

## Original Articles.

## THE TREATMENT OF PLACENTA PREVIA BY CÆSAREAN SECTION, WITH REPORT OF A SUCCESSFUL CASE.\*

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THE condition known as placenta previa is today the most fatal condition with which the obstetrician has to deal, and even in the hands of the most expert obstetricians and under the most favorable conditions, shows a death rate, fetal and maternal, higher than almost any other obstetrical condition. That the published statistics do not fairly represent the high mortality in this condition is the opinion of nearly all observers; for they consider that the reported cases give simply the lowest mortality obtainable, because, as a rule, selected cases only are reported. Lawson Tait,<sup>1</sup> voicing this sentiment, says that more than half the cases die of hemorrhage or sepsis, and advised the removal of the uterus as the only safe method of treatment.

**Definition.**—A placenta is usually denominated previa when it occupies the lower uterine segment, or that part of the uterus which dilates during labor. Clinically, however, a placenta is previa when it has an attachment in the lower uterine zone and partially or entirely covers the os.<sup>60</sup>

**Varieties.**—The varieties have been denominated as complete, incomplete, lateral, central, marginal, partial and deep implantation; but that which one observer calls partial another will term complete, while lateral, partial and marginal are terms which are used with an interchangeable signification in literature. Practically no two men adopt the same classification.

It would be better<sup>2</sup> if the varieties were divided into two classes,<sup>8</sup> complete and lateral; complete meaning that condition in which the os uteri is entirely covered by the placental tissue; lateral meaning all other insertions in the lower uterine zone in which the os uteri is not covered. Lateral previa under this definition is much more frequent than complete, but the ratio is hard to estimate owing to the confusion of terms in reported cases.

**Frequency.**—Authorities vary as to the frequency of placenta previa, but from an average of reported cases it would appear that it occurs about once in 800 deliveries. Late statistics, however, would lead us to infer that it is becoming more frequent, but this, I think, may be attributed to more careful diagnosis. There is a marked difference between its occurrence in primiparae and multiparae,<sup>67</sup> its occurrence being about seven times more frequent in the latter class.<sup>68</sup> It is also liable to occur twice with the same patient. Out of 51 cases reported by Jardine,<sup>4</sup> 2 had had placenta previa in former pregnancies. The age at which it occurs is also of interest. In 239 cases Read<sup>5</sup> found that 54% of the patients were over thirty years old, and Mueller,<sup>6</sup> in 248 cases, found that 50% had passed the thirtieth year. If we consider that three times the number of women give birth to children before their thirtieth year, we find that it is relatively three times as frequent in persons who have passed thirty years as in those who have not attained that age.<sup>68</sup>

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One very important fact in its occurrence is the number of abnormal presentations, due, perhaps, to the abnormal shape of the uterus, various observers giving from 24% to 32% of abnormal presentation.<sup>23 24</sup>

**Diagnosis.**—The diagnosis is not usually made until hemorrhage occurs, and it is the occurrence of this symptom which directs the attention of the physician to the possibility of a previa.

Hemorrhage occurring without appreciable cause after the third month of pregnancy, that is, after the formation of the placenta, should give rise to suspicion of placenta previa.<sup>7</sup> On examination, the lower uterine segment will be found to be soft and boggy,<sup>22</sup> and in case of lateral placenta one side will be found thicker than the other. The presence of unusually large blood vessels in vaginal or uterine wall may aid in confirming diagnosis.<sup>12</sup> Ballottement is usually absent.<sup>77</sup> Absence of morning sickness in multiparae who have been previously troubled may be considered a diagnostic sign.<sup>8</sup> For the purpose of confirming the diagnosis of such a serious condition it is held justifiable (if case is seen during last three months of pregnancy and hemorrhage is profuse), to pass the finger through os to determine the presence or absence of placenta. If the examining finger encounters a rough, granular and spongy mass, differing in constitution from a blood clot, the diagnosis may be considered as confirmed.

**Treatment.**—The treatment of placenta previa in the past has not taken sufficiently into consideration the fact that two lives are involved, and while craniotomy has become a thing of the past, and its performance on a living child, by many men, not justified today,<sup>47</sup> there is not the same feeling about the induction of premature labor, or the resort to severe operative delivery, which no less surely than craniotomy takes away the chance of life from the child. Lusk,<sup>9</sup> in 1887, speaking of craniotomy, said: "If it were proposed to a physician to beat out the brains of a newborn child with a view to diminish the perils of the puerperal period, the proposition would certainly be rejected as too horrible for consideration, even though the physician were convinced that the theoretical ground for the recommendation were correct. Yet there seems to be a prevailing disposition to treat any hesitancy to destroy the unborn child, in the interests of the mother, as pure sentimentality."

A list of the various methods generally employed would include tampons of vagina<sup>80</sup> or cervix,<sup>78</sup> colpeurynter, partial or circular detachment of placenta, perforation of the placenta,<sup>88</sup> incision of cervix,<sup>68</sup> rupture of membranes,<sup>21</sup> forceps, induction of premature labor, version followed by immediate delivery, version not followed by immediate delivery, and Cæsarean section. These methods and others have each had, and still have, vigorous supporters and defenders, but all the treatments have been directed to arresting the flow of blood, emptying the uterus, combating anemia.<sup>11</sup>

For the purposes of this paper a consideration of the following will be sufficient: (1) Induction of premature labor;<sup>69 71</sup> (2) rupture of membranes followed by natural delivery or delivery by forceps;<sup>27 91</sup> (3) manual dilatation of os with delivery by version;<sup>4</sup> (4) Cæsarean section.

Induction of premature labor is advised as soon as diagnosis is made.<sup>12</sup> This treatment is based solely

on the desire for the safety of the mother without regard to the child's life. After the seventh month it might be logical treatment if no better offered, but before the seventh month it should not be justified. In the early days of pregnancy the classical treatment for threatened abortion should be given, namely, rest in bed, patient not being allowed to rise for any purpose during continuation of symptoms; all mechanical irritation of cervix should be avoided and the bowels kept open. In cases of contracted pelvis, maternal mortality of section at term is no higher than after induced labor, while the fetal mortality is practically nothing. On the other hand, the cases of induced labor show an immediate fetal mortality of 33.1% with an ultimate mortality of from 50% to 75%.<sup>13</sup> This fetal mortality can never be much diminished, for it depends upon conditions over which we have no control, namely, the delicacy of the premature infant and its consequent liability to suffer from the effects of labor; the frequent necessity for interference during labor, due to malpositions and deficient uterine action; the liability of the child to perish from malnutrition within the first weeks of extra-uterine life;<sup>14</sup> and the impossibility of knowing that we are dealing with a viable child.<sup>15</sup>

The second method is useful in cases of lateral or marginal placenta, where good pains are present and os dilated or dilating. Under favorable conditions this treatment shows extremely low mortality, but it is useful only in cases which do well naturally and is not recommended where immediate delivery is indicated, or in cases of complete previa.

The third method, the treatment of placenta previa by manual dilatation followed by version, is the method almost universally used today by English and American obstetricians, and has shown in the hands of experts a steadily decreasing maternal mortality; but it can hardly be called an ideal treatment, since while it has reduced the maternal mortality to probably the lowest point obtainable (about 12%), it has done so at the expense of the fetus.<sup>16</sup>

Blackmer, whose results with version show the lowest mortality of reported cases, says: "The safety of the mother is, of course, of paramount importance, but a mode of treatment which does not in any way tend to lessen the already numerous dangers to the child's life cannot be called an ideal one. We are justified, then," he continues, "in considering any method which may diminish the risk to the child while at the same time it does not increase the risk to the mother."<sup>16</sup>

The difficulties and dangers of version are not shown in the published statistics, even of experts, as they all agree that the results obtained in private practice are entirely different from those obtained in hospital service. The chief objection to version must ever be the high fetal mortality obtained even in the most skilled hands. Other objections are: (1) That it is not always easy to do and does not arrest hemorrhage;<sup>17</sup> (2) with multiparae the difficulties of version increase, owing to continued increase in size of fetus with successive pregnancies, and also there is lessened intensity of contractions of the uterine and abdominal walls;<sup>18</sup> (3) the fetus is already shocked by placental hemorrhage, and there is additional shock to the fetal heart from the manipulation of the cord necessary in version;<sup>19</sup> (4) owing to a disproportion in size of head, or for other reasons, it is sometimes necessary to perforate aftercoming head.<sup>19</sup>

Cesarean section for this condition was recommended as long ago as 1892 by Dr. W. Huston Ford,<sup>10</sup> of St. Louis, who advocated section in certain cases on purely theoretical ground. At that time, however, the mortality from Cesarean section, even in selected cases, was a high one, due principally to errors in technique, and abdominal surgery in general had not reached that perfection which we know today. Dr. Bernay,<sup>20</sup> of St. Louis, reported in 1894 that he had performed the operation upon a patient with central previa who was much exhausted from loss of blood. He saved the mother, but the child died in ten hours of asphyxia. He also reported 2 other instances in which the operation had been done under extremely unfavorable circumstances by other men, both cases resulting unfavorably. Dr. Wenning,<sup>21</sup> of Cincinnati, in 1898 mentioned Cesarean section as a treatment but gave no details as to the indications.

At the meeting of the Maine Medical Society in June of this year, Dr. Dudley,<sup>22</sup> of New York, read a paper advocating Cesarean section also on theoretical grounds.\*

The resort to Cesarean section in these cases must, therefore, in the absence of statistics, be based more or less upon theoretical ground, but the justification for this radical treatment is found today in the hundreds of successful Cesarean sections for causes other than placenta previa, which have resulted in an extremely low maternal mortality and practically no fetal.

Dr. Reynolds,<sup>18</sup> in an article on the causes of failure after Cesarean section according to the Sanger method, in cases of contracted pelvis, defends the following proposition: "That when the mother is in good condition, that is, when she is generally sound, uninfected, and not exhausted by long labor, or by prolonged efforts at delivery by the forceps, *the Cesarean section is so safe an operation that it may be used unhesitatingly in cases at term whenever an intrapelvic delivery will be fatal to the child, and may often be preferred even to the induction of premature labor, on account of its superiority in the saving of fetal life.* [Italics are mine.] How low the fetal death rate of the Cesarean section will prove it is difficult to say; but if we consider the favorable cases only, it is certainly the lowest infant death rate obtainable." In support of this proposition, Dr. Reynolds reported 15 cases of Cesarean section without a death, maternal or fetal. Since the publication of the above paper he has operated on 4 more cases, which I have his permission to quote, with the same successful results. He also reports 50 operations of Leopold when these conditions were observed, and also 24 of Evarkes; a total of 93 sections without a maternal or fetal death. In spite of these extremely favorable results, it is too radical to advise section in all cases of placenta previa, as there are certain cases which do well under conservative treatment. There are, however, certain cases which do not do well under any of the classical treatments, and in which section seems indicated.

Very few groups of cases are so reported as to be capable of analysis on the basis of surgical intervention or not, but examination of the reported cases of placenta previa show: (1) That the greatest mortal-

\* I have carefully looked for the reports of other cases but have found none, and in communications, Drs. Ford, Bernay, Wenning and Dudley say they know of none except those already mentioned. So that the case I am reporting appears to be the first entirely successful one in this country.

ity, both fetal and maternal, is obtained in cases of complete previa. Depaul<sup>23</sup> reports 25 central with a maternal mortality of 56%, Jardine<sup>4</sup> reports 12 complete with a maternal mortality of 16½% and a fetal mortality of 66½%. (2) The second deduction from reported cases shows that in primiparae the firmness and resistance of the tissues render quick operative interference difficult. (3) A source of great danger is found in a rigid os uteri. Read<sup>5</sup> reports 39 cases where the condition of the os was given as rigid. These showed a maternal mortality of 33% and a fetal mortality of 70%. (4) In cases of contracted pelvis the greatest death rate is not obtained in the major degrees of contraction, but where there is disproportion between the size of the fetus and the size of the pelvis.<sup>29</sup> (5) Malpositions of fetus requiring operative interference, and cases where the cord is prolapsed, show high mortalities.<sup>24</sup>

If we accept the foregoing deductions as correct it would seem that section, in preference to other operative interference, is indicated in: (1) Cases of complete previa; (2) cases of previa in primiparae when signs of fetal or maternal exhaustion are evident; (3) when the condition of rigid os is present; (4) where there is a history of previous operative delivery; (5) in transverse positions and in cases of prolapsed cord, if the cord is not easily returnable.

That Cesarean section is the easiest of celiotomies all who have performed it admit, and in nearly every large community it is possible to obtain an operator capable of performing it under strict aseptic and antiseptic precautions. It is also an extremely safe operation not only for mother but for child, and this latter fact leads Dr. Reynolds<sup>18</sup> to say in the paper already quoted: "Is not the life of the child as good a reason for the performance of a simple abdominal operation as the chronic backache for which such operations are done daily?"

For the successful performance of version an obstetrician having the necessary experience (performance of at least fifty versions, for instance, being considered sufficient experience) is not so readily obtainable. The place of operation is generally considered of great importance,<sup>28, 32</sup> but it seems to me that section may be safely done where the performance of any clean obstetrical operation is possible.

A second Cesarean section on the same woman is easier and less dangerous than the first.<sup>60</sup> Pollak<sup>25</sup> reports 120 Cesarean sections performed on 58 women with 1 death, a woman dying of embolism after the fifth operation. After the operation the uterine wall becomes thoroughly healed without thinning, if it has been properly sutured. The abdominal wall, when closed by terraced sutures, shows no tendency to rupture, and in cases where the uterine scar has adhered to the abdominal at the time of the first operation, subsequent operations are really extraperitoneal.<sup>26</sup>

This paper, while it does not aim at completeness, is designed to emphasize the fact that modern surgery has not reached its limitations, and the successful outcome of section in the appended case, when another mode of delivery would have been fatal to at least one of the lives involved, offers hope of success to others when confronted by the same grave emergency.

The report of the case is as follows:

Ruth W., age forty years, born in Plymouth, Mass., married nine years. One previous pregnancy six years and six months ago; delivered at that time by forceps.

Last catamenia, November 5, 1899. Expected confinement August 12, 1900. Quickening began last March. No unusual symptoms until Monday, August 6, 1900. Flow suddenly commenced, lasting two hours. It was profuse and unaccompanied by pains. It was not sufficient, however, to cause alarm. On August 12th she began to flow in the morning, and Dr. E. D. Hill was called from Plymouth about nine o'clock that night. He made a diagnosis of placenta previa. Mother's temperature 99°, pulse 80, fetal heart 120. Position O. L. A. Dr. Hill remained with patient until 11.30 p. m., when, symptoms not being urgent, he returned to Plymouth.

In the morning, being detained by an operative case, Dr. Churchill was sent at 9 A. M. to look after the case twelve miles away at Long Pond, and report to Dr. Hill, who was with Dr. Mixer at Manomet, seven miles away on the other leg of a triangle. Dr. Churchill reported to Dr. Hill at one o'clock that the pulse of the mother was 110, the temperature 99°, and the fetal heart 130. Hemorrhage not profuse. As the case seemed to be doing well, Dr. Mixer, to whom I had suggested Cesarean section if it was a case of complete previa, returned to Boston, leaving me behind to look after the case and to operate if I thought necessary. About 5 p. m., Dr. Hill, Dr. Churchill and myself drove down from Plymouth to see patient; found her in a state of collapse. The hemorrhage had recurred and a messenger had been sent to Plymouth, but we had missed him on the road. Hemorrhage had been so profuse that the mattress on the bed had been soaked through completely.

On examination, vagina was found full of clots. Clots were removed and douche of corrosive sublimate solution, 1-3,000 given, but during examination active hemorrhage persisted and clots continued to form. The os was high up in pelvis and not reachable until the whole hand had been passed into the vagina. Os was then found to be dilated so that it would admit two fingers, covered by placental tissue, and extremely rigid. The whole lower segment of the uterus was boggy and no ballotement could be obtained. Patient's temperature 99.4°, pulse 140. Labor pains present. Operation advised, and consented to at once by husband and by patient.

The house was an ordinary one-story country house, with three or four rooms on the ground floor. Patient was in charge of ordinary country nurse, who afterwards took care of patient during convalescence. Operating table was made by extending the kitchen table with a light stand, and the whole covered with a folding blanket and sheet. A washstand served as a table for sponges and instruments. Light was furnished by two kerosene lamps. A wash boiler of hot water was soon ready in which the instruments were boiled. In a washbowl was mixed 2 quarts of corrosive-sublimate solution, 1-500, in which six towels were put to soak. Hands were washed at sink, water being supplied from pump. After scrubbing hands with green soap, crystals of permanganate of potassium were emptied into the palms of hands and with a little water pumped onto them made a saturated solution, which although small in amount was effective. The excess of permanganate of potassium was washed off by more well water, and the hands and arms bleached in a solution of oxalic acid. Dr. Hill, who assisted me, went through the same process. Ether in the meantime was being administered by Dr. Churchill. Dr. Henry R. Hitchcock, of Hyde Park, Mass., who was at his summer place about one mile away, had been sent for to help with baby, and arrived soon after woman had been placed on table. Preparation of woman consisted of shaving, scrubbing with green soap, corrosive-sublimate solution, and finished up by a dash of peroxide of hydrogen. Field of operation was surrounded by wet corrosive towels. Incision was made at a point corresponding to middle of rectus, beginning opposite umbilicus and extending well down to pubes. Abdominal wall was extremely thin and first incision opened peritoneal cavity for about one inch. Incision enlarged with a scissors until uterus could be pulled through it. Gauze then packed into abdominal cavity to hold back

intestines. Rubber tube was passed round broad ligaments, tight enough only to control hemorrhage. Uterus opened by vertical incision in median line, and membrane bulged into incision, which was enlarged upward and downward. Pail of hot and one of cold water had been provided for resuscitation of child. Membranes were then ruptured, and child's head presenting, was delivered in that way. Eyes sponged out, throat cleared with finger. Baby gasped a little, but as cord was pulsating feebly it was clamped and cut. Under treatment of Dr. Hitchcock child was soon crying vigorously. Rubber tube was then relaxed and contraction of the uterus followed. As patient was in good condition and no hemorrhage going on, the placenta was allowed to separate in the normal way, and after ten minutes was delivered through incision in uterus. There was no hemorrhage except a very slight oozing from the placental side which was directly over the os. Hemorrhage was so slight it did not wet one gauze sponge. Mucosa closed by a continuous suture of No. 1 half chromicized catgut (St. John Leavens). The uterine muscle was brought together by eight interrupted sutures, and a continuous suture of catgut closed the peritoneal wound. Gauze packing then removed. Peritoneum closed by continuous catgut suture, rectus muscle caught together by the same material, and fascia of rectus closed by continuous suture. Continuous silkworm-gut suture closed skin incision. Sterilized dressing applied, patient returned to bed. Whole operation consuming forty-five minutes. After treatment consisted of corrosive douches with pad until tenth day, when a slight odor of lochia caused a change to sulphonaphthol douches. Patient sat up in bed on twelfth day and left bed on twenty-first day.

On September 12th, house and outbuildings were completely destroyed by forest fires, and patient was driven to Plymouth after walking one and one-half miles through woods with baby in her arms. Patient suffered no ill effects from this, and she and baby are alive and well today.

## BIBLIOGRAPHY.

1. Tait. *Lancet*, February 27, 1899.
2. Parvin. *Textbook*.
3. *American Textbook of Obstetrics*.
4. Jardine. *Transactions of the Glasgow Obstetrical and Gynecological Society*, 1896-98.
5. Read. *Placenta Previa and its Treatment*.
6. Mueller. *Placenta Previa*. Stuttgart, 1877. Monog.
7. Reynolds. *Textbook*, New York, 1892.
8. Shaw. *British Medical Journal*, April 30, 1896.
9. Lusk. *Transactions of the National Congress*, 1887.
10. Ford. *American Journal of Gynecology*, September, 1892.
11. Sebillote. *Annals of Gynecology and Pediatrics*, vol. xviii, 1898.
12. Lusk. *Textbook*.
13. Reynolds. *Obstetrics*, New York, January, 1900.
14. Barnes. *Jour. de m d. de Paris*, December 17, 1899.
15. Piantozza. *International Congress of Gynecology and Obstetrics*, Amsterdam, 1899.
16. Blackmer. *Transactions of the Obstetrical Society of London*, 1897; *Ann. de gyn.*, January, 1896.
17. Spiegelberg and Rundge. *American Textbook of Obstetrics*.
18. Leopold. *Arch. f. Gyn k.*, Bd. lvi, H. 1.
19. Dobbins and Williams. *Obstetrics*, July, 1899.
20. Bernay. *Journal of the American Medical Association*, May 12, 1894.
21. Wenning. *Transactions of the American Academy of Medicine*, Cincinnati, 1897-98; *American Journal of Obstetrics*, 1897, vol. xxxvi; *Loc. cit.*, 1893.
22. Dudley. *Transactions of the Maine Medical Society*, 1900.
23. Depaul. *Bull. Acad. de m d.*, Paris, 1851-52, vol. xvii.
24. Lomer. *American Journal of Obstetrics*, 1884.
25. Pollak. *Centrl. f. Gyn k.*, April 15, 1899.
26. Spencer. *Medical Press*, July 11, 1900.
27. Schroeder. *Lehr. d. Geb.*, 9th ed., p. 708; *Monats. f. Geb. u. Gyn k.*, Bd. vii, H. 2.
28. Coe. *Gynecological Transactions*, 1892.
29. Kezmaracky. *Orosi Hetil*, No. 44, 1898.
30. Smily. *British Medical Journal*, 1895, vol. 1, p. 62.
31. Fullilove. *Transactions of the Mississippi State Medical Association*, 1889.
32. King. *American Journal of Obstetrics*, October, 1880.
33. Frendenberg. *Die Frauenarzt*, December 16, 1898.
34. Hirst. *American System of Obstetrics*, 1889, vol. ii.
35. Hirst and Dorland. *Gould's American Year Book*, 1898, p. 448.
36. Taylor. *Transactions of the American Gynecological Association*, 1878.
37. Von Randohr. *American Gynecological and Obstetrical Journal*, February, 1900.
38. Murray. *Loc. cit.*
39. Doranth. *Monats. f. Geb. u. Gyn k.*, 1898, No. 5.
40. Fenwick. *British Medical Journal*, January 20, 1900.
41. Edgar. *American Gynecological and Obstetrical Journal*, February, 1900.
42. Shauta's Fest Monats. f. Geb. u. Gyn k., January, 1900; *Shauta's Centrbl. f. Gyn.*, 1898, No. 31.
43. Pierce. *British Medical Journal*, February 17, 1900.
44. Bourdier. *Thesis*, Paris, 1895, No. 250.
45. Gamsen. *British Medical Journal*, April 21, 1900.
46. Williams. *Maryland Medical Journal*, July, 1900.
47. Pinard. *Paris. International Congress of Obstetrics and Gynecology*, Amsterdam, 1899.
48. Pestalozza. *Loc. cit.*
49. Winckel. *American Textbook of Obstetrics*, vol. ii.
50. Baker. *Obstetrics*, New York, vol. 1, No. 9.
51. Fritsch. *Centrl. f. Gyn.*, May, 1897.
52. Evarke. *Loc. cit.*, 1898, No. 31.
53. D hrssen. *Berlin. klin. Woch.*, 1896, p. 530.
54. Boldt. *Medical News*, July 9, 1898.
55. Jewett. *Brooklyn Medical Journal*, September, 1898.
56. Treub. *Die Frauenarzt*, December 16, 1898.
57. Weber. *Centrl. f. Gyn.*, No. 35.
58. Rood. *American Journal of Obstetrics*, July, 1900.
59. Hopkins. *Philadelphia Medical Record*, 1899, vol. v.
60. Bar. *L'Obstet.*, May 15, 1899, p. 275.
61. Washburn. *Boston Medical and Surgical Journal*, 1898, vol. cxxxviii.
62. Erb. *Loc. cit.*
63. Frank. *Monats. f. Geb. u. Gyn k.*, January, 1900.
64. Fr rend. *Berlin. klin. Woch.*, February 19, 1900.
65. McDiarmid. *American Journal of Obstetrics and Gynecology*, April, 1899.
66. Sligh. *American Journal of Obstetrics*, February, 1892.
67. Simpson. *Journal of Obstetrics and Gynecology*, 1871.
68. Holmes. *Obstetrics*, New York, 1899, vol. 1, No. 6.
69. Thomas. *Transactions of the New York Obstetrical Society*, vol. 1, p. 262.
70. Hecker. *L. Mueller's Monog.*, 1877.
71. Murphy. *British Medical Journal*, 1884, p. 215.
72. MacDonald. *Transactions of the Medical Society of the State of New York*, 1897.
73. Landessman. *Therap. u. Wiener Clinic*, Vienna, 1900.
74. Meigs. *Treatise on Obstetrics*, 1866.
75. Darby. *Journal of the Medical Society of Dublin*, 1879, vol. lxvii.
76. Long. *American Journal of Obstetrics*, 1896.
77. Bassler. *Medical Record*, New York, vol. lvii, No. 22.
78. Storer. *Boston Medical and Surgical Journal*, 1856, p. 334.
79. Quinn. *Medical and Surgical Report of Philadelphia*, 1874.
80. Nicholson. *British Medical Journal*, February 17, 1900.
81. Trask. *Transactions of the American Medical Association*, 1855.
82. Webster. *American Journal of Obstetrics*, July, 1900.
83. Percy. *Loc. cit.*
84. Truzzi. *Ann. di ob. e gyn.*, January, 1899.
85. Sippel. *Arch. f. Gyn.*, 1899, vol. lvii.
86. Routh. *Medical Press*, London, July 11, 1900.
87. Dobbin. *Textbook*.
88. Gerboud. *Thesis*, Paris, 1899.
89. Robertson. *Transactions of the Mississippi State Medical Society*, vol. iii.
90. Abd-el-Nour. *Thesis*, Paris, 1895, No. 358.
91. Barnes. *System of Obstetrics, Medical and Surgical*, p. 584.
92. *International Congress of Obstetrics and Gynecology*, Amsterdam, 1899.

THE DUTIES OF THE MEDICAL EXAMINER IN MASSACHUSETTS.<sup>1</sup>

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In these days when the subject of medicine is divided into so many specialties, the medical examiner may be considered very properly a specialist in the detection of the causes that result in unnatural deaths.

He should be familiar with the appearances that wounds on the live body present after death, and be able to decide the nature of the instrument that inflicted them; he should be able to recognize the post-

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