best commentator upon the phenomena of the past is the most acute observer of the minute changes occurring in the earth's strata to-day.

This law is also potent in the realms of surgery, and, as we shall see, carries us back to the birth of Cesarean section.

Four facts in actual operation to-day demonstrate conclusively the hoary antiquity of Cesarean section, an operation almost as old as the cradle of our race.

In the *first* place, recent records furnish us with the histories of eleven cases of Cesarean section performed by horned animals. The woman near her term, in field, plaza, or barnyard, was caught by an infuriated bull, ox, cow, bison, or buffalo, and ripped open by a thrust of the horn. Eight of these women and five of the children survived this most rough and rapid Cesarean delivery. Three of the children are now living in America, at ages of 37, 22, and 10 years.

When we consider the constant, close association of man with horned animals throughout his whole history, no possible reason can be urged why similar accidents should not be at least as frequent in antiquity as at present.

In the *second* place, three ignorant midwives have been known to resort to this terrible device after finding themselves unable to deliver their patients *per vias naturales*. Two of the mothers and two children recovered from this necessarily crude and unscientific procedure.

No good reason can be assigned showing that the midwives of the past were not at least as daring as their most ignorant representatives to-day.

In the *third* place, in the Uganda, in Central Africa, Dr. Felkin saw an untutored savage perform a very skilful and successful Cesarean section upon a native woman. That this was not a very unusual case may be judged by the fact that he would thus have operated upon a second case, had not Dr. Felkin first obtained permission to try the forceps and thus delivered the woman.

In the *fourth* place, in various parts of the world, at different times and under diverse circumstances, six women, either insane or desirous of concealing the fact of their pregnancy, have ripped open their own bellies and pulled out the child—cases of self-inflicted Cesarean section. Five of the women and three of the children survived this operation.

I might add to these facts the well-known brutality of the armies of the past, citing the numerous instances in which soldiers have been known to rip up pregnant women. It is probable that from observation dating from this practice, associated with the small value of human life at all times, arose the establishment of this operation in Central Africa.

In none of the modes just cited is there any reason why we should fix a time limit to the practice. The operations were either involuntary, under such conditions as have ever surrounded our species, or else were undertaken by persons as uneducated as the most ignorant hundreds or even thousands of years ago.

The Grecian, Hindoo, and Roman mythologies contain numerous records of Cesarean births of deities, and it seems to have been almost a fashion in Rome, in the apotheosis of their great men, to find prophetic indication of their careers in this remarkable form of birth.

Under the false application to the particular case we must distinguish some remote but living fact, never forgotten by our race, and in time elaborated in the folk-lore.

This is as probable as it is that the Diana of Ephesus, with her manifold breasts, representing the fertility of the earth, was not a pure figment of the brain, but was rather suggested by some well-marked cases of polymastia seen at rare inter-

vals—seedlings of thought and speculation which finally crystallized historically in the image of the great goddess.

The first positive fact is the old Roman law commanding that the body of every woman dying in advanced pregnancy should be opened and the fetus extracted, under penalty of death: "Negat rex legia mulierem, quæ pregnans mortua sit, humari, antequam partus ei excidatur: qui contra fecerit spem animantis cum gravida peremisse videtur."

Throughout the early centuries of the Christian era no important facts were added to this dead letter of the law until, in the year 1500, Jacob Nufer, a gelder, of Sigershausen, Switzerland, operated upon his own wife, in the presence of physicians and two midwives who had courage to remain in the room. The quaint record tells of the skilful stroke with the knife by which the child was exposed, of its cries, and of the clamor of the eleven midwives, who had been shut out, to get in. The operation was successful, both lives being saved. The child died at the age of seventy-seven.

I refrain here from entering into a discussion to determine whether this was a case of Cesarean section or a case of extra-uterine pregnancy. I myself believe it to have been the former. In either case, the Cesarean birth was the intent and expectation of the operator, and serves our purpose here fully as well.

Suddenly in the year 1581 appeared this now very rare treatise, of which I exhibit a copy to the Society, by François Rousset, on "Hysterotomotokie," or Sectio cæsarea—a great work, breaking the soil for all the marvellous records which have followed. Since that historic date operations and writings have never ceased.

In 1796 Wm. Plocquet, professor of medicine at Tübingen, edited a bibliography of medical science which I here present to the Society; in this volume he has collated, under the heading "Partus Cæsareus-Hysterotomotokie," two hundred and fifteen references—to such an extent had the literature multiplied.

In June, 1837, Prof. Michaelis, of Kiel, successfully performed an operation *for the fourth time* upon Frau Adametz, and expressed confidence in the reports of a number of similar

multiple operations which he had previously collected and criticised.

This case aroused so much interest in court circles that the king stood as godfather, and the Countess van Reventlow as one of the godmothers for the baby, named Frederike Caroline Luise Cæsarine.

In 1842 Dr. Winckel, of Berleburg, writes: "It cannot be denied that in most recent times Cesarean section has been robbed of much of its terrors, from the more complete technique on the one hand, and the establishment, on the other, of the obstetrical limits and indications."

Twenty-one years later, Dr. Winckel, the son, writes in similar language in reporting a series of fifteen cases of Cesarean section.

In 1882 the great and classical work of Sänger, of Leipzig, appeared, a volume of 200 pages, based upon the profoundest scientific investigations, and containing proposals for the improvement of the old Cesarean operation, which will in all probability remain for all time substantially as now adopted. From this era in its history the operation has been born anew, having by Sänger's efforts been elevated from the ranks of the most fatal to an acknowledged position among the comparatively safe procedures.

I speak of the Cesarean operation as performed under those proper conditions which it has a right to demand for itself as an essential part of its technique.

The three cases included in this report were operated upon by this method.

Case I.—*Cesarean Section: Absolute Indication.*—On the 17th of April, 1888, Dr. Ireland, of Philadelphia, called me to see Mrs. J., who was in labor, stating that in the opinion of himself and Dr. Starck, a consultant, nothing but Cesarean section would save the woman's life.

At the time Dr. I. called upon me I had as guests at my house Dr. R. P. Harris and Prof. Gardner, of Montreal. We all three proceeded to her house, a loose frame structure in a small alley in a densely populated part of the city.

We found a wan little woman, only fifty-two inches high, 26 years old. She was evidently in a state of profound shock; she had a pinched, anxious expression, and a thready pulse running along at 142. Two weeks previously she had had regular pains, when she sent for the midwife, who stayed

with her for five days, when, finding that in spite of frequent severe pains she made no progress, she sent for Dr. Ireland, who watched her for nine days longer. The old midwife, with an experience of fifty years, stated that she had never seen any woman suffer such severe pains. When we saw her the pains had become very feeble and irregular. The waters had drained off three days before.

The child was feebly alive, with its head above the superior strait, in the first position. Upon carrying the finger up into the pelvis, it impinged everywhere against dense, hard cellulitic masses, so completely choking it that the only structure which could be recognized at all was the cervix, immovably fixed as if embedded in a cake of ice. It would have been utterly impossible either to dilate or to introduce the smallest instrument into the uterus.

The external pelvic measurements were: sp. i., 19 cm.; cr. i., 25 cm.; d. b., 15 cm.; d. tr., 29 cm. The conjugatæ could not be measured, but the vera was estimated at about 5½ cm.

The measurements were manifestly of no practical importance whatever, as an absolute indication lay in the condition of the soft parts. The alternatives were evidently either a desperate Cesarean section or death. Prof. Gardner and Dr. Harris both concurred with me in feeling that a moral obligation rested upon me to give the patient the last desperate chance which remained. And I shall not soon forget the emphasis with which Dr. Harris dwelt upon the fact that this was one of the most unfavorable cases on record, and there was very little hope of her pulling through.

All the preparations for operation were being made while we were discussing the case. She was at once etherized, and the table, instruments, and water arranged in the corner of the bedroom where we could get the best light.

It was very clear that in this case a few minutes of time saved might save a life. Every arrangement was made, therefore, that the various steps of the operation might follow each other in rapid succession, without any delay incident to getting things out of the satchel or threading needles.

She was put upon the table, the vagina douched, the abdomen shaved and thoroughly washed. An incision was made over the uterine eminence through the umbilicus. The uterus was incised *in situ*, *placenta prævia cæsarea* discovered, the placenta avoided, the membranes perforated to one side, and the child caught. The body escaped easily, but the head stuck badly. I first tried to lift it out as the body was raised up through the incision; then Veit's method of freeing the after-coming head was tried in vain; it finally yielded to powerful traction upon the legs.

As the child made its escape, the lower angle of the incision was torn for an inch into the lower uterine segment.

The head of the child had thus lain in the lower segment of the uterus, between the contracting corpus above and the undilated portion of the cervix, felt through the vagina, below.

The asphyxiated child (a female) was handed to Prof. Gardner, who succeeded in resuscitating it with much difficulty. It lived for a week, dying with jaundice.

The placenta and membranes were delivered with the child, and the uterine incision closed at once by twelve deep and twelve superficial silk sutures.

The abdomen was carefully cleansed and the uterus returned, the omentum drawn down back of it, and the abdominal incision closed.

Time consumed.—The child was born in two minutes, and

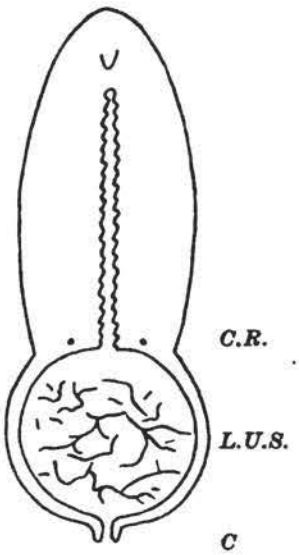

FIG. 1.—The upper portion of the uterus (*U*) is seen well contracted down to the contraction ring (*C.R.*). The lower uterine segment (*L.U.S.*) is distended full of clots; the undilated cervix (*C*) lies below this.

in thirty-five minutes from the beginning of the operation the last abdominal suture was inserted.

Hypodermatics of ergot and brandy were given repeatedly throughout to stimulate a flagging pulse and insure uterine contraction.

In three days after the operation the pulse was 88 and the temperature normal. The dilated lower uterine segment in which the head had lain did not contract at all, and gave rise to a novel complication in the convalescence (Fig. 1). It formed a large reservoir in which blood clots accumulated and became fetid. I discovered this on the third day and removed

a large amount of débris, and after that kept it clean by syringing the cavity out twice daily (Fig. 1).

The inflamed vaginal tissues began to break down in the first week. Later I removed a large, crackling piece of the cervix, hooking it down with my fingers. The uterus must have become united to the abdominal incision at a very early date, for with the breaking down of the cervix a physometra developed, and both uterine and abdominal walls broke down, and there was free discharge and communication between the

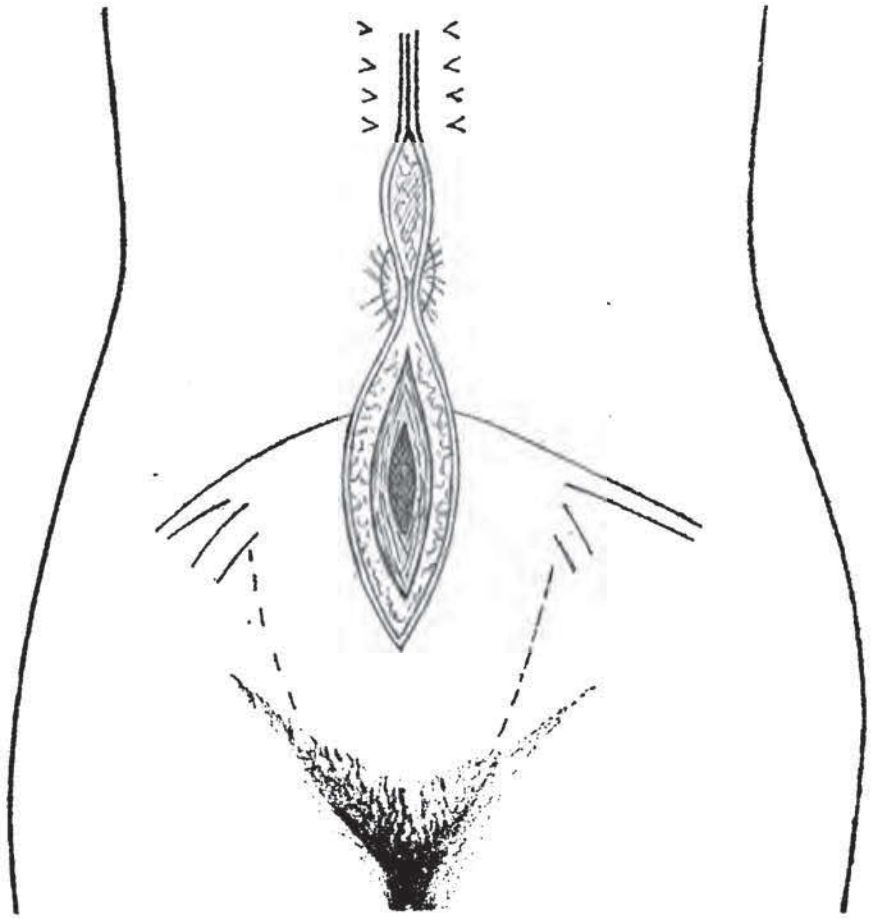

FIG. 2.—Showing utero-abdominal fistula (*f*) sixteen days post operation in Mrs. J.'s case.

inner surface of the uterus and the outside, through the abdomen (Fig. 2). There was at no time any reaction whatever upon the part of the peritoneum. For two or three days, while the discharge was becoming established, the temperature went up, but she was not in any way affected by it. Two weeks after operation a phlebitis developed in the right leg. In spite of these complications she made an easy and a comfortable recovery.

She is to-day a stout, rosy woman, in perfect health.

The cervix gradually contracted down into a hard, stellate cicatrix in the vaginal vault, the abdominal wound closed completely, but every month a little, soft cicatrix in the wound became intensely blue two days before the period, breaking down at the time, allowing a stillicidium of blood for four days.

One year after the operation the pelvic measurements were repeated and a double promontory discovered. The vagina was soft and natural, there was no leucorrhea, and the pelvis was entirely free from any exudate. The uterus was attached to the abdomen near the umbilicus, drawn out and cord-like. It is probable that, if she should live as long, the condition of the uterus will closely resemble that in Mrs. Reybold's case, operated upon by Prof. Gibson in 1835, and examined post-mortem fifty years later.

Dr. Harris writes me "that in Mrs. Reybold's uterus there was no trace of a uterine cicatrix or thinning, but the fundus was elongated by tension to four and one-half inches. This elongation was thin and resembled the tongue of a small dog. She bore four children between the 22d and 28th years, and ceased at the latter age, perhaps because of the condition of her uterus and its position in the pelvis. The adhesion between the uterus and abdomen had given way during a period of years and been reduced to two inches."

Previous to the labor in which I attended her, Mrs. J. had been pregnant four times, miscarrying at four and one-half months, two months, six weeks, and nine weeks.

I am indebted to Dr. Harris for the table on pages 234 and 235.

Dr. Harris writes: "My table of Philadelphia Cesarean cases is much more than a condensation of the facts contained in the references given, and presents many points of personal observation. Each case contains in few words its most important facts, and the final results, where death of mother or child has occurred at a remote period, are given. The subjects of operations 1, 2, 5, 7, 8, and 11 were either well known to me or I was present when they were operated on. I have also seen, at different times, nearly all of the children saved, and the autopsies of cases 1, 2, and 7. Only one of the ten Cesarean women is now living, and she is the last on the list. Of the children, one survives at the age of 53, with three of her eight children; a second is a girl of 18; and the third and last, presumed to be living, is a boy of 7. We shall, no doubt, present in the future a much more creditable record than the

CESAREAN OPERATIONS—"OLD STYLE," "PORRO," AND "SÄNGER"—PERFORMED IN PHILADELPHIA. TABULATED BY ROBERT P. HARRIS, M.D.

No.	Date.	Operator.	Style of operation.	Age.	Color.	Height.	Conj. Vera.	Number of Pregnancy.	Hospital or Private.	Cause of difficulty in labor.	Time in labor before operation.	Condition of woman at time of operation.	Result to woman.	Result to child.	Time of survival and cause of death in woman.	Time of survival of child.	References.
						Ft. In.	Ins.										
1	March 25, 1835.	Prof. William Gibson.	*Old.* Uterus not sutured.	26	White, Irish.	4 8	1¾	Third.	Private.	Rachitic deformity of pelvis.	12 hours.	Favorable.	*Recovered.*	Lived.	Died Aug. 15, 1885, aged 76 years.	Living in 1888; has borne 8 children.	Am. Jour. Med. Sci., vol. xvi., 1835, p. 343
2	Nov. 5, 1837.	Prof. William Gibson.	*Old.* Uterus adherent to abdominal wall.	28	White, Irish.	4 8	1¾	Fourth.	Private.	do	10 hours.	Excited. Pulse 112, fell to 88 after the operation.	*Recovered.*	Lived.	.....	Died Oct. 4, 1881, aged 43, leaving 2 daughters and a grandchild	Opus cit., vol. xxii., 1838, p. 18. *Autopsy*: Opus cit., Oct. 1885, p. 422.
3	Sep. 17, 1869.	Dr. Walter F. Atloe.	*Old.* Uterus not sutured.	31	White, Irish.	Not taken.	2	Third.	Private.	do	Several hours.	Favorable.	Died.	Lived.	Died in 6 days from intestinal obstruction.	Living in 1888, a girl of 18 years	Opus cit., April, 1870, p. 393.
4	Feb. 27, 1878.	Dr. Rowland G. Curtin.	*Old.* Uterus sutured with catgut.	20	Black.	4 8	2	First.	Hospital	do	24 hours.	Apparently favorable.	Died.	Lived.	Died on 7th day, slight peritonitis, fibrinous heart clot; wounds gaping.	Died in summer of 1879.	Am. Jour. Obs., 1878, p. 613.
5	Sep. 22, 1880.	Dr. Elliott Richardson	*Porro-Müller.*	25	White, Native.	3 10	2	First.	Private.	do	Not in labor; 8½ months pregnant	Favorable.	*Recovered.*	Lived.	Died Feb. 24, 1883, of cirrhosis of the liver and Bright's disease.	Living in 1888, a well grown and healthy boy.	Am. Jour. Med. Sci., Jan., 1881, p. 86. *Autopsy*: Am. Jour. Obs vol. xvi., 1883, p. 584

6	Mar. 5, 1883.	Prof. Anna E. Broomall.	*Old.* Uterus sutured with silver-wire and silk.	22	Black.	Not taken.	7-10	First.	Hospital	Rachitic deformity of pelvis.	36 hours.	Very unfavorable. Pulse 180. Temp. 104°. Forceps severely used before admission	Died.	Living.	Died of septic peritonitis in 35 hours. Uterine wound united.	Died in 39 hours; pelvic bones of right side fractured by the forceps	Communicated by the operator.
	" "																
7	June 30, 1888.	Prof. William H. Parish.	*Porro-Müller.*	40	White, Native.	3	8	First.	Hospital	do	Not in labor; 6½ months pregnant.	Unfavorable from albuminuria.	Died.	Lived.	Died in 43 hours of exhaustion and nephritis.	Died July 18, 1888.	Am. Journ. Obs., vol. xvi., 1888, p. 1197.
8	Nov. 12, 1881.	Dr. Thomas M. Drysdale.	*Sänger.* 11 deep and 11 superficial sutures.	35	White, German.	Medium	Normal.	First.	Private.	Uterine fibroid blocking up the pelvis.	8 days irregular. 4th to 5th and 8th to 12th Nov.	Very unfavorable. Pulse 124. Ante-partum hemorrhage.	Died.	Dead and macerated.	Died in 26 hours of septicemia. Uterine peritoneum united	.....	Med. News, Nov. 26, 1887, p. 621.
9	Sep. 20, 1885.	Prof. William H. Parish.	*Sänger.* 11 deep and 4 superficial sutures.	33	White.	.....	.....	Third.	Hospital	Three fibroids blocking lower segment of the uterus.	43 hours.	Pulse 194; much exhausted.	Died.	Dead and putrid.	Died in 12 hours of exhaustion and septicemia	.....	Trans. Am. Gynecol. Soc., 1886, p. 424.
10	July 15, 1886.	Dr. Elliott Richardson	*Old.* Uterus closed with silk.	30	White.	....	....	.....	Hospital	Dying from cerebral apoplexy.	Not in labor; 7 months pregnant	Hopeless. Operation in interest of fetus.	Died.	Living.	Died in 5 hours from the apoplexy.	Died in 4 days.	Communicated by the operator, July 19, 1886.
11	Apr. 17, 1888.	Dr. Howard A. Kelly.	*Sänger.* 12 deep and 12 superficial sutures of silk.	25	White, Native.	4	4	2½	Fifth. 4 miscarriages.	Private.	Infantile pelvis; no traces of rickets. Very small bones, feet and hands.	2 weeks; membranes ruptured 4 days.	Very unfavorable. Pulse 142. Version and forceps fortunately not tried.	Recovered.	Living.	....	Died in 7 days, delicate and jaundiced.	

past now shows. No case upon the list, not positively hopeless at the time of the operation, was in a more unfavorable condition, to judge by the rapidity of her pulse—carefully counted by me at 142—than was the last; and this rose to 150, and fell to 130, during the operation. Still this patient recovered, notwithstanding the fact that the posterior lip of her cervix sloughed away, and the uterine and abdominal wounds gaped open after three days' closure. But during these three days, when the method of uterine suturing prevented any leakage from the uterine into the abdominal cavity, local peritonitis was uniting the uterus and abdomen around the wounds, so that the peritoneal cavity was a shut sac when the sutures no longer held their edges in contact. This salutary process of nature has saved the lives of several women in this country after the Cesarean operation, and was of very vital importance in favoring the antiseptic control of the last case. More than sixty years ago, Dr. John L. Richmond, of Newton, Ohio, syringed out daily, through a catheter, an occluded uterus from which he had removed a fetus by gastro-hysterotomy, and kept up this cleansing process with warm soap-water until the eighteenth day. Should Mrs. J. again become pregnant, the Cesarean operation can in all probability be performed, as was done in case 2 under Prof. Gibson, without opening the peritoneal cavity, and with comparatively little risk to life if done early in labor. The cicatricial condition of the cervix will no doubt prevent the possibility of success in an attempt to deliver her prematurely *per vias naturales;* and the size of her pelvis would require an induced labor at too early a period to save the fetus. In several instances in this country, where there was no pelvic deformity, such a loss of uterine tissue after labor as in Mrs. J.'s case has proved to be so serious a preventive of cervical dilatation that delivery could only be effected by abdominal section. It will be of interest also to note the effect of utero-abdominal adherence upon the process of conception. Whether this produced sterility in Mrs. Reybold (case 2) after the age of 28, or not, has been questioned; but it is a plausible explanation of her cessation to conceive after having been four times pregnant in a few years. At her autopsy it was discovered that her fundus uteri had been drawn out to a length of 4½ inches by the old adhesion between it and the upper part

of the abdominal cicatrix. The repeated filling of the bladder and the motions of the abdomen tend to break up these adhesions, but in Mrs. Reybold there was still an inch of attachment, after fifty years, where there had been originally four or more inches.

"*The last twelve Cesarean operations in the United States* (March 22d, 1887, to April 17th, 1883, inclusive) were all performed, with some variations of detail, according to the method of Sänger, and resulted in saving 7 women. Of the 5 fatal cases, only 1 was regarded as *favorable* at the time of the operation, and here death resulted from diphtheritic endometritis, there being no peritonitis, and the wounds being found united after five days. The other deaths were: 1st, *in nine days*, from an abscess of the abdominal wall bursting into the peritoneal cavity and producing septicemia; 2d, *in forty-four hours*, from shock, the forceps having been used over an hour; 3d, *in sixty-two hours*, from uremia, in a case regarded as hopeless from kidney disease; and 4th, *in seventy-one hours*, from coma, attributed largely to morphia in an exhausted, strumous subject. Ten of the twelve children were delivered alive, and eight were still living when the respective cases were reported. There have been 5 operations, with a saving of 3 women and 4 children, since January 1st, 1888."[1]

Case II.—*Cesarean Section: Relative Indication.*—With the operator it was the option between craniotomy on the living child and the Cesarean section; the parents, however, allowed no choice, as they unhesitatingly chose the Cesarean operation.

History.—Mrs. G., 26 years old, of Irish parentage, had had two children—a male child, three years ago, delivered bruised and dying after a difficult forceps labor; in the second labor she gave birth to a girl of "such puny size that no one thought she could possibly live." My patient had two sisters, both with strongly contracted pelves. One of them, after a succession of craniotomies, finally died in a frightful labor, in which the body of the child was torn from the head, which remained in utero, while the mother died.

The pelvic measurements of Mrs. G. are: sp. i., 24 cm.; cr. i., 26 cm.; tr., 29 cm.; d. b., 16½ cm.; c. d., 8 cm.; c. v., estimated 6½ cm. to 7 cm. She has, therefore, a markedly flattened pelvis.

[1] Mrs. J. is again pregnant, being now about in her fourth month.

Dr. Harris first saw her in consultation with me, and later Dr. C. P. Noble. Both of my consultants concurred in estimating the child as too large to pass the superior strait without craniotomy.

She entered the Kensington Hospital a week before the expected confinement, and was immediately put upon preparatory treatment—baths, vaginal douches, dieted, and the emunctories carefully regulated.

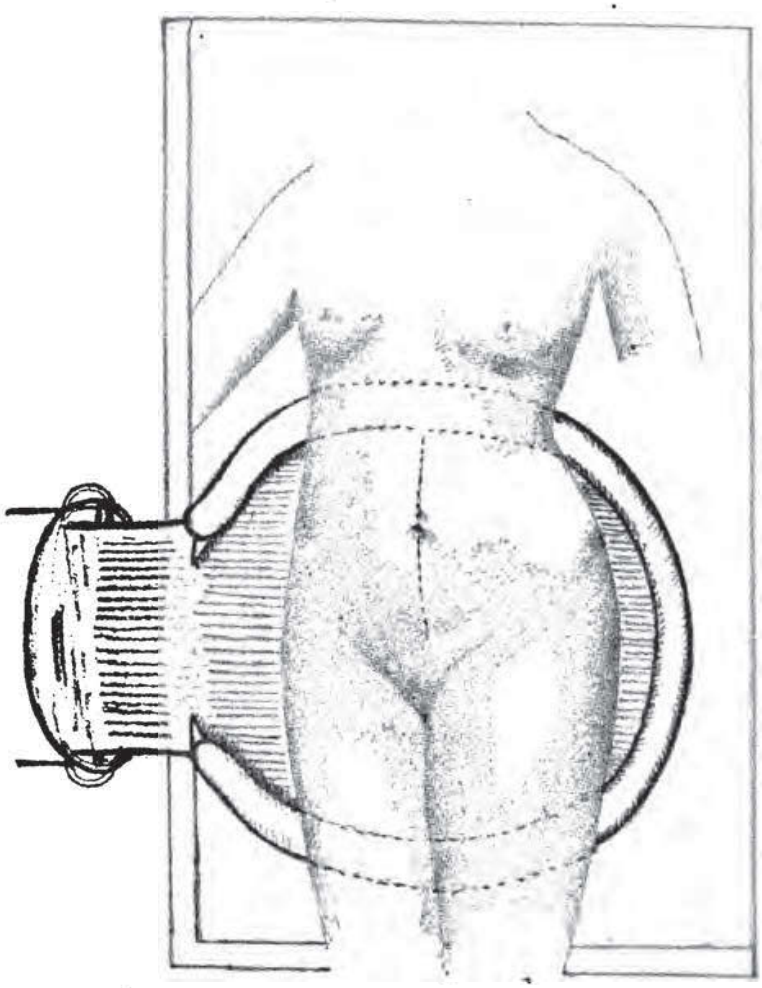

FIG. 3.—Showing ovariotomy pad in position for operation on Mrs. G.; also line of the incision (dotted).

She measured at the umbilicus 99 cm., and 44 cm. from ensiform cartilage to pubes.

Her pulse rate was 120; the fetal heart beat 140 to the minute in the first position.

I could feel the fetal head distinctly, and estimated the occipito-frontal diameter as 12¾ cm., and the length of the flexed body of the fetus at 30½ cm.

On the 10th of May I punctured the membranes, letting

slowly out about a pint of amniotic fluid. An hour later the uterus was contracting regularly, when she was etherized and placed upon the ovariotomy pad (Fig. 3).

Drs. Harris, Ireland, P. S. Carpenter, Ziegler, A. K. Minich, W. N. Ferguson, Wm. R. Lincoln, Geo. McKelway, and Shelly were present at the operation. Drs. Robb and Noble assisted.

After the preliminary isolation of the field of operation by prepared towels and gauze, the incision was made, one-third above and two-thirds below the umbilicus; and while the assistant pressed the abdominal walls in on the exposed uterus, a rapid incision from fundus to lower segment exposed the child. An arm protruded in the incision, was caught, and the body delivered; the head stuck in the lower uterine segment, as in the former case, and was only delivered by careful efforts with the fingers hooked into the maxillary fossæ, *after extending the incision* down into the thin lower segment for 3 cm. The placenta lay attached to the posterior surface of the uterus. A large venous sinus which was opened in the incision was temporarily clamped. In two minutes from the beginning of the operation, a lusty female child was born crying and handed to Dr. Minich.

The baby weighed 6 lbs. 15 oz.; length flexed, 30½ cm.; whole length, 51 cm. Occipito-frontal diameter, 13 cm.; occipito-mental, +15 cm.

Placenta and membranes were delivered together by grasping the placenta with the open hand and twisting it off.

The uterus was next lifted out of the abdomen, and the abdominal cavity behind protected by cloths wrung out of hot water and laid across the incision. The uterus remained flabby at first and disposed to bleed. While I excited contraction by kneading, Dr. Robb grasped the cervical portion with both hands and thus controlled the hemorrhage by manual pressure. He continued this until I had closed the uterine wound by seven deep and fifteen superficial silk sutures (Fig. 4). These were drawn up *firmly*, not *very* tight, until the small area in the immediate neighborhood of each stitch was blanched. With the bleeding thus controlled and the uterine wound smoothly coapted, the uterus was returned to the abdomen, which was well washed out with hot water, and finally closed by silk sutures, four to the inch. A bichloride cotton dressing was laid over the wound, held in place by a simple binder. During the operation two hypodermatics of ergotin were given (4 grains) and one of tincture of digitalis. Her pulse was 130, dropping rapidly to 114 and 108.

The next morning, pulse 86, temperature 99°. Comfortable. Constant slight sanious flow per vaginam.

June 1st, 7:30 A.M., pulse 84, temperature 99⅘°. "Slept splendidly last night." 10:30 P.M., pulse 82, temperature 99⅕°.

June 2d, milk coming freely into breasts; pulse 75, temperature 99°.

She began at this time to suffer much from fissured nipples, which sent her temperature up and forced us to wean the child. Her general condition continued excellent throughout. Two weeks after delivery she had a mild phlebitis, which did not prevent a rapid and complete recovery, and she soon after went home with her baby, named Cæsarina. The child lived fourteen and one-half months, dying during dentition in summer.

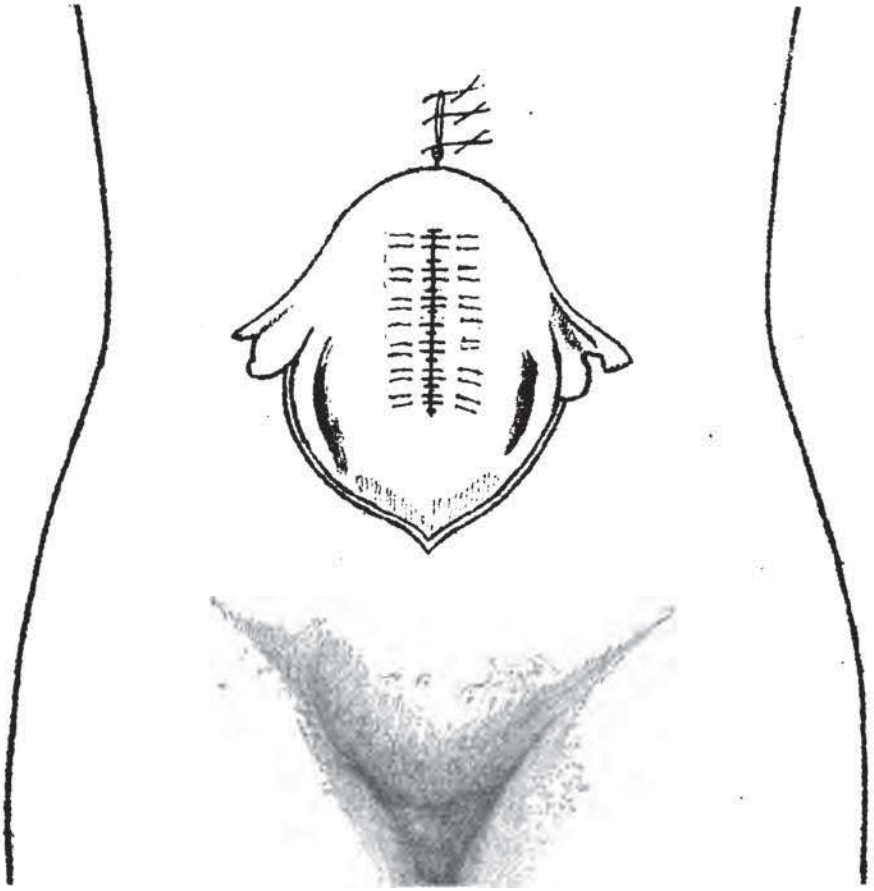

FIG. 4.—Mrs. G. Showing deep sutures tied, and superficial sero-serous sutures in place ready to tie.

She again became pregnant early in 1889. I examined her repeatedly, and, as soon as I judged that the head was getting beyond a safe size, sent her to the hospital to have labor brought on at eight months. I introduced a bougie into the uterus on November 9th to start the labor.

The following letters from Dr. Noble, the present surgeon to the Kensington Hospital for Women, tell of the difficult labor by which he delivered a child weighing 5$\frac{1}{16}$ lbs., or 30½ oz. smaller than the Cesarean-section baby:

DEAR DOCTOR KELLY:—I delivered Mrs. G. with high forceps at 1:30 A.M., November 12th. There was no pain following first bougie. I introduced second at 9 P.M. Sunday. Pains began at 11 o'clock. At 1 o'clock Monday no advance. I introduced Barnes' bag, 1, 2, 3, at intervals of about three hours. Hard labor after 9 A.M. I ruptured membranes and applied a binder at 5:30. Head was still above superior strait. Hard pains continued until 11, when they began to die away. A little after 12, midnight, I concluded that it was best to deliver. Baby is girl, and alive; apparently all right. I write this at 3 A.M. Will send measurements and details.

Yours truly, CHAS. P. NOBLE.

DEAR DOCTOR KELLY:—In a note to Dr. Robb, written this morning, I referred to Mrs. G. She continues to do well, as does the baby. But I shall watch her with some anxiety. The placenta was adherent to the anterior wall, and was detached with some difficulty, and in the region of the scar the uterine surface was not perfectly smooth. I have not measured her pelvis externally, but I am certain the internal measurements are less than were supposed. I make the indirect conjugate three and three-sixteenth inches and the estimated true conjugate two and five-eighth inches. I am certain there is not much error about this, from the measurements of the fetal head. The head came slightly into the true pelvis after twenty-six hours of labor, during thirteen of which the labor was hard; waters evacuated about seven hours. When I drew it down with the forceps, there was so little room as to crowd the soft parts very much. It was "a very tight fit." I applied first the Simpson forceps, but the widely separated shanks stretched the perineum so much that I took it off, applied the Hodge forceps, and delivered after the manner of Pajot. The mechanism was that characteristic of the flat pelvis, the occiput being directly in relation with the left ilium. The head was semi-flexed, the anterior fontanelle lower than the posterior. I delivered without using force.

The fetal measurements are as follows, taken three-quarters of an hour after birth, without using pressure with cephalometer: B. p., 7.5 cm.; b. t., 6.5 cm.; bimastoid, 6.5 cm.; suboc. breg., 9 cm.; oc. front., 10.5 cm.; oc. men., 11 cm.; trach. breg., 9.5 cm.; front. men., 7.5 cm.; bisacrom., 11 cm.; bisacrom. circumf., 31 cm.; suboc. breg. circumf., 30 cm.; oc. front. circumf., 31.5 cm.; length, 44.5 cm.; weight (naked), $5\frac{1}{2}$ lbs.; sex, female.

As I measured the head three-quarters of an hour after labor, when the transverse diameters were only slightly greater than when in the pelvis; and as the bitemp. diameter was in relation with the c. v.; and as all available space was occupied,

I am sure the c. v. is but little more than 6.5 cm., certainly not more than 7 cm.[1]

CASE III. *Cesarean Section; Absolute Indication; Pelvis choked by Large Bony Tumor.*—Mrs. S., German, age 34, IVpara, 6, 5, 4, 3. Regular menstruation began first at 20. She is of a markedly rachitic build, with curved tibiæ. She had puerperal fever after her first and third confinements. The second pregnancy terminated in a miscarriage at six months. She came to me April 25th, 1889, referred by her physician, Dr. Parcels, of Lewistown, Pa. She had been delivered in her last two confinements by Dr. Parcels, who sent me a very graphic account of the almost insuperable difficulties he encountered. In January, 1885, he estimated the conj. vera at two and one-half inches, and delivered, performing craniotomy, crushing the skull and then turning. Again in June, 1885, he was called to her, when he found, by careful measurement, that the conjugate had diminished from two and one-half to one and three-quarter inches. Again it was necessary to perform craniotomy and version, he encountering even greater difficulties than at first. This operation was accompanied by great loss of blood.

Pelvimetry, April 25th, 1889.—Sp. i., 22 cm.; cr. i., 25½ cm.; d. b., 17½ cm.; tr., 31½ cm.

The vaginal outlet much relaxed, filled posteriorly by a large rectocele. Upon introducing the finger into the pelvis, it at once strikes a bony tumor which so completely chokes the lumen of the pelvic canal that it leaves but a small crescentic area to the left for the emunctories (Figs. 5 and 6). The tumor is densely hard, like bone, with here and there a curious sensation of crackling, as if a shell were being indented. It projects out of the pelvis under the right pubic ramus. High up on a level with the superior strait, at the left extremity of the transverse diameter, lies the cervix uteri with a marked posterior split. At this point the lumen between the tumor and the margin of the strait is two centimetres (Fig. 5). Just behind the symphysis pubis the lumen measures one centimetre (Fig. 6). The whole of the uterus with the child lay thus wholly without the pelvis, the uterus lying with its cervix dipping into the pelvis on the extreme left, and its fundus lying wholly in the right hypochondrium. The head of the child lay over the cervix, and the buttocks under the liver. The circumference at the umbilicus was 95½ cm. on May 9th. The fetal pulse was 30, heard 2 cm. below and 10 cm. to the left of the umbilicus. The urine was of a pale amber color, specific gravity 1.004.

[1] January 15th, 1890, the child is living, gaining rapidly in weight, and in excellent general condition.

Previous to operation she was carefully examined by Drs. Dulles, Harris, E Wilson, J. T. Johnson, Parish, Platt, and Parcels. The usual careful preparations were made before the operation, cleansing her skin and quickening its activity, and getting her kidneys and bowels acting freely.

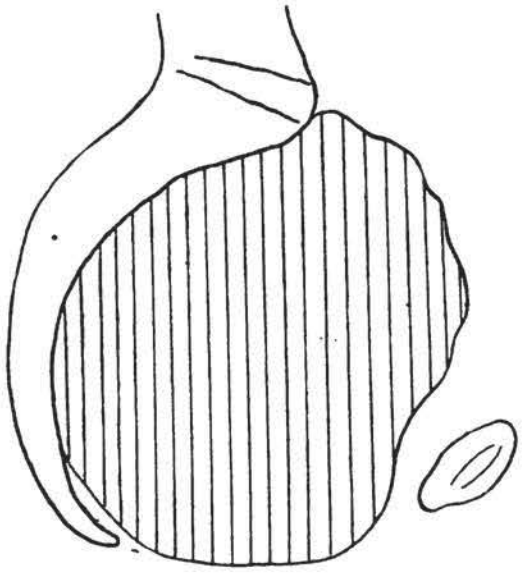

FIG. 5.—Sagittal section of the pelvis in Case III. Barred area is the tumor.

Operation.—May 10th, 1889, in the presence of a large number of visitors, at the time determined by me to be the completion of her pregnancy, she was brought to the table

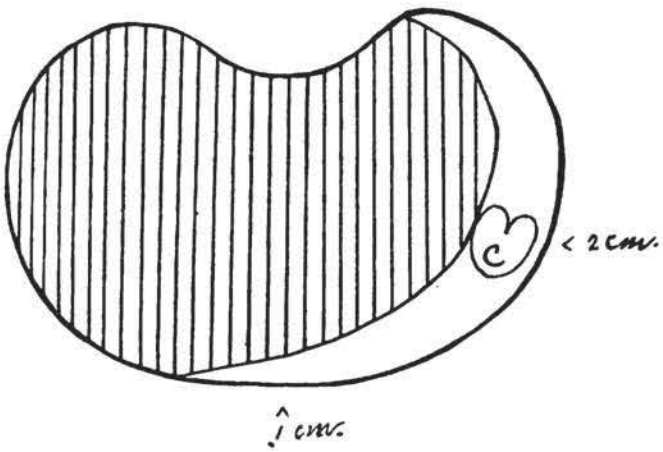

FIG. 6.—Pelvic inlet in Case III. Barred area occupied by tumor *c* is the cervix uteri.

under ether, the abdomen again thoroughly scrubbed, the genitals shaved, and the vagina douched. The field of operation was next isolated by cloths above and below, and a large piece of gauze laid over the whole, torn open over the site of the tumor. The operation was conducted through this rent. In

this way the field was completely isolated. An incision twenty centimetres long was made in the median line, one-third above and two-thirds below the umbilicus, exposing the uterus. The incision was made at once in the uterus *in situ*, fifteen centimetres in length. The placenta lay immediately under the incision (*placenta prævia cæsarea*). Pushing to the left of this, the membranes were broken through and a prolapsing arm caught. The body came at once, but the head stuck, and I was unable to deliver it until I had first enlarged the incision by two centimetres down into the lower uterine segment. The child cried lustily as he came out with two coils of cord about his neck; the cord was at once clamped between two pairs of forceps and cut between, and handed to Dr. Milliken, to whom I am indebted for some valuable notes made. The placenta and membranes followed the child.

While Dr. Robb grasped the uterus at the cervix, constricting the vessels, I lifted the uterus out of the abdomen and proceeded to pass the deep sutures. These grasped the peritoneum and the muscularis down to but not including the decidua. The superficial (sero-serous) followed, and completely hid the deep line from view. The bony tumor was then carefully examined through the abdomen. The pelvis was found choked, all but the narrow crescentic area mentioned; the tumor was flattened rather than convex on its upper surface, extending but slightly into the abdominal cavity.

After carefully cleansing the vesical pouch, the iliac fossa, and the retro-uterine space, the uterus was returned and the abdomen closed.

Her pulse before the operation was 104; after taking ether for eight minutes it was 120; towards the end of the operation it was 140. She was etherized in fifteen minutes.

The operation began at 3:42 P.M.; the peritoneum was opened at 3:42:15; the child was handed to the assistant at 3:43:15; the uterine suture was commenced at 3:45; the eight deep sutures were in place at 3:51; the thirteen superficial sutures were in place by 3:57:10; abdominal sutures were started at 4:00:30, completed at 4:07.

The child was thus born in a minute and fifteen seconds, and in nine minutes from the beginning the uterine wound was closed and all danger of any serious loss from hemorrhage was over. The duration of the operation up to the one point common to all abdominal operations, the closure of the abdominal incision, was fifteen minutes. The child, a healthy boy of seven pounds weight, was livid when born, and did not exhibit any apnea. His pulse, 140 at birth, became 152 in two minutes.

The fetal diameters were: Biparietal, 8 cm.; bitemporal, 7.25 cm.; bimalar, 7 cm.; suboccipito-bregmatic, 9 cm.; oc-

cipito-frontal, 10.5 cm.; occipito-mental, 12 cm. Circumference, occipito-frontal, 33 cm.; circumference, suboccipito-bregmatic, 31.5 cm. Bisacromial diameter, 11 cm.; bisacromial circumference, 33 cm. The length of the child was 46 cm.; strongly flexed, 23 cm.

Patient after the Operation.—Her *pulse* for two days varied between 120 and 108. On the third day it dropped to 86, and remained after that time between 78 and 90.

Her *temperature* varied before the operation from 98° to 99°. On the second and third days after operation it just crossed 100°, dropping on the third day to 99°, after that continuing normal.

Eight deep and nine superficial sutures were taken out from the abdominal wall seven days after the operation, and the line of union found to be perfect throughout. She had one stool the day after operation, and on the third day a very large passage, filling a bed-pan. The baby nursed from the first.

She rose from bed in two weeks. I would gladly have kept her there longer, but she was becoming so restive over her unusual inactivity that I was obliged to allow her to sit up. Nineteen days after the operation she took a long journey home by railroad.

I cannot close the record of these three cases which have come under my care, without adding a few comments touching upon several features which, although minor in character, proved valuable in providing comfort for the operator and in hastening the completion of the operation—a point of value so long as it is subordinated to utmost attention to details and nothing in the completeness of the operation is sacrificed.

The *ovariotomy pad* was of great comfort, allowing the use of an abundance of water without any anxiety as to whether bed, clothing, or floor was being deluged. In this way the abdomen and genitals were douched, the child delivered, and the discharges caught by the bottom of the pad, prevented by the rim from running off on to the table, and were conducted into the bucket on the floor.

I can see no disadvantage in *setting the time for the operation*, as I did in these last two cases, and many very great positive advantages. The cervix in both cases was amply dilated and allowed the free discharge of the lochia. I put the last patient in the lithotomy position after the completion of the operation, with the expressed intention of dilating the cervix, but I found it already abundantly open. By setting his own

time the operator is sure of all the assistance he needs, and can prepare himself for the operation, and operate when he is in the best condition. There is also no hurried, unsatisfactory gathering-up of the instruments, and the general dissatisfaction attending haste. I know of an operator who was summoned a long distance at two o'clock in the night, and obliged to operate with an unsatisfactory light, to say nothing of the other inconveniences. I have also known of an operator, anxious to secure the manifold advantages, waiting for the daylight several hours beyond the time when his judgment told him the operation ought to be performed.

It was a mistake to puncture the membranes in the second case; they should always be preserved, as it is much easier to deliver a child swimming in the amnion than from a dry, contracted uterus. My intention was to start the labor to such an extent that the cervix would be well dilated.

A feature the importance of which can hardly be exaggerated is the rapidity with which the successive steps follow one another. I do not mean haste, but refer to the commonest of all sources of delay—waiting until something is sought which is sadly needed but was forgotten in the preparation, until some silk is untangled or some needles threaded which ought to have been ready from the start. I cannot conceive how an uncomplicated operation can be dragged out to an hour and a half or longer, as has been the case. The shock of the procedure must be a very significant item in the death rate of these operations.

Of the difficulty in delivering the head experienced in all three cases, I desire to say something more *in extenso* at another time. It is an annoyance which has distressed many operators.