

## Original Communications.

WHAT INFLUENCE WOULD  
A MORE PERFECTED OBSTETRIC SCIENCEHAVE ON THE  
BIOLOGICAL AND SOCIAL CONDITION OF THE RACE?\*

By ALFRED L. CARROLL, M. D.

WHATEVER spiritual sins of mine may be stricken from the books of the Recording Angel, as fully expiated by the penitential attempt to answer the question allotted to me in this discussion, I fear that I shall add to my professional shortcomings in venturing upon an argument which depends almost entirely on an overstrain of the "scientific use of the imagination."

For a proper consideration of the problem we should possess statistical evidence of the mortality and morbidity of mothers and children respectively, due, immediately or remotely, to parturition, and of the degree in which such mortality and morbidity may be regarded as preventable. This evidence, however, is in all respects scanty, and in some absolutely non-existent.

"Still-births" are not officially registered either as births or deaths, and even in the very imperfect occasional records

1,600, being 1 in 13.9, or 7.2 per cent. But of these, 763 were not born dead, 633, or 2.85 per cent. of the total births, being classed as "feeble"—i. e., "apoplectic, premature, etc."—116, or 0.52 per cent., as "abortive" (non-viable), and 14 as monstrous or deformed, leaving 837, or 3.76 per cent., actual still-births. This accords with the few later estimates founded on sufficient numbers to warrant generalization. Farr opined that in England the proportion was about 4 per cent., in Belgium (1860-1865) it was reported as 3.7 per cent., in France (1875) as 3.6 per cent.

There are no means of ascertaining how many of these "dead-born" are done to death during the act of parturition, but that the number is very great may be inferred from a comparison of spontaneous and artificial deliveries, the latter of which are usually performed on account of mechanical obstacles in the genital passages, uterine inertia, maternal hæmorrhage or convulsions; or, on the foetal side, malpresentations, prolapse of cord or arm, or deformities of various kinds. From the subjoined condensation which I have made of Lachapelle's tables, it is shown that in all the spontaneous deliveries (omitting those of the shoulder, in which the two still-born are specified as "putrid") the ratio of the dead-born is 3.5 per cent., while in the artificial deliveries it rises to 25 per cent.:

PRESENTATION AND DELIVERY.	Total.	Living.	Dead.	Feeble.	Abortive or deformed.	Total deaths.	Excluding non-viable children.
Vertex, spontaneous.....	20,567	19,450	635	462	20	1,117 = 5.43%, or 1 in 18.4	1 in 18.75
" forceps.....	72	38	17	17	...	34 = 46.8% " 1 " 2.1	
" version.....	47	29	8	10	...	18 = 38.3% " 1 " 2.6	
Face, spontaneous.....	88	78	3	6	1	10 = 11.36% " 1 " 8.8	
" forceps.....	5	1	1	3	...	4 = 80.00% " 1 " 1.25	
" version (inertia).....	7	4	...	3	...	3 = 42.86% " 1 " 2.33	
Pelvic, spontaneous.....	790	575	101	98	16	215 = 27.2% " 1 " 3.67	1 in 3.9
" version.....	12	6	3	3	...	6 = 50.0% " 1 " 2	
Shoulder, spontaneous.....	12	...	2	...	10	12 = 100%	
" version.....	106	63	26	17	...	43 = 40.57%, or 1 in 2.5	
Brow, changed to face.....	2	1	...	1	...	1 = 50.0%	
Craniotomy.....	12	...	9	...	3	12	
Hysterotomy, after death of mother.....	4	...	2	2	...	4	
Presentation undetermined, spontaneous.....	517	397	29	11	80	120 = 23.2%, or 1 in 4.3	1 in 12.9
" " version.....	2	1	1	...	...	...	
Total spontaneous.....	21,974	20,500	770	577	127	1,474 = 6.7% " 1 " 14.9	1 in 16.3
" artificial.....	269	143	67	56	3	126 = 46.8% " 1 " 2.13	1 " 2.19
" spontaneous and artificial.....	22,243	20,643	837	633	130	1,600 = 7.19% " 1 " 13.9	1 " 15.13

of them it is impossible to separate the foetal deaths before the beginning of labor from the deaths during birth or soon after birth, the latter being often reported under this category; nor can we determine, outside of a few hospital reports which represent an infinitesimal fraction of the total child-bearings, the proportions of abnormal presentations, of deformed maternal pelves, or of spontaneous or artificial deliveries in these alleged still-births, the vast volume of private midwifery being virtually a sealed book. Quételet computed the ratio of still-births to total births as 1 in 12.5, or a little over 8 per cent., but he evidently included many children who had breathed before dying, as is demonstrated by the contemporaneous tabulation of Mme. Lachapelle's experience, comprising 22,243 births, with a total mortality of

Further analysis of the presentations and accidents of labor is necessary to gain a partial view of the cases in which obstetric science and art may lessen this mortality, which means the death, at or soon after birth, of nearly seventy-two thousand children out of every million born.

In the vertex presentations, spontaneously born, of Lachapelle's table, the "dead" were 1 in 32.4, and the "feeble" (dying within a day or two) 1 in 44.4, the only commentary made being that, in ten or twelve instances, the cord was prolapsed, half of these dying during delivery. Of her artificially-aided vertex deliveries, the "dead" were 1 in 4.76 and the "feeble" 1 in 4.4. But in the 72 applications of the forceps, 39 were for uterine inertia or rigidity of the external genitalia, 8 for pelvic contraction, 2 for "scirrhus of cervix," 1 for hæmorrhage, 1 for uterine obliquity, 8 for maternal convulsions, 9 for faulty positions

\* Read before the New York State Medical Association, October 23, 1890.

of the head, 3 for prolapse of the cord, 1 for prolapse of arm—that is to say, in 59, or 82 per cent. of the whole, the dystocia was due to maternal causes, the children dead or dying being 1 in 2.1, and to fetal causes in 13, or 18 per cent., with the same ratio of mortality. The versions in head presentations, 47 in number, comprised 24 for inertia, 6 for contracted pelvis, 1 for rigidity, 1 for recto-vaginal cyst, 8 for hæmorrhage, 5 for prolapsed cord, 1 for prolapse of hand, and 1 for parietal position; 40, or 85 per cent., maternal causes, with 1 in 2.5 children dead or dying, and 7, or 15 per cent., fetal causes, with a death-rate of 1 in 3.5. Of the cases due to inertia, convulsions, and hæmorrhage a considerable proportion would doubtless be averted by hygienic precautions, especially during pregnancy, but in the majority of instances, and particularly in hospital practice, the physician has little or no opportunity to enforce these precautions, and among the poorer classes too often the conditions of health are unattainable.

The face presentations in Lachapelle's catalogue were 100 in number, or 1 in 222.4. Of these, 88 were spontaneously born; 9, or 1 in 9.7, dead or dying. Of the 5 forceps deliveries and 7 versions, all were for inertia except 1, in which a brow presentation was rectified by forceps, the mortality being 1 in 1.7. Thus, in all the face presentations, we find a mortality of 1 in 6.25, or 16 per cent. Lusk computes the ratio of these presentations as 1 in 255.5, and quotes Winckel's statement that the mortality of children is 13 per cent. Swayne estimates the frequency as 1 in 231. The experience of Collins shows a mortality of 12 per cent. Most of these records, however, concern only the children born dead, omitting those which die soon after birth, so that the estimate based on Lachapelle's table is probably nearest to the actual death ratio.

Pelvic presentations (including breech, foot, and knee) are stated by Lachapelle as 1 in 27 labors; by Swayne and Tanner as 1 in 38, the breech presenting about twice as often as the feet or knees. The mortality, according to Lachapelle, is a little over 25.5 per cent.; to Tanner, 33 per cent.; to Meigs, over 20 per cent.; to Collins, 37 per cent.

Shoulder presentations are, by the estimates of different observers, as follows: Lachapelle, 1 in 188.4; Churchill, 1 in 252; Spiegelberg, 1 in 180; Depaul, Dubois, and Pinard (quoted by Lusk), 1 in 117; Swayne and Tanner, 1 in 231; the infant mortality being about 50 per cent.

The comparative frequency of brow presentations is not easily estimated, since many of them are spontaneously converted into face or vertex before a diagnosis is made. As regards the mortality of children in recognized cases, Lusk cites 34 deliveries: 10 spontaneous (brow continuing), with 3 deaths during labor; 10 converted to face or vertex naturally, with 1 death; 9 extracted by forceps, brow first, with 1 death (from prolapsed funis); 5 changed by forceps to face or vertex, with no deaths—a total mortality of 4 attributable to the presentation, or about 12 per cent.

Taking the averages of all the data which I have been able to obtain, the probable frequency and child mortality (excluding non-viable fetuses) of different presentations in a million births may be thus approximately stated:

PRESENTATION.	Total.	Dead or dying.
Vertex.....	960,000	53,500
Face.....	4,000	640
Pelvic.....	30,000	9,000
Shoulder.....	5,000	2,500
Undetermined, including forced delivery for maternal convulsions or hæmorrhage, embryotomies, contracted pelvis, etc.	1,000	360
Total.....	1,000,000	66,000 = 6.6%, or 1 in 15.

In addition to these, there will be about 5,800 non-viable children, raising the death list to 71,800=1 in 13.9.

In the course of these million labors we shall meet with about 600 cases of placenta prævia, 4,000 of prolapse of the cord, 1,000 of contracted pelvis, and 2,000 of maternal convulsions (including those which occur before or after delivery as well as those during labor), with a maternal mortality of 1,400. Artificial delivery by forceps or version will be necessary in somewhat over 12,000 cases, with nearly 5,500 infant deaths. Of these instances of dystocia, about 48.5 per cent. will arise from maternal causes, and about 51.5 per cent. from fetal causes. In the former category uterine inertia plays the largest part.

To what extent this loss of infant life may be reduced is a mere matter of surmise, but in its reduction obstetric science and hygiene must work together. The correction or better management of malpresentations is already showing beneficent effects in the practice of experts, and will doubtless ere long improve the general results; but even here there is room for great advance. The mortality from either natural or artificially induced pelvic presentations is, in the majority of examples, owing to compression of the cord, and this mortality is so large as to cast a shadow of doubt upon the propriety of podalic version in many cases in which it is advocated by some eminent authorities. According to Churchill, version in normal pelvis is fatal to more than one third of the children, and in contracted pelvis the death-rate is, of course, much larger. Lusk, who is wisely conservative in this respect, argues that, with a conjugate diameter of more than three inches and a half, nature is, as a rule, adequate to accomplish delivery. In the statistics cited by him, version in ordinary flattened pelvis was followed by the death of 50 per cent. of the children; version in generally contracted pelvis by about 90 per cent. of fetal deaths; with the use of forceps above the brim, nearly 40 per cent. of mothers and over 60 per cent. of children died; while in spontaneous deliveries less than 3 per cent. of mothers and 13 per cent. of children were lost. Inasmuch as a large proportion of deformed pelvis arises from rickets in early life, and a smaller from malacosteon in later years—both being principally results of insanitary conditions—it is not only possible, but probable, that, as the knowledge and application of hygiene become more diffused, these causes of dystocia will be vastly diminished in number; indeed, their frequency is demonstrably in inverse ratio to the prosperity of a community. So, also, watchfulness and prophylactic treatment during pregnancy may (and in the best practice do) decrease enormously the percentage of puerperal convulsions.

Premature or abortive births, as they arise from general ill health or local disease of the mother (including many cases of placental degeneration), or, occasionally, from chronic lead poisoning, may to a certain extent be preventable by hygienic or gynecological means; those from external violence or nervous shocks will continue to hold their place on our records as long as feminine impulsiveness, staircases, and brutal husbands exist, and autocratic drivers usurp their reckless right of way.

As regards the effects of dystocia on the later life of the child, little can be learned. In patients whom we see as adolescents or adults we can rarely ascertain the character of the birth or the condition of infancy. None of us can doubt, however, that the morbidity from this source is very great. From the French returns Farr calculates that out of a million children born, 29,121 die in the first week, 22,128 in the second week, and 22,236 in the next sixteen days, making a total of 73,485 in the first month. The English Life Table computes a somewhat less mortality—i. e., 46,500 deaths in the first month, 17,200 in the second, 12,180 in the third, 10,100 in the fourth, 9,550 in the fifth, 9,030 in the sixth, 8,550 in the seventh, 8,080 in the eighth, 7,660 in the ninth, 7,250 in the tenth, 6,870 in the eleventh, and 6,520 in the twelfth, a total of 149,490 to the million in the first year. Many of these early deaths are produced by insanitary conditions, as is proved by the difference between the "healthy districts" of England and Liverpool, in the former of which 36,610 per million children die within the first month, while in the latter the mortality during the same period is (or was when Farr's analysis was made) 54,490 to the million. It is to be regretted that the registration of vital statistics is so imperfect in this country as to preclude any attempt to classify by months the mortality under one year; but the data, such as they are, indicate that, in the United States generally, about 25 per cent. of live-born children die during the first twelvemonth.

It would not be unreasonable, perhaps, to assume that at least half of the deaths under one month are attributable to accidents in parturition, and that a large residuum of those occurring in the first year has a similar origin; but the admirable reports of Farr may enable us to go a step farther in the field of inference. The death-rate under one year per 10,000 births in England, for the three years ending with 1875, was 1,527. Of these, 95 were ascribed to the acute zymoses, 29 to "teething," 171 to diarrhoea, 263 to "lung diseases," 98 to tuberculosis, 128 to prematurity, 267 to "atrophy," 14 to "suffocation," and 251 to convulsions, leaving 211 "not stated." The deaths from prematurity, "atrophy," and convulsions constitute nearly half of the mortality, all of the former and a considerable proportion of the latter two being referable to the time or act of parturition, and some of the pulmonary disorders having their predisposition, if not their origin, in atelectasis at birth. In Farr's *March of an English Generation*, based on the labor of over thirty years, he computes that the average deaths per million under one year will be 149,493, of which 30,637 will be from diseases of the nervous system and 21,995 from respiratory maladies. West, taking a wider view of "nervous" disorders, ascribes to these 30.5

per cent. of all the deaths under one year, and to convulsions alone 73.3 per cent. of the "nervous-system" mortality—equivalent to 33,421 to the million births.

After the earlier weeks of this perilous first year, convulsions, like "atrophy," are often due to maternal neglect or improper management (most notably in the administration of the various atrocious infant foods which flood the market and fill our waste-baskets with their "sample packages"), and sometimes are reported as causes of death when they are really but forerunners of rapidly fatal febrile disorders. But in an unascertainable proportion of cases they are unquestionably the result of compression of the head during delivery, and in such instances, according to West, tend to recur without obvious exciting cause, and to retard or retrograde mental development, leading very often to later epilepsy. Beau (quoted in Reynolds's *System*) found, out of 211 epileptics, 17 (8 per cent.) congenital, and Hughlings Jackson observes that "epileptic fits in adults not rarely date from convulsions in infancy." Nothnagel assigns to overlapping of the cranial bones during forceps extractions or tedious and difficult labors the causation of meningeal hæmorrhage—usually extravasation into the meshes of the pia—from which the children in the majority of instances are either born dead, or linger for a short time, or, rarely, recover to swell the morbidity of succeeding years. Erb refers to the occurrence of spinal meningeal hæmorrhage from difficult or instrumental labor. The principal injuries to the child in dystocia or instrumental interference are: depression or fracture of cranial bones, with or without laceration of brain; "apoplexy of nervous centers"; too tight hold of the forceps, leading occasionally to hemiplegia; and ruptures of viscera.

These considerations emphasize the importance of sound judgment to decide between the dangers of compression of the head by the maternal genital passage or by the forceps, and to determine when to apply the latter to the best advantage. It is undeniable that many lives which would have been sacrificed in the days of traditional prejudice against artificial aid are now saved; but there is reason to fear, with Playfair, that "the pendulum may have swung too far in the opposite direction." Not alone in simply tedious labors without indication of incompetence of the natural powers, but frequently to accelerate normal parturition, for the mother's comfort, or for economy of the accoucheur's time, forceps are used with as little regard for the welfare of the infant as the average street-car conductor has for the expectant passenger, or the "protectionist" legislator for the interests of the unprotected consumer, and, in inexpert hands, with a plentiful crop of maternal lacerations for the lucrative reaping of gynecologists. Lawson Tait's disputed statement—that the infant mortality from forceps delivery in impacted labor is 1 in 7 or 8—is corroborated by Dr. J. G. Swayne (*Brit. Med. Journal*, April 28, 1890), who reports 211 instrumental extractions in difficult and protracted labors, "without reckoning complications," and 30 fetal deaths, or 1 in 7; pointing out a hitherto unnoticed source of danger in the accidental pressure of the cord against the child's neck or head by the blade of the forceps.

Excessive mortality—implying a still greater morbidity

—continues through the first five years, the deaths during this period, in England, being 263,182 to the million births. In this State, by the only method of calculation possible, they constitute 37 per cent. of the total deaths at all ages. Deducting the first year's fatality, the subsequent four years produce 113,689 deaths, of which 9,428 are from diseases of the brain and 23,950 from respiratory diseases and phthisis. In Massachusetts the registration reports, as cited by Dr. T. B. Curtis (Buck's *Hygiene*), attribute from 10 per cent. to 15 per cent. of all deaths under five to "tuberculosis and scrofula." More than half of the death and sickness of this first lustrum arises from insanitary environment, as is evident from a comparison of the statistics in healthy and unhealthy districts, and is therefore amenable only to general hygiene, and about one third from zymotic disorders; but of the remainder an important reduction may be hoped for in the progress of obstetric science and art. After the age of five years, official statistics afford no ground for even guessing the effects of dystocia or premature births upon mortality and morbidity; but the experience of most observant physicians will support the conclusion that they are by no means insignificant.

Turning now to the maternal aspect of the question, and relying, as before, mainly upon Farr's English statistics, we find that of the 488,255 girls born in the hypothetical million whence his "generation" takes its start, 342,281 pass the age of fifteen. Of these, 79 per cent., or 270,402, marry. According to the inquiries of Sir James Simpson and others, about 10 per cent. of marriages are sterile; so that 243,362 of these wives bear children at the rate of 5.23 each, and 6,921 perish in consequence of the process, or 1 in 35 mothers in all their childbearings (2.8 per cent.), which is equivalent to 1 maternal death in every 183 parturitions. These figures apply to all classes of the population, and, of course, overstate the mortality where skilled assistance is at hand. Thus the maternal mortality from childbirth is variously estimated by obstetricians as from 1 in 200 to 1 in 212, while Dr. Rigden (quoted by Farr) in 4,132 private cases had a death-rate of less than 1 in 516. In the records of hospitals and of the experience of consulting obstetricians, more difficult cases, and consequently a higher rate of fatality, are likely to occur. From our prophylactic point of view, it is desirable to discriminate the deaths directly due to the act of parturition from those caused by secondary puerperal diseases, and this has been done by Farr in his separate classification of "metria" and "other accidents of childbirth." We have further to consider the influence of age during the fertile period of woman's life, which, in temperate latitudes, may be regarded as extending from fifteen to a maximum of fifty-five. The following table shows the ratio of deaths of mothers to the number of children born:

Age.	Metria.	Accidents of birth.	Total.
15-25	0.277%, or 1 in 361.7	0.391%, or 1 in 255.75	0.668%, or 1 in 149.7
25-35	0.148% " 1 " 675.7	0.277% " 1 " 361.7	0.425% " 1 " 235.3
35-45	0.154% " 1 " 649.3	0.479% " 1 " 207.9	0.633% " 1 " 157.9
45-55	0.163% " 1 " 613.5	0.720% " 1 " 138.9	0.883% " 1 " 113.2
15-55	0.172%, or 1 in 581.4	0.358%, or 1 in 279.3	0.530%, or 1 in 188.7

In the State of New York about 1 per cent. of the total mortality from all causes is returned as "puerperal," but this includes other accidents of parturition also.

Nearly the whole of the mortality under the head of metria ought to be avoidable by aseptic midwifery and after-management, vastly diminishing the perils of the lying-in chamber, especially to primiparæ, and obstetric skill may lessen that from other accidents of childbirth. We hear less now than thirty years ago of metritis or sloughing from too prolonged pressure, of rupture of the uterus, of fatal exhaustion or post-partum hæmorrhage; but, even with our better modern training, a great part of such preventable lethality will remain beyond our control as long as ignorant and uncleanly midwives conduct the majority of labors among the poorer classes; for, particularly in rural districts, nearly half of all confinements take place without the attendance of a physician. The enormous amount of morbidity entailed upon women who escape death is familiar to every one who has seen much of gynæcic practice. Moreover, it is among the overworked and often underfed poor that malpresentations and pelvic deformities are most prevalent and obstetric skill most needed. To demonstrate how much such skill may accomplish, Dr. J. T. Hartill (*Brit. Med. Journal*, September 27, 1890) has recently reported the results of 2,000 consecutive confinements, largely among the wretched operatives in the "Black Country," comprising 14 cases of complete or partial placenta prævia, 61 pelvic presentations, 24 transverse, 60 contracted pelvis, 29 cases of uterine inertia, 12 of rigidity of soft parts, and 1 of ovarian tumor; 164 applications of the forceps (1 in 12 of all labors); yet, despite these adverse circumstances, there were but 8 maternal deaths from childbirth, or 1 in 250 mothers, 2 from subsequent metritis, 1 from embolism, 1 from phthisis, and 1 from pneumonia—a total mortality, assignable to labor, of 11, or 1 in 182.

The term "aseptic midwifery" has been advisedly used, because in obstetrics, as in surgery, our duty should be to preserve from infection rather than to wait to combat it after it has occurred; and this is usually practicable in the domiciles of the well-to-do. Amid unwholesome surroundings, "antiseptic" measures may be prudently adopted; but these need hardly extend to a bichloride baptism of the child's advancing head or to its birth into a carbolyzed fog, and enough cases of obstetric poisoning by corrosive sublimate have already been recorded to render us cautious in the employment of strong solutions of so dangerous an agent.

Imprudence or mismanagement after parturition is a fertile source of local disease or general ill-health, reacting, almost of necessity, upon subsequent offspring, and so, to a certain extent, upon the biological condition of the race.

Nothing has been said of the graver ventures of modern obstetric surgery, such as Saenger's modification of the Cæsarean section, Porro's or Thomas's operations, or the surgical treatment of extra-uterine pregnancy, for the reason that these are still *sub judice* among those to whom we must look for an authoritative opinion, and the cases requiring

them are happily too few to warrant statistical deductions. The object I have had in view has been to present sufficient data whereon to base a conjecture, if nothing more, of the saving of life and health which may yet be effected by obstetric medicine.

As regards social conditions, I have little to say beyond expressing the belief that misery rather than midwifery is responsible for most of the degradation which blots our vaunted civilization. It may be that in some cases such misery is the outcome of physical disability dating from birth or parturition, but in more instances it is the result of acquired vicious habits. Social statistics show that the numbers of murders, suicides, and other kinds of crime bear about the same proportion to population every year; but of the ætiology of criminality nothing can be positively affirmed. Even those who dogmatically ascribe all the ill-doings of the world to alcohol have still to find some antecedent factor, and to explain why the vast majority of consumers of alcoholic beverages refrain from crime. Inebriety is often the excitant, but the predisposition must be sought behind it. "*In vino veritas*" has a wider philosophical meaning than they who quote it ordinarily wot of.

Recent anthropometric examinations of convicts have frequently detected cranial malformation or asymmetry; it is not yet proved, however, that this is more common in criminals than in the law-abiding classes, and, if it were, the wildest flight of fancy would fail to reach a guess of its possible connection with dystocia. If it be considered that civilized life is artificial, and that the absolutely natural man would be, in the eyes of the civilized man, an habitual criminal—gratifying all his animal propensities; taking, furtively or forcibly, whatsoever he coveted; killing his brother savage when prompted by any grievance; stealthy or violent in accordance to the degree of his strength and courage—then the "reversions to a lower type" which police records depict may be better understood, and imputed, after the hereditary transmission of an imbruted organization, to neglected childhood, lack of moral training, and evil communications.

The vexed question of heredity (not so much of disease as of proclivity to disease) has little relation to obstetrics, save as it has led some enthusiasts to imagine an impossible prophylaxis by forbidding the marriage of physically, mentally, or morally unhealthy persons, and in this way diminishing obstetric practice, except in illegitimate births; and it is doubtful if anything but a destructively retrogressive midwifery or an increasing prevalence of oophorectomy can materially reduce hereditary morbidity, since delicate, and especially consumptive, women seem to be more apt to conceive and less likely to miscarry than their more robust sisters. As a "glittering generality" it may be asserted that every obstetric advance which saves mothers from invalidism and children from incapacity for future effort must promote the social condition of the race; but politico-economic rules and the inexorable operation of natural laws will probably always overshadow in this respect the influence of medical science, or even of congressional legislation.