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A Combination of the English and French Obstetric Locks, for the Prevention of Dangerous Compression of the Fetal Head by Forceps.

BY

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NEW YORK CITY.

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A COMBINATION OF THE ENGLISH AND FRENCH OBSTETRIC LOCKS, FOR THE PREVENTION OF DANGEROUS COMPRESSION OF THE FETAL HEAD BY FORCEPS.*

By A. Ernest Gallant, M.D.,

NEW YORK CITY.

"The subject of this lecture relates to a branch of medical science, in which we are all interested; not only as men appointed to discharge the important duties of their profession, but also as members of society, who ought to look to the increase of it as a relative obligation tending to the preservation of that amiable part of creation, woman, from whom we derive our being and our greatest happiness." The sentiments expressed in this elegant preamble are as forceful to-night as when first announced by Professor John Leake in 1773, when he presented to the profession his newly devised three-bladed forceps. (Theory and Practice of Midwifery, 3d Ed., p. 1.)

Historical.

During the stirring times of the Huguenot persecution in France, William Chamberlen, with his wife Geneveve, and their three children, Peter, Simon and Jane, left Paris to settle in South Hampton, England, and there partook of their first communion on July 3d, 1569.

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* Read before the Medical Association of the Greater City of New York, December 17, 1906.

"Three years later (1572) another son was born, and to the confusion of all biographers who have written upon the Chamberlens, he was named Peter. There were, therefore, now two brothers called Peter, the elder and younger." (The Chamberlens, J. H. Aveling, 1882, p. 3.) For the sake of clearness and brevity, we may outline the "family tree" as follows:

THE CHAMBERLEN FAMILY OF "MAN MIDWIVES."

1st generation.	2d generation.	3d generation.	4th generation.	5th generation.
William	Peter, elder Peter, younger	Dr. Peter, Jr.	Hugh Paul John	Hugh, Jr. Dr. Walker, grandson of Peter, Jr.

"In the year 1668, Francis Mauriceau, after an extensive practice for several years, in the Hotel Dieu and the city of Paris, published a treatise on midwifery, which exceeded everything before made public on that subject."

"Cotemporary with Mauriceau were Dr. Chamberlen (Peter, Jr.), and his three sons, who practiced midwifery in London with great reputation. One of these sons, Hugh (Sr.) father of the late Dr. Hugh Chamberlen (Jr.), translated the first volume of Mauriceau into English; and in a note upon that author's method of extracting children by the help of the crochet and *tire tête,* affirms that his father, brothers (Paul and John), and himself were in possession of a much better contrivance for that purpose." (Smellie, W., M.D., Theory and Practice of Midwifery, 1779, i., p. xliv and xlv.)

Hugh Chamberlen, Sr., in his translation of Mau-

riceau's Midwifery apologizes for not giving the secret on account of "my father and two brothers living that practice this art," and goes on to say that "the aforementioned three persons of our family and myself can serve them in those extremities, with greater safety than others."

Smellie (ibid, xlvi) tells us "This was no other than the forceps, which they kept as a nostrum (as was the custom), and was not generally known till the year 1733, when a description of the use of the instrument was published by Chapman. Long before that period, indeed, several kinds of forceps, or extractors, different from those mentioned by the Arabians, were used in France, Germany, and other places; but all of them fell short of the instrument of the Chamberlens, *said to be contrived by the uncle.*" (Peter Chamberlen, the elder.)

The first notice of the use of the Chamberlen forceps was recorded by Mauriceau, observation xxvi, Le 19 Aout, 1670 (Observations sur la Gross esse et l'Accouchement, t. ii, p. 23, 1738).

Edmund Chapman, in his Essay on Improvement in Midwifery, London, 1733, reports fifty cases, and in his dedication says: "If I mistake not, I am the first Englishman that has written originally and professedly on this subject, one only excepted, who wrote about one hundred years ago, and that very indifferently."

On page 12, he modestly (?) says: "As to the former of these (the fillet), I must be silent in, as being entirely an invention of my own; nor shall I, I hope, be censured for so doing, any more than the great Dr. Chamberlen was for choosing to conceal the method, or secret whereby he could extract children in this case without hooks, where other artists were forced to use them."

"As to the forceps, which I think, no person has yet any more than barely mentioned, it is a noble instrument, to which many now living owe their lives, as I can assert from my own knowledge and practice." (ib., p. 13.)

Chapman apologizes in a postscript: "This essay, I confess, is more imperfect than it would otherwise have been, because I was informed that there was a Piece of Midwifery already in the Press, which was to be published in a little time. It is highly probable there may be something in this work which is advanced in mine; and I should, after this, have incurred the censure of the town in publishing what was not wholly mine own. I chose, therefore, rather to let this make its appearance in a sort of Undress than to run the Hazard of being thought a Plagiary by deferring it any longer; for which some friendly allowance will be made, especially when it is considered that Truth and matter of fact need no gawdy Decorations."

The "Piece of Midwifery already in Press" was a book "Written by the late Mr. William Giffard, revised and published by Edward Hody, M.D., in which he reported 225 "Cases in Midwifery," the dedication being dated July 30, 1733, thirty-one days before that of Chapman, though the former was not published until 1734. It contained cuts of Giffard's Extractor, and the improved Extractor by Mr. Freke, these being the first illustrations of the English forceps we find on record.

Owing to severe criticism Chapman, in his 1735 edition of his Treatise of Midwifery, gave a description, and included a cut of a forceps almost a facsimile of that used by the Chamberlens.

According to Rigby (*London Med. Gaz.*, 1831, vii, 462), Chapman, in 1736, described his Improved

forceps, with the now famous loose lock and the familiar hook on each handle.

It is to this lock of Chapman, and its peculiar danger that I wish to direct your attention.

The Evolution of the Obstetric Lock.

Aveling (p. 216) tells us that the two portions of the Chamberlen forceps were separable, and in this consisted the novelty and excellence of the instrument.

"The two portions of the (original) instrument are united by means of a rivet, which can be unscrewed. Its head has not the usual notch in it, but is made oval." (p. 221.)

Dr. Hugh Chamberlen "was the last of that ancient family who practiced the Art of Midwifery in the Kingdom, except Dr. Walker, who is Grandson to the aforementioned Dr. Peter Chamberlen, Jr. According to Dr. William Douglas, this Dr. Walker was the inventor of the English lock of midwifery forceps, for in a letter to Smellie (1748, p. 8) he says: 'Dr. Walker pretended to improve Dr. Chamberlen's instrument but in truth spoils them by making them male and female.'" (Aveling, p. 193). This we believe refers to the fitting of the two blades, the one into the other, as shown in the models of the Chamberlen forceps. It can hardly apply to the flanged lock of Chapman above referred to.

What Is the Danger Incident to the Chapman Lock?

When forceps furnished with the Chapman or loose lock have been introduced and adjusted to the head, one of the following propositions will confront

us: (a) If the cavity of the blades as a whole corresponds to the size of the head within the grasp of the blades the handles will lock without difficulty or compression. (b) If the cranial diameters are greater than the cavity of the blades, in order to bring the handles together the head must be compressed, though in most cases within the limit of safety set by Ferran (*Med. and Surg. Rep.*, Phila., 1877, xxxvii, 446), as one-half inch. (c) If, however, the cervix is only partially dilated or rigid, or the vagina and vulva undilated, or the pelvic inlet or outlet narrowed, when traction is made these structures will offer resistance to advance, and by *pressure on the convexity of the blades* force them together, imbed the tips well into the delicate cranial structures, compress the head with a force which has been determined by Deloré to average about one-half of the traction power exerted, and result in depression or fracture, sometimes intracranial hemorrhage, and a disabled or dead infant.

In this *undue approximation of the blades* lies the great danger especially as the maximum compressing force is exerted on that portion of the head embraced within the tips, be it occipito-frontal, biparietal, bi-mastoid, or any diameter involving the base of the skull.

Misdirected Efforts for Controlling Compression.

According to Hodge (*Am. Journ. Obstet.*, 1875-6, viii, 1) Edward Foster, in his Principles and Practice of Midwifery, 1781, placed "A stop or kind of nail, to pass from one handle to the other at their extremities for the excellent purpose of preventing too much pressure upon the head of the child."

Seventy-seven years later, George T. Elliott, of this city described "A new Midwifery Forceps, having a Sliding Pivot to prevent compression of the Fetal Head" (*N. Y. Journ. Med.*, 1853, v, 3d s., 160-163). This pivot was placed between the handles, and could be adjusted in such a way as to hold the handles apart, and Elliott claimed that with his forceps "traction can be applied, and should be applied by competent men, in well-selected cases, through an os uteri as yet barely dilated sufficiently to admit the blades separately, and that delivery may be subsequently effected by dilating, or lacerating, or incising the os and cervix uteri."

The pivot of Elliott was later supplanted by the now familiar screw-pin inserted in the proximal extremity of the handles, and catalogued as the "Bellevue" forceps, but the author of which we have been unable to determine.

From our standpoint, neither the pivot nor the screw-pin during traction hold the blades apart, and they, therefore, wholly fail in "the excellent purpose of preventing too much pressure upon the head of the child."

How May We Recognize Dangerous Compression.

In the construction of the obstetric forceps designers usually endeavor to adjust the width between the blades and the aperture of the tips, so that when the average head is within the grasp of the forceps, they may be locked and the handles brought together without unwarranted compression of the head. Could this relation be maintained but little damage would result.

Separation of the handles, near the lock, during

traction, as an indication of excessive compression of the head within the blades, has been overlooked or but little importance has been attached thereto; yet it must be borne in mind that with the fulcrum now at the proximal extremity of the handles, and the extremity of the blades from 13 to 16 inches away, a separation of the handles near the lock of only ⅛ inch, will, in some forceps, bring the tips almost in contact, and result in very disastrous if not fatal compression.

Approximation of the Tips of the Forceps Due to Lateral Pressure.

	Elliott's Forceps.	McLane's Forceps.	Mathews' Forceps.
Length over all.....	15½ in.	13½ in.	15¾ in.
Handles locked, tips of blades apart 16/16	"	16/16 "	12/16 "
Handles separated at lock, 2/16-in. tips 10/16	"	9/16 "	5/16 "
Handles, separated at lock, 3/16-in. tips 8/16	"	7/16 "	3/16 "
Handles separated at lock, 4/16-in. tips 5/16	"	3/16 "	Contact

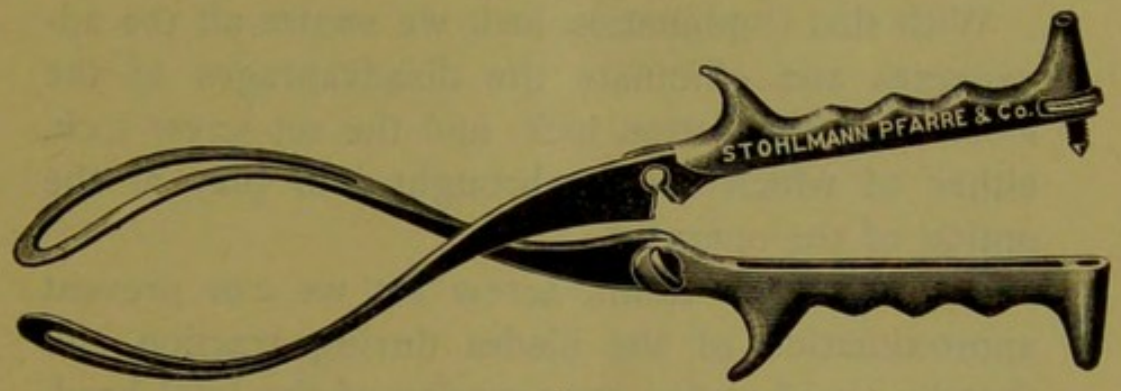
Thus, by *noting the separation of the handles near the lock* we are advised of the extra approximation of the blades and may take warning ere we damage or destroy one of the lives entrusted to our care.

Can Excessive Pressure Be Prevented?

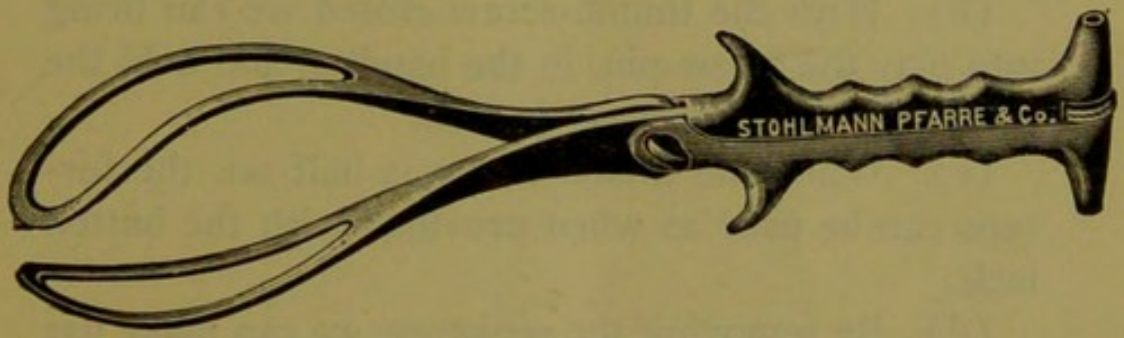
1. The shoulder on the long-shank forceps, placed at the junction of the shank with the left blade, recently described by the writer, effectually prevents the blades from coming together any closer than they are designed to do when the handles are together and locked. With this shoulder on a long shanked forceps no amount of lateral pressure dur-

ing traction can force the blades together, and lateral compression of the head is avoided. (*Ann. Gynec. and Ped.*, 1906, xix, 649).

2. The safety lock to which I now direct attention shows a combination of the English and French locks, the thumb-screw of the latter having been inserted, free, through a circular hole in the



A



B

Gallant's safety obstetric lock. *A* Shows countersunk notch in right blade; and set-screw passing through flange into shank of left blade. *B* Shows forceps locked, set-screw set, fixing blades so that they cannot be forced together by external pressure of the genital tract, thus avoiding undue compression of the fetal head.

flange of the left blade, and is screwed into the main portion of the shank. The right blade is provided with a notch on its inner side, partially countersunk, which embraces the thumb-screw. When the latter is set it securely fastens the blades at the lock, and if the instrument is made of forged steel, the blades cannot be forced together by any amount of traction force which it is justifiable to exercise,

when any portion of the parturient canal is narrowed or undilated.

The flanges serve as guides when adjusting the blades, which are steadied by the screw, and when the thumb-screw is set the blades are securely fastened together, *with the fulcrum at the lock.*

Advantages of the "Safety Lock."

With this combination lock we secure all the advantages and eliminate the disadvantages of the loose lock, the button lock, and the set-screw lock, either of which can be brought into play at the option of the operator.

(a) With the thumb-screw set we can prevent approximation of the blades during traction and thereby avoid undue compression of the fetal head.

(b) With the thumb-screw closed we can bring into play the screw-pin, in the handles, and hold the blades as wide apart as desired.

(c) When the thumb-screw is half-set, the forceps can be used as when provided with the button lock.

(d) By removing the set-screw we can make use of the forceps as with the English or loose lock.

(e) By the aid of the flanges the forceps can be adjusted quickly; locked easily and fastened securely.

(f) The thumb-screw can be put on any forceps with the so-called English or loose lock.

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