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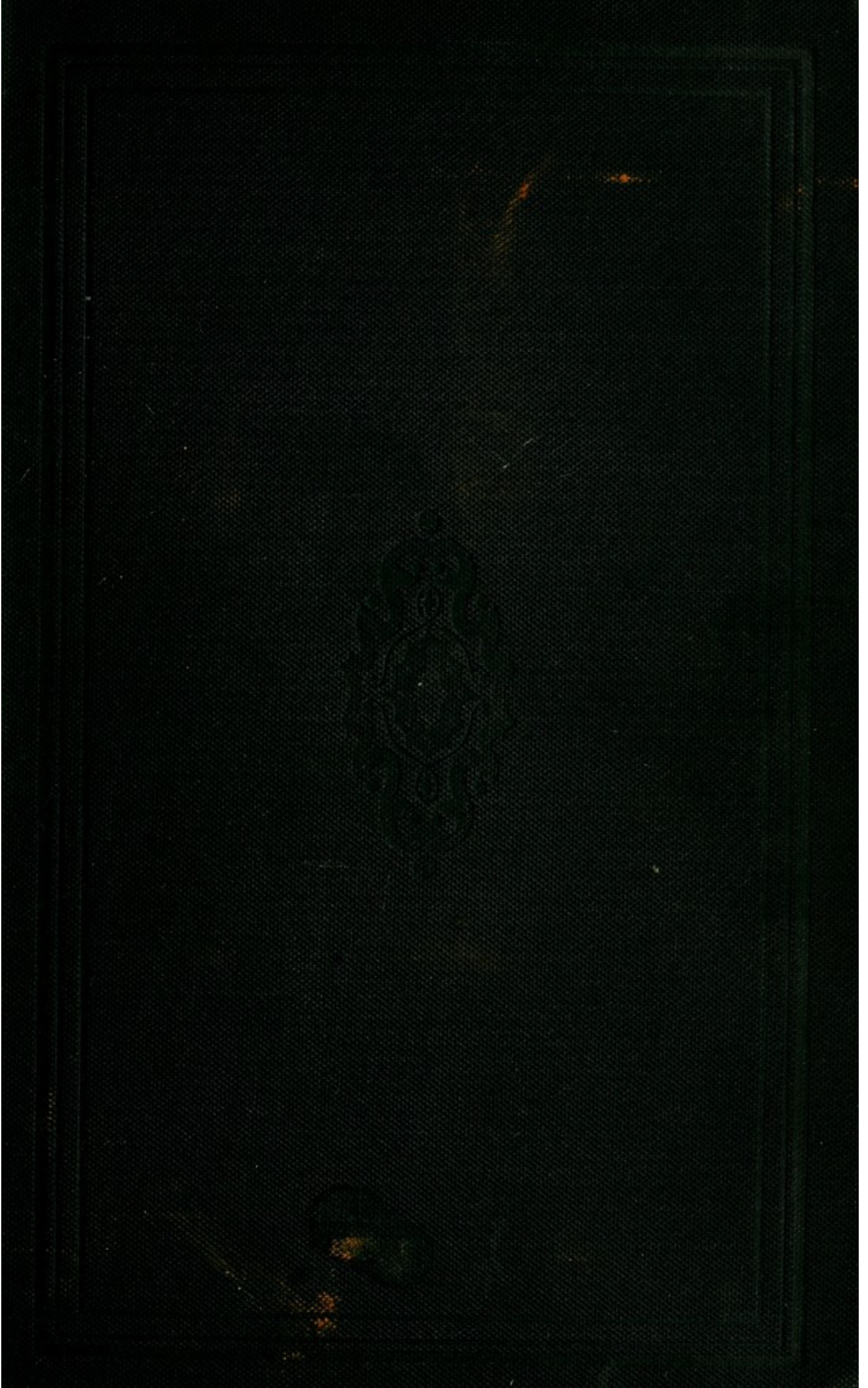
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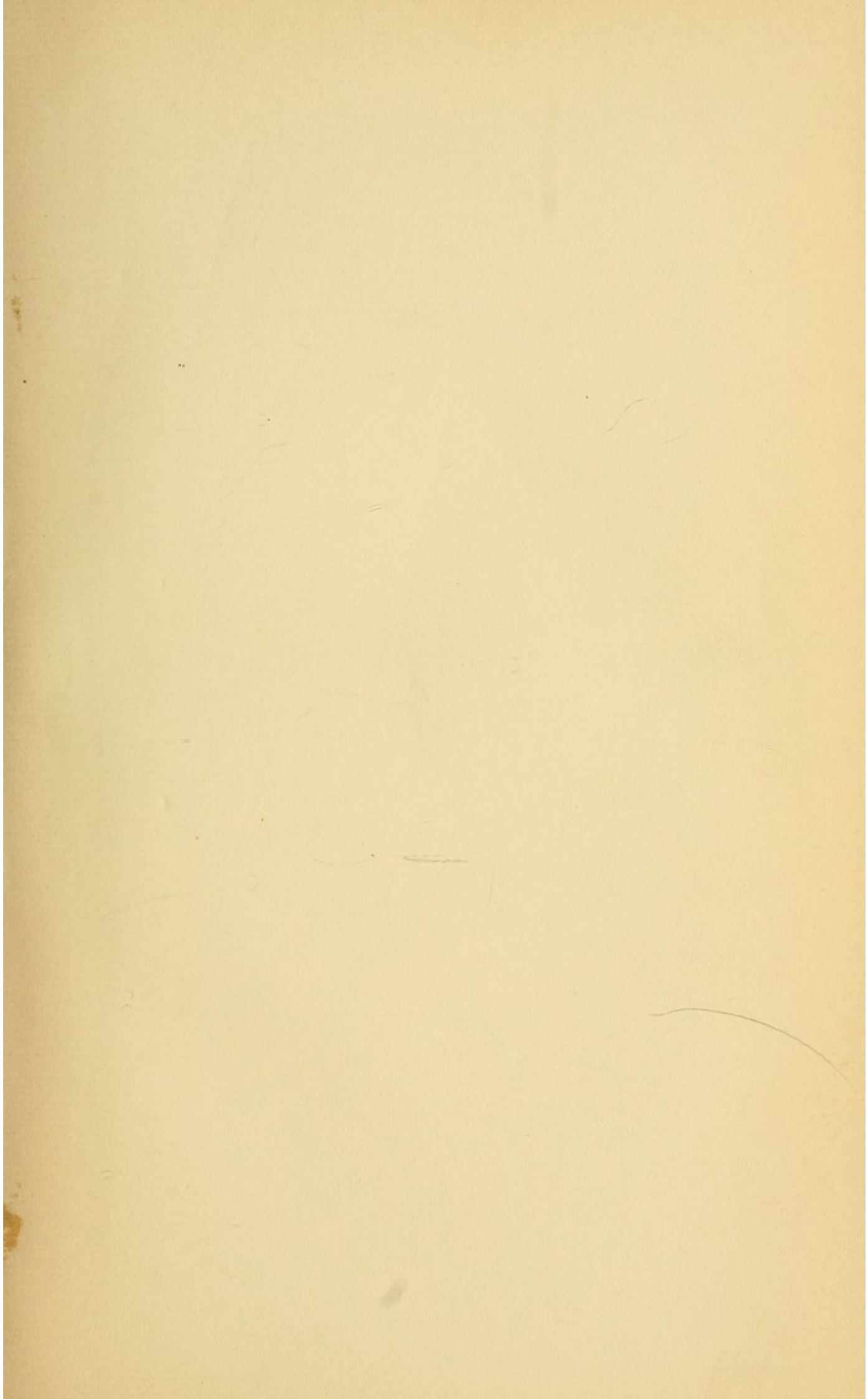
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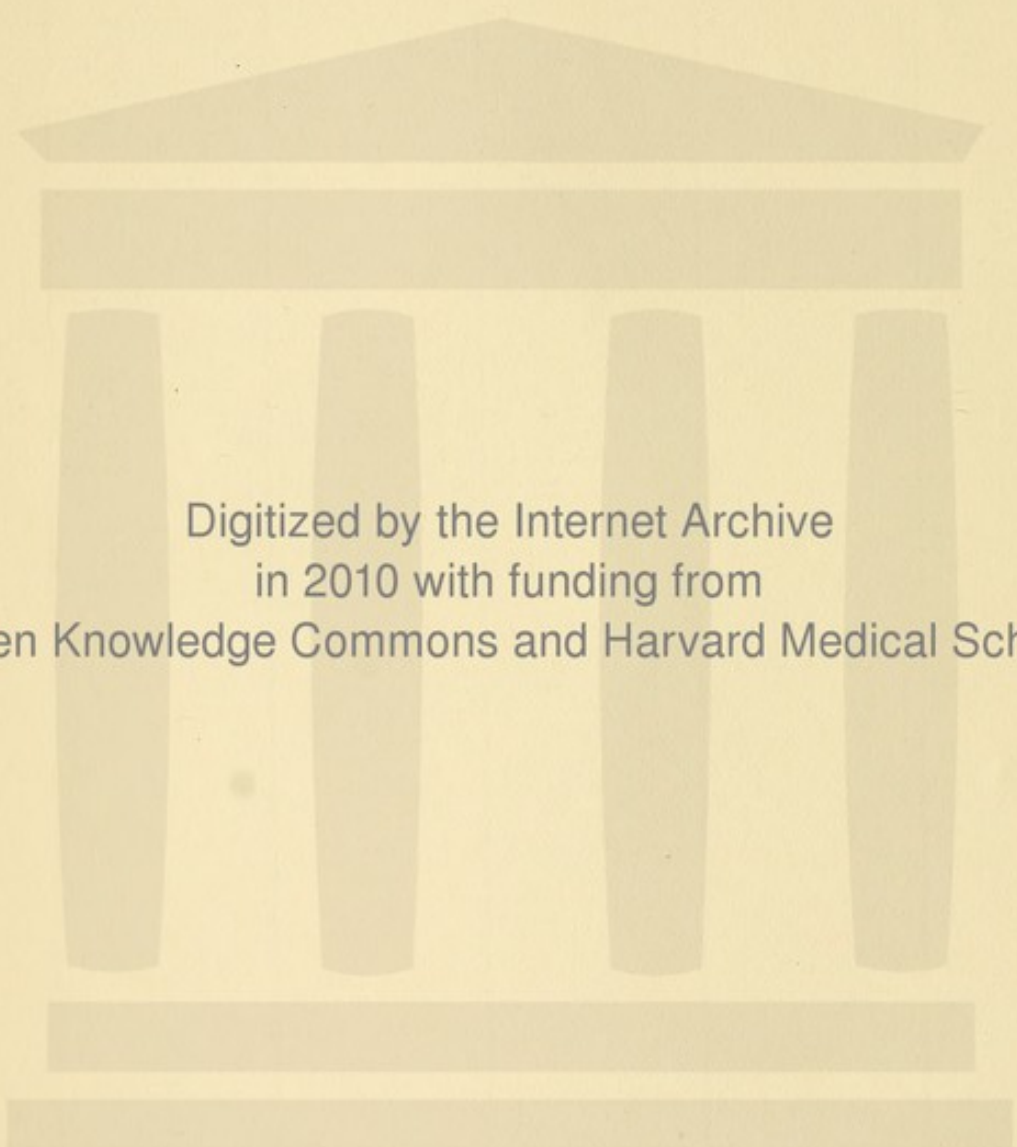
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INFANTILE MORTALITY DURING CHILD-BIRTH
AND ITS PREVENTION.

TO

The Memory of

WILLIAM FURNESS JENKS, M.D.,

WHOSE EARLY DEATH ALONE PREVENTED HIS OCCUPYING A FOREMOST

PLACE AMONG

OBSTETRICAL WRITERS,

THIS ESSAY,

HONORED BY THE SECOND AWARD OF THE

WILLIAM FURNESS JENKS MEMORIAL PRIZE,

IS PUBLISHED BY THE

TRUSTEES OF THE MEMORIAL FUND.

INFANTILE
MORTALITY DURING CHILD-BIRTH
AND ITS PREVENTION.

BY

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WILLIAM FURNESS JENKS PRIZE ESSAY OF THE COLLEGE
OF PHYSICIANS OF PHILADELPHIA.

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TO THE TRUSTEES OF THE WILLIAM FURNESS JENKS
MEMORIAL PRIZE FUND.

GENTLEMEN:—

The William Furness Jenks Prize Committee of the College of Physicians beg leave to report that the subject selected for the prize of five hundred dollars was "Infant Mortality during Labor, and its Prevention."

Six essays were received, and after critically examining them, the Committee decided that the one with the motto "Vive L'Enfant" was the best Essay presented, and, consequently, its author, A. Brothers, M.D., of New York City, is entitled to the Prize.

Respectfully submitted.

HORACE Y. EVANS.

EDWARD L. DUER.

EDWARD P. DAVIS.

PREFACE.

THE art of obstetrics has been brought to such a high scientific standard by careful and learned men of the past that it requires a certain amount of courage to intrude on this oft-trodden road without feeling that we can add something to the knowledge already possessed. Our fathers and forefathers, in this particular field of work, have been such careful and astute observers that rules laid down years ago for the management of the manifold accidents and complications occurring during child-birth are, in the main, still adhered to to-day. To be sure we have made some differences and advances in methods of treatment, especially since the sister branch of obstetrics—gynecology—was developed into its present enormous proportions. But the use of the forceps, the various modes of treating prolapsus of the cord, and the methods of changing the presenting parts, in the interests of mother or child, are not new, but have been handed down to us. It must, however, be conceded that we of the present generation have not been idle. All sorts of changes and improvements in the technique of obstetrical manœuvres, with ever-constant efforts to improve the instruments at our command, are continuously being made all over the civilized world. There is one phase of this subject in which we are distinctly in advance of our forefathers. With the limited means at their command, with the dangers of shock and septicemia to the mother constantly glaring them in the face, it was natural for them to do everything for the mother and little or nothing for the child. This superstition of the past, in which the sacrifice of the child counts for little or nothing, still has strong hold

on the community, and, probably, will continue to hold more or less sway until the art of obstetrics, combined with gynecology, shall reach such a degree of perfection that the major operations of to-day—from which the mass of practitioners involuntarily shrink—can be performed with slight or little maternal risk. If such a time ever does arrive, and there seems to be good reason to hope that it may, the sacrifice of living children by operations like craniotomy, evisceration, etc., will be buried in the gloomy depths of the past, and many a useful member of society, now doomed to death before having had an opportunity to draw a single breath, will be added to the community at large.

Since the recent results of the Cesarian section, and of the revived symphyseotomy, have assumed so favorable an aspect, we are on the threshold of a new era in the development of the obstetric art. The object of the present essay is to make a careful bird's-eye view of the entire subject without attempting to give a detailed account of everything, as required in text-books, and to point out the advances made in recent years in the interests of the unborn child previous to labor, during the critical hours of actual labor, and in the earliest period of life succeeding labor. The writer assumes this highly responsible task on the basis of a ten-years' active midwifery practice, combined with a large experience in the fields of pediatrics and every-day gynecology. As a result of this tripod foundation, he feels that his points of observation have been sufficiently comprehensive to allow him to carefully weigh the subject in both hands.

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TO HIS HONORED FRIEND AND TEACHER,

ABRAHAM JACOBI, M.D.,

THIS WORK

IS DEDICATED AS A SLIGHT TOKEN OF APPRECIATION

BY THE AUTHOR,

FOR THE MANY ACTS OF KINDNESS SHOWN HIM

FROM THE

EARLIEST PERIOD OF HIS PROFESSIONAL CAREER.

INFANTILE MORTALITY

DURING

CHILD-BIRTH, AND ITS PREVENTION.

CHAPTER I.

GENERAL REMARKS.

The Accoucheur.—The attendance during labor to-day, as in the past, falls chiefly into the hands of two classes of people—the midwife and the general practitioner. This we believe to be right, but open to improvement. It is worth while to again draw attention to this important subject, for, in every labor, two human lives are at risk. Does it not seem paradoxical and contradictory that in just this branch of medicine the greatest amount of carelessness and ignorance prevails? Who are the midwives in this country? They can be divided into three classes: 1. The old woman or neighbor who knows nothing at all, but assumes charge of the accouchement. This is of course criminal, but the offence is continuously perpetrated in a large city all the same and rarely prosecuted. 2. The midwife with a foreign diploma, who knows or pretends to know everything. These women are mischievous from the fact that, presuming to know everything, their high sense of inflated dignity prevents them from calling in medical assistance in the interests of mother or child until it is too late. 3. The third variety embraces our home product.

Who are they? Graduated from private schools founded by physicians, with strong business instincts, but little professional standing, these women, after short courses of doubtful instruction, are thrown upon a gullible and little suspecting public to ply their calling, and we, the medical profession, stand calmly by and see human lives sacrificed by the score without almost a single protest! If this condition of affairs could be improved, the greatest possible stride in advance toward preventing infantile mortality during child-birth would be accomplished at one single bound. As a recent writer says: "More lives of unfortunate women would be saved than any threatened infectious disease can destroy; hundreds of children would be among the living which now, through ignorance, pass as still-born" (Francis Foerster, *Post Graduate*, May, 1895). How can this state of affairs be improved? By following the example of European nations and establishing authorized colleges, and after that holding the graduates criminally responsible for their work. Such a state of affairs can readily be brought about by concerted action emanating from the various academies of medicine and medical societies. A proper recommendation from such bodies seriously pushed would be sufficient to get the State sufficiently interested in the matter to provide the requisite legislation.

In the profession itself the largest amount of obstetric work falls into the hands of the general practitioner. And this is only right, for the day of the pure obstetric specialist is as far in the future as it can only be. But is there no room for improvement here? The writer has met practitioners who have told him that the hours of attendance on their first cases were spent in anguish. Many of them had never attended a case of labor previous to entering upon practice. Such an attending physician is really worse than an ignorant midwife. Fortunately our colleges are taking this thing in hand and the graduated physician of to-day is, on the average, a much better prepared man than his colleague was ten years ago.

The obstetrician of the future must be thoroughly educated and trained in the branches of obstetrics, gynecology and pediatrics.

To be thoroughly versed in obstetrics without a good knowledge of gynecology will not fit a man properly for the more recent operative work taught us by this latter science in the interests of the mother and child entrusted in his charge. Similarly, but to a less degree,

is a knowledge of the branch of pediatrics—so very much neglected in medical colleges—necessary to the obstetric physician. A careful watch of the condition of the child during every labor is an essential in modern obstetrics. An approximate estimate of the size of the child, a study of its heart-sounds from time to time during the progress of labor, a consideration of possible inherited or congenital diseases, a knowledge of the thinned structure of its blood-vessels and other tissues or organs, the nature, size, and position of its cranial sutures and fontanelles—are a few of the dozens of facts, cognizant to every student of pediatrics and of great value in determining the nature of interference looking towards its safety. After labor this branch of medicine assumes great importance if we wish to save as many as possible of our newly-born, which now, often, are sacrificed by the universal neglect which this little being receives on emerging into the world. After being delivered, the majority of physicians toss the newly-born to a nurse, as though it were a mere bagatelle, and devote themselves to the mother exclusively. How many of such children are sacrificed yearly to pneumonia from a cold bath, to gastro-enteritis from improper nourishment, to sepsis from an improperly protected navel?

Besides being properly educated, the obstetrician of the “first water” must be a man of sound judgment, conservative as a rule, but capable of showing intense coolness and courage under emergencies. He must be a man of patience, but one who will not sacrifice infantile life by delay. He must be willing to leave the majority of cases to nature, but must not shrink, in case of necessity, from the thoughts of version, forceps, symphysectomy, or Cesarian section. And, although it would be manifestly exaggerated to expect every general practitioner to be prepared to perform all these operations himself, he must be sufficiently well informed to know the indications for these various methods of interference and be sufficiently at home in gynecological work to be a useful assistant instead of an obstruction.

CHAPTER II.

STATISTICS OF INFANTILE MORTALITY.

Through the courtesy of Dr. John T. Nagle, of the Bureau of Vital Statistics of New York City, I am enabled to present the following table of infantile mortality occurring in this city during the years 1889 to 1892 :

| YEAR. | TOTAL NO. OF BIRTHS. | TOTAL NO. OF STILL BIRTHS. | STILL BIRTHS AT FULL TERM. | NO. OF DEATHS AT LESS THAN FOUR WEEKS. |
|-------|----------------------|----------------------------|----------------------------|--|
| 1889 | 37525 | 3349 | 1533 | 2668 |
| 1890 | 39250 | 3315 | 1477 | 2560 |
| 1891 | 46904 | 3414 | 1514 | 2783 |
| 1892 | 49447 | 3573 | 1539 | 2814 |
| | 173,126 | 13,651 | 6,063 | 10,825 |

During four years, therefore, with 173,226 births there were 13,651 still-births at all stages of utero-gestation reported, and 6063 at full term. As cases of abortion occurring during the early months are seldom reported, these figures can safely be assumed to refer to children who have reached the viable stage of fetal existence. But, taking into consideration only those cases which have gone on to the full term, we still find the amazing ratio of one dead-born child to every 28.5 deliveries, or a mortality of nearly four per cent. This, however, does not include those children which have breathed, but have not survived the first hours, days or weeks of life. To determine the number of children which do not pass the first four weeks of life the last column of figures gives us light. While we do not claim that these deaths can be attributed to causes arising during labor, but may, in great measure, be traced to post-natal etiological factors, still the close relationship which they bear to the subject under consideration renders them worthy of some notice. Thus, if these cases be added to the still-births at term, we find that, during this period of four years, 16,888 children born at term have died within the age of one month.

This represents a proportion of one death to every 10.8 labors. That ten per cent. of our children should be lost before they have reached the age of one month is perhaps a startling fact to many, but those who have made a study of infantile mortality will readily accede to the truth of these figures. During the past year studies in this direction, but on a much larger scale, have been carried on by Julius Eröss on the Continent (*Jahrb. f. Kinder heilkunde*, 1893, xxxv. p. 9). Studying the statistics of sixteen large European cities and including no less than 1,439,056 children, he finds that ten per cent. of the children born alive die within the first four weeks of life. These results were arrived at about the same time the writer was making his investigations, so that, although working independently of each other, we have both reached almost the same conclusions. Eröss, futhermore, discovered that the largest mortality occurred on the first day of life and diminished day by day as the child grew older. Of all the children which died within four weeks after birth he attributes 54.24 per cent. of the deaths to one cause—congenital debility. As the records of our Bureau of Vital Statistics are not reliable in regard to this matter, the writer has not been able to study numerically into this etiological factor, but believes the deductions of Eröss to be fairly correct.

CHAPTER III.

MORBID ANATOMY AND ETIOLOGY.

STUDIES OF FORTY-SEVEN POST-MORTEM EXAMINATIONS.

In order to make this chapter contain as much original work as possible, the author intended to collect the records of a large number of autopsies made on newly-born children, and draw his deductions from this source instead of rehashing the material already existing in the numerous text-books on this subject. To his intense regret he found, after communicating with three large institutions devoted to the care of newly-born children, that in one of them no autopsies at all were held on these cases, and that in the other two, during the past ten years, only forty-seven post-mortems had been made. It is needless to add that this is a shameful state of affairs. One gentleman, well known as a pathologist, whose autopsies number by the hundreds, frankly wrote me that he had never made an autopsy on a still-born child. With the above explanatory apology, and in the hope that it may draw attention to this very much neglected field, the writer proceeds to append the adjoining table and, as far as possible, summarize it:

We have sub-divided the cases into three sets: (1) Still-born children; (2) Those which died within twenty-four hours; (3) Those which died within fifteen days.

In the six cases of still-birth the lungs were found atelectatic and non-aerated; extensive hemorrhages in the alveoli and intra-alveolar tissue were present in one. In the heart were found patent foramen ovale, clots in the right and left ventricles, and, in one case, the lesions of ulcerative endocarditis. The liver and kidneys of one of the children showed diffuse small-celled infiltration, with thickening of the arterial walls. In one child, after difficult instrumental delivery, was found a fracture of the left parietal bone with extravasation of blood under the scalp and congestion of the brain substance. In one difficult labor case the sutures of the skull were found after death

| No. of Case | AGE | No. of Children | PARITERATIONS | LABOR | PELVIS | CHILD | CORD | LIVED | CAUSE OF DEATH | GENERAL FACTS AND CONDITIONS FOUND AT AUTOPSY |
|-------------|-----|-----------------|---------------|------------------------------|------------|--|---------------|-------------------|--|---|
| 1 | 24 | Primipara | R. O. A. | Tedious | | Asphyxiated | | 2 days | Probably unerated lungs | Nothing unusual found at autopsy. |
| 2 | 24 | Primipara | Breeds | Normal | | Normal | | 1 day | Catarrhal pneumonia of both lungs | |
| 3 | 17 | Primipara | L. O. A. | Precipitate | | Asphyxiated | | 9 days | Congenital debility | Lungs only partially erated. Cleft palate. |
| 4 | 24 | Primipara | L. O. A. | Tedious; forceps | | Still born | | | Urterative endocarditis | |
| 5 | 22 | Primipara | L. O. A. | Tedious; forceps | | | | | Probably unerated lungs | Nothing unusual found. |
| 6 | 24 | Primipara | R. O. A. | Normal | | Asphyxiated | | 8 days | Amnionitis | Lungs slightly erated; liver deeply bile-stained; other organs anemic; ecchymoses in the skin. |
| 7 | 19 | Primipara | R. O. P. | Tedious; forceps | | | | 6 days | Asphyxia and cerebral hemorrhage | Hemorrhages at base of brain; also in the middle and posterior fossae of cranium; and in the cerebellum. |
| 8 | 24 | Primipara | L. O. A. | Tedious | | | | 2 hours | Pulmonary atelectasis | Maternal fall with uterine hemorrhage. Patent foramen ovale. |
| 9 | 24 | Primipara | R. O. A. | Tedious | | | | 10 days | Meningitis | Edema of the glands. Lungs congested. |
| 10 | 24 | Primipara | R. O. A. | | | | | 2 days | Intussusception | Slight hemorrhage in peritoneal sac. |
| 11 | 24 | Primipara | L. O. A. | | | | | 3 days | Miliary hemorrhage; jaundice | Hypostatic congestion of left lung; liver enlarged and yellowish-brown; spleen enlarged; adhesions about descending colon and inflated. |
| 12 | 24 | Primipara | L. O. R. | | | Convulsions and jaundice | | 2 days | Pneumonia; cerebral hemorrhage and meningitis | Catarrhal pneumonia; purulent meningitis; increase in liquid contents of lateral ventricles. |
| 13 | 24 | Primipara | L. O. A. | Tedious; forceps | | Asphyxiated | | 14 days | Septicemia | Abscess of right mammary gland; hyperemia of liver. |
| 14 | 24 | Primipara | L. O. A. | Tedious; forceps | | Cyanotic | | 10 days | Congenital cardiac disease | |
| 15 | 24 | Primipara | Vertex | | | Persistent vomiting | | 4 days | Imperforate anus | Death after operation. |
| 16 | 24 | Primipara | Vertex | | | | | 2 days | Peritonitis, nephritis, pneumonia | Mattling of liver, intestine and gall-bladder; cirrhotic liver; interstitial and parenchymatous nephritis; interstitial pneumonia. |
| 17 | 24 | Primipara | Vertex | | | Still-born | | | Congenital atelectasis | Anomalous clot in right and left arteries; lungs unerated. |
| 18 | 22 | Primipara | Brow | Tedious; forceps | | Still-born | | Coiled about neck | Fracture of skull; hemorrhages in lungs | Rigor mortis; fracture of left parietal bone; bloody extravasation beneath scalp; lungs unerated; brain congested; kidneys were the seat of diffuse small-celled infiltration with thickening of arterial walls. The same in liver, but to a less extent; extensive hemorrhages in the alveoli and intra-alveolar tissue of the lungs; also infiltration with leucocytes. |
| 19 | 35 | III-para | Vertex | Tedious; forceps | Contracted | Large; still-born | | 1 day | Congenital asphyxia | Hematomas of scalp; congestion of brain; rigor mortis; lungs unerated. |
| 20 | 23 | Primipara | Vertex | Tedious; version; forceps | Contracted | Large | Prolapsus | 1 day | Cerebral hemorrhage | Rigor mortis; septum imperfectly closed; hematomas of scalp; hemorrhages surrounding right kidney; extensive hemorrhage at base of brain; congestion of meninges of brain. |
| 21 | 30 | Primipara | Vertex | Tedious; forceps | Contracted | Large | | 5 days | Rupture of right kidney | Difficulty in extracting body of child; much serum and fibrin in peritoneal cavity. |
| 22 | 19 | Primipara | Vertex | Tedious | Contracted | Large; still-born | | | Cerebral hemorrhage; congenital asphyxia | Scalp wound; premature ossification of skull; brain clots; thickening and opacity of pia mater; lungs non-erated. |
| 23 | 18 | Primipara | Vertex | Tedious | | Large; still-born | | | An encephalonic monster | Cleft palate; entire absence of cerebrum and cerebellum. |
| 24 | 31 | Primipara | Vertex | Tedious; rigid on | | Large | | Few hrs | Congenital asphyxia or debility | Congestion of kidneys and liver; also of stomach and portions of small intestine; stomach distended with gas and mucus; ecchymoses in ileum and jejunum. |
| 25 | 31 | IV-para | Vertex | Tedious; forceps and version | | Large; asphyxiated; convulsions | Non-pulsating | 7 hours | Congenital atelectasis | Posterior fontanelle absent; cerebral sinuses filled with dark blood; brain congested, edematous, and soft; heart filled with dark clots; bloody extravasations in heart-substance; mucus in trachea. |
| 26 | 16 | Primipara | Vertex | | | Jaundiced | | 4 days | Imperforate rectum | Hypostatic; jaundice; secondary hemorrhages; intestinal distention. |
| 27 | 28 | III-para | Vertex | | | | | 5 days | Heart failure | Found dead in bed; lungs the seat of atelectasis, congestion, and ecchymoses; liver hyperemic and ecchymotic with beginning fatty degeneration; blood dark. |
| 28 | 19 | I-para | Vertex | | | Asphyxiated | | 5 days | Congenital atelectasis | Congestion of kidneys and liver; also of stomach and portions of small intestine; stomach distended with gas and mucus; ecchymoses in ileum and jejunum. |
| 29 | 26 | I-para | Vertex | | | Premature (8-months) | | 2 days | Prematurity; congenital atelectasis | Posterior fontanelle absent; cerebral sinuses filled with dark blood; brain congested, edematous, and soft; heart filled with dark clots; bloody extravasations in heart-substance; mucus in trachea. |
| 30 | 31 | I-para | Vertex | | | Large | | 2 days | Hydrocephalus | Abnormal amount of gas; stomach congested with granular blood in its cavity; liver and spleen enlarged; kidneys show urate infarcts; heart substance pale; lungs collapsed and pale with a few ecchymotic patches. |
| 31 | 31 | I-para | Vertex | | | Cyanotic | | 19 hours | Cerebral hemorrhage; pulmonary atelectasis | Blood coming from nose and mouth; thinning of brain-substance with over-distention of the lateral ventricles; liver, kidneys and spleen congested; lungs erated; stomach dark; intestines pale and distended with gas. |
| 32 | 17 | I-para | Vertex | Tedious | | Large | Gangrene | 3 days | Sepsis from navel | Heart normal, but filled with blood; thymus large; subperitoneal ecchymoses; atelectasis; firm, organized clot at base of cerebellum. |
| 33 | 20 | I-para | Vertex | Tedious | | Large; convulsions | | 42 hours | Intra-meningeal hemorrhage | Bloody extravasation about navel with gangrene; ecchymotic spots over surface of body; subperitoneal and subcutaneous clots; surface of brain covered by clot; brain soft; lateral ventricles filled with bloody serum; hemorrhagic effusion in perineal cavity; lungs congested; stomach contains mucus and altered blood; extravasations in intestine. |
| 34 | 21 | I-para | Vertex | Normal | | 6 pounds | | 2 1/2 hours | Congenital syphilis; pulmonary atelectasis | Hypostatic congestion of lungs. |
| 35 | 24 | I-para | Vertex | Normal | | 9 1/2 pounds | | 33 hours | Meningeal hemorrhage | Punphlysis; brain soft; blood-stained cerebro-spinal fluid; puncta vasculosa; lungs slightly erated; spleen large, dark, and firm; liver rosant and gritty. |
| 36 | 22 | I-para | Vertex | Normal | | Premature (7-months) | | 55 hours | Prematurity | Brain soft; blood in meninges; also blood (semi-solid) about meninges and cerebellum; lungs erated; liver congested; urate infarcts in kidneys. |
| 37 | 22 | I-para | Vertex | Normal | | Fairly large | | 28 hours | Meningeal hemorrhage; pulmonary atelectasis | Heart pale and small; foramen ovale, partially open; aorta curved to the right; thrombi in hypogastric arteries; kidneys showed infarctions; liver large, stomach small. |
| 38 | 20 | I-para | Vertex | Normal | | 9 1/2 pounds | | 30 hours | Cerebral hemorrhage; pulmonary atelectasis | Ecchymotic spots over skin and lungs and heart; lungs atelectatic; heart pale; liver slightly pale; brain soft and filled with liquid blood; also large clot. |
| 39 | 30 | I-para | Vertex | Normal | | | Phlegmon | 5 days | Umbilical abscess; erysipelas (general); diffuse peritonitis | Cerebellar and meningeal hemorrhage; pulmonary atelectasis and edema; mucus and serum in trachea and bronchi; clots in heart; urate infarcts. |
| 40 | 18 | I-para | Vertex | Normal | | Skin eruption | | 5 days | Erysipelas of inguinal region; diffuse peritonitis | Mother died of erysipelas. |
| 41 | 27 | I-para | Vertex | Precipitate | | Premature (7-mos.); one of twins weight 2 1/2 pounds | | 2 days | Meningeal hemorrhage; pulmonary atelectasis | Cerebro-spinal fluid blood-stained. |
| 42 | 27 | I-para | Vertex | Precipitate | | Premature (7-mos.); one of twins weight 2 1/2 pounds | | 14 hours | Prematurity; cerebral hemorrhage; pulmonary atelectasis | After 12 hours child became cyanotic. |
| 43 | 24 | I-para | Vertex | Normal | | Mate to last; weight 3-pounds | | 15 hours | Prematurity; pulmonary edema | Ventricular hemorrhage; tracheitis; small ecchymoses in serous membranes; pulmonary edema. |
| 44 | 26 | I-para | Vertex | Normal | | | | 10 days | Umbilical phlebitis; pyemia | Small ecchymoses in the serous membranes. |
| 45 | 26 | I-para | Vertex | Normal | | Premature (8-mos.); one of twins | | 4 days | Prematurity; cerebral hemorrhage; catarrhal inflammation of air-passages | 150 c. m. turbid serum in peritoneal cavity; purulent inflammation of umbilical vein and branches of the portal vein; small abscesses in liver; enlarged lymphatics; peri-epididitis. |
| 46 | 29 | I-para | Vertex | Normal | | Persistent vomiting | | 6 days | Intestinal obstruction | Trachitis, bronchitis, broncho-pneumonia, circumscribed pleuritis, catarrhal gastritis; intra-ventricular and meningeal hemorrhage; urate infarctions. |
| 47 | 23 | I-para | Vertex | Normal | | | | 10 days | Purulent parotiditis; pyemia | Duodenum passed through an aperture in the head of the pancreas and was greatly distended above; right kidney displaced in the pelvis; internal hydrocephalus; greenish material from stomach to larynx, trachea, and bronchi. |

completely ossified, and, in a forceps case, there was a scalp wound with hemorrhage beneath. Clots in the brain were present at times, and one brain showed thickening and opacity of the pia mater. In the case of an encephalous monster, as was to be expected, there was a complete absence of the cerebrum and cerebellum. In single instances exophthalmus and cleft palate were found.

In eight cases the children were born alive, but died within twenty-four hours. *In five of these there was distinct atelectasis.* Two cases showed subpleural ecchymoses, and one each presented the lesions of pulmonary œdema and catarrhal pneumonia. The heart showed partial or complete patency of the foramen ovale in two cases; contained dark, imperfectly clotted blood in two others, and, in still another case, showed bloody extravasation in the heart substance. The liver in some of the cases was congested, in others resistant or grizzly to the touch. One spleen was found to be dark, large, and firm. In one case the kidneys were congested, and hemorrhage was found surrounding a kidney in another. The stomach was congested or distended with gas and mucus. In one case the duodenum, jejunum, and ileum were markedly congested with patches of ecchymosis. Intracranial hemorrhages were present in various localities: the cerebrum, cerebellum, and ventricles. Some cases showed congestion of the brain substance and membranes, others showed narrowing or absence of fontanelles and sutures. In some the cerebral sinuses were full of dark blood, or the brain substance was congested, œdematous, and soft. One brain showed numerous punctata vasculosa, and the cerebro-spinal fluid of another was blood-stained. The peritoneum was the seat of ecchymoses in one. The skin was noted as markedly cyanotic in some, while in others were found hematmata or the eruption of pemphigus. The lesions of tracheitis were observed in one, and an enlarged thymus was noted in another.

In twenty-eight cases death occurred between one and fifteen days after birth. Even in these the lungs are distinctly stated as being the *seat of more or less atelectasis in eight*, with congestion and ecchymoses in four or five others. Particular attention is called to this matter of atelectasis and non-æration of the lung tissue to prove the statement, which we shall make in a later chapter, that it may require many days of life in feeble children before the lungs can be considered as fully ærated. Such children left to nature, after being born

asphyxiated, often die, whereas, if persistent and repeated efforts be made to get the lungs fully inflated with air, many of these little lives may be saved.

Among the other lesions in the chest were noted catarrhal and interstitial pneumonia, pulmonary œdema, beginning abscesses in the lungs, pleurisy, and hemorrhagic effusion into the pleural cavity. The heart, in some, contained blood-clots, ecchymoses in its substance, and hemorrhages in the endo- and pericardium. In some the heart-muscle was pale. In one the foramen ovale was partially open, and in another the aorta curved to the right. The liver showed various conditions. It was bile-stained and yellowish-brown, enlarged and hyperemic or cirrhotic, ecchymotic, fatty, or contained small abscesses. The gall-bladder, in one, was distended and its duct obstructed by mucus. The spleen was anæmic, or deeply congested, or enlarged and firm, or the seat of splenitis. The kidneys were anæmic, or congested, or succulent, or the seat of interstitial and parenchymatous nephritis, or of urate infarcts. In one difficult labor case the kidney was ruptured. One kidney was displaced. The stomach was anæmic, or congested, or distended with gas. In others it was small, or the seat of catarrhal gastritis, or contained blood and mucus. The intestines were anemic, or congested in parts, or the seat of bloody extravasations. They were distended with feces or gas. In two cases the children were born with imperforate anus and rectum. In one case there was intussusception. The descending colon was bound down by adhesions in one, and, in another, the duodenum passed through the head of the pancreas with consequent obstruction. The brain showed anemia, or softness, or congestion, or thinning of its substance. The meninges were inflamed or the seat of hemorrhage. The ventricles contained an excess of fluid or blood. One case showed sub-aponeurotic and sub-dural clots, while another showed ecchymoses and staining of the occipital bone. The peritoneum was the seat of acute diffuse peritonitis with serum and fibrin in the abdominal cavity in several cases. In one there was matting of the liver, intestines and gall-bladder. The skin was ecchymotic in four cases, jaundiced in three cases, and, in single cases, the seat of pemphigus, erysipelas, and umbilical abscess. Among the rarer findings might be mentioned cleft palate, œdema of the glottis, abscess of the mammary gland, hypospadias, blood particularly dark colored, bloody

liquid in the uterine cavity, bloody oozing from the nose and mouth, thrombi in the hypogastric arteries, blood-stained serum and mucus in the trachea and bronchi, purulent inflammation of the umbilical vein and branches of the portal vein, and general enlargement of the lymphatic glands.

In endeavoring to trace the relationship between the nature of the labor and the post-mortem findings the writer defers from making sweeping deductions because of the paucity of the material at his disposal. A number of interesting facts, however, are easily discovered. The large number of hemorrhages present within the cranium and in the various organs of the chest and abdomen again emphasizes the fact that the blood-vessels of the fully-developed child are very delicate and cannot be roughly handled with impunity. The occurrence of fractures of the various bony parts reminds us of the natural fragility of these structures.

That fractures and impressions of the child's skull caused by labor are by no means rare is proved by the fact that Rosinski (*Ztschr. f. Gebtsh. u. Gynäk.*, 1893, xxvi. 255) was able to collect no less than forty-four cases in which sixteen children were born alive. Many of these children naturally die, although, if no other complications are present, such children may grow up. The older methods of treatment by suction and trephining were followed by such dismal results that they have been practically abandoned. In very recent times, however, a successful case of trephining and raising the depressed bones in a newly-born child after the use of forceps has been reported in this country by Irving W. Smith (*N. Y. Journ. of Obst.*, May, 1893, p. 712). The frequent occurrence of meningitis pleuritis and peritonitis recalls how easily prone the serous-membranes are to undergo inflammatory changes in the fetus as well as later in life. The occurrence of organic changes in the heart, lungs, liver, kidneys, spleen, stomach and intestines lays stress on the importance of keeping these organs in view. The possibility of ruptures and displacements of such organs as the liver, spleen and kidneys must be borne in mind. Taken all in all, we must remember, during the progress of labor, that the ensemble of a child about to be born consists of a mass of delicate organs and tissues, and that any unnecessarily rough handling may be followed by the loss of a human life.

For fuller details and the relation of the labor to the pathological

conditions found in the individual cases, the reader is referred to the histories in detail. Suffice it here to state that the majority of cases of death were due to difficulty in delivery due to obstructions arising from the mother or child. As this is a small selected series of cases, too much stress must not be allowed this fact, for we know that one of the most important causes of infantile death is due to prematurity or congenital debility of the child without regard to the nature of the labor. Still, if the art of obstetrics can be so perfected as to overcome the obstructions caused by mother or child during labor, a great many lives of children may be saved in the future which are now sacrificed.

CHAPTER IV.

CAUSES OF INFANTILE MORTALITY.

In studying the etiology of our subject the writer* again availed himself of the records of the Bureau of Vital Statistics. The causes of death in two hundred and one cases of still-birth at term were noted. As in the majority of these cases no autopsies were held, the conclusions are only approximately true. The same might be said of the ninety-nine children which were born alive, but died after a period of time ranging between a half hour and five days.

CAUSES OF DEATH IN TWO HUNDRED AND ONE STILL-BIRTHS AT TERM.

| CAUSE OF DEATH. | ALONE. | COMPLICATED. |
|--|--------|--------------|
| Asphyxia Neonatorum | 16 | 17 |
| Protracted Labor | 31 | 36 |
| Precipitate Labor | 1 | 1 |
| Malpositions | 27 | 30 |
| Maternal Diseases, Abnormalities, Deformities or Accidents . | 23 | 24 |
| Fetal Abnormalities | 15 | 15 |
| Abnormalities of Placenta and Membranes | 10 | 10 |
| Abnormalities of Cord | 31 | 53 |
| Artificial Delivery | 13 | 15 |
| | 167 | 201 |

As death was rarely due to a single cause, the second column really more nearly represents the truth. Thus a case of artificial delivery as a rule would presuppose a protracted labor, a possible malposition, and a condition of asphyxia. Still the writer has tabulated the causes as they were given. As protracted labor and asphyxia really go hand in hand, we find that, in the two hundred and one cases, fifty-three or twenty-six per cent. of all the still-births at term were due to this combination. An equally potent factor in causing still-births lies in the umbilical cord-prolapsus, coiling or knotting. Here compression of the cord cost the life of fifty-three children among the two hundred and

* With the kind assistance of Dr. M. Silverman.

one, or again twenty-six per cent. The malpositions included breech, transverse and brow presentations in the order of frequency. Maternal abnormalities included deformities of the pelvis, diseases or accidents. The fetal abnormalities embraced variations from the normal in size and number, diseased states—such as hydrocephalus or spina bifida—and one case of fracture of the fetal skull. The abnormalities of placenta and membranes were represented by placenta previa, degenerations of the placenta and hydramnion. The artificial deliveries referred to forceps, version and craniotomy. As the cases of transverse presentations properly belong to the list of artificial deliveries, we find that in thirteen per cent. of the cases where such interference was necessary the children were born dead.

CAUSES OF DEATH IN NINETY-NINE CHILDREN BORN ALIVE, BUT DYING
WITHIN FIVE DAYS.

| CAUSE OF DEATH. | NO. OF CASES. | COMPLICATIONS. | LIVED. |
|-------------------------------|---------------|---|-------------------------------|
| Prematurity | 43 | Atelectasis Placenta Previa Cyanosis Cerebral Hemorrhage Pulmonary Edema Maternal Injury | } $\frac{1}{2}$ hr. to 5 dys. |
| Protracted Labor and Asphyxia | 18 | Convulsions Forceps Delivery Deformed Pelvis Breech | |
| Congenital Feebleness | 17 | Convulsions Convulsions Maternal Phthisis Atelectasis | } 1 hr. to 5 dys. |
| Convulsive Disorders | 7 | | |
| Various Causes | 14 | | $\frac{1}{2}$ hr. to 5 dys. |

In this list, if we combine the children which were born alive, but died from prematurity and congenital feebleness, we find the startling number of sixty, or more than one-half. As stated before, Eröss, in investigating a much larger number of cases in European cities, reached almost an identical result, for he found that 54.24 per cent. of deaths occurring in children under four weeks were due to congenital debility, including prematurity. The fact that nearly eighteen per cent. of the children resuscitated after asphyxia, died within three days, again emphasizes the fact of the dangers of this state and the necessity of making sure that the obstacles to the respiration have

been permanently overcome, and of persevering in our efforts, at intervals during the first days of life, where there is any doubt regarding the matter. Convulsive disorders carried off at least seven per cent. of the children. As this usually represents hemorrhages in the cranial cavity, the necessity of care becomes all the more apparent in handling the fetal skull. The various other causes, grouped together, included solitary instances of bronchitis, jaundice, abnormalities of the urinary tract, paralysis of the throat, entero-colitis, patent foramen ovale, hydrocephalus, tetanus neonatorum, hernia cerebri, hemophilia, umbilical hemorrhage, imperforate anus, and syphilis.

CHAPTER V.

INFANTILE MORTALITY DUE TO MATERNAL CAUSES.

a. PRECEDING LABOR.

Although this essay is chiefly concerned with infantile mortality occurring during labor, it may be interesting to rapidly pass in review the large number of causes which usually sacrifice the lives of tens of thousands of immature children. Febrile affections, excessive anemia, nerve irritability, and strong mental emotions; all frequently result in abortion or premature delivery. Various conditions emanating from the uterus directly, rigidity of its walls from fibroma or carcinoma, old peritoneal adhesions, old pelvic cellulitis, may produce the same result. Hyperemia of the gravid uterus, leading to rupture of the blood-vessels and premature expulsion of the ovum or fetus, may result from inflammatory affections of this organ and adnexa; excessive coitus, valvular lesions of the heart, pulmonary and hepatic obstructions to the circulation, and the various acts of vomiting, coughing and straining, or jolting of these parts arising from railway journeys, or violent exercise, may all be followed by the same result. Similarly, disease of the fetal appendages (umbilical cord, chorion, amnion, and placenta) and of the decidua, due to hypertrophy or atrophy of the uterine mucosa, may induce the same termination.

Without entering into further details regarding the subject of abortion, for it is beyond the scope of the present subject-matter, we pass on to the consideration of those conditions which emanate from the mother, and result in the destruction of the viable child. And, in discussing these conditions, the writer wishes expressly to state that minute details, especially regarding pathology, symptomatology, and diagnosis, will be only lightly alluded to, as they are fully elucidated in all text-books. On the other hand, everything in the interest of the infant, prognosis, treatment (actual and preventive), will receive as full attention as the author is able to give it. As the experience of one individual, no matter how great, can never do full credit to such

an extensive subject, the writer has not hesitated to draw upon recent literature, especially that of the last four or five years, to give us the latest phases of treatment looking toward the welfare of the unborn or newly-born child.

Previous to labor the death of the living child may be due: (1) To the death of the mother herself; (2) To constitutional diseases (syphilis, tuberculosis, malaria); (3) To organic diseases (as of the heart or kidneys); (4) To acute diseases (as typhoid fever, pneumonia, cholera, and septicemia); (5) To chronic disorders of the chest; (6) To diabetes, icterus, chorea, and poisoning in lead and tobacco workers; (7) To hyperemesis and to maternal shocks or injuries; (8) To extra-uterine pregnancy; (9) To uterine diseases (endometritis); and (10) To placental derangements (such as inflammation, syphilitic degeneration, placental separation with antepartum hemorrhage, and placenta previa). We will now consider these conditions more in detail.

1. MATERNAL DEATH BEFORE THE ONSET OF LABOR.

The fact that the mother has died does not justify us in sacrificing the life of the unborn babe. This principle has been recognized from time immemorial, and, in ancient times, certain nations made it obligatory to remove the living child from the womb of the dead mother. This was the origin of the Cæsarian section. There has always been a feeling of repugnance in the physician and laity at large to mutilate the body of a woman just expired; but we must look conditions squarely in the face and, if we wish to lower our rates of infantile mortality, every condition must be taken into consideration. The statistics gathered of this operation are uniformly bad. According to Playfair, Schwartz has collected 107 cases without a living child; and Duer collected fifty-five cases, of which forty-four were extracted alive, but ultimately succumbed. Charpentier refers to the statistics of Heymann and Lange, in which, of 331 operations, only six or seven children were saved, and thirteen lived but a few hours. Joseph Bäcker (*Centrbl. f. Gyn.*, 1894, No. 24, p. 569) recently reports the extraction and ultimate success with a living child, extracted after the mother had died of chronic atrophy of the heart with chronic pulmonary œdema; and refers to a second case, extracted dead at the same clinic, in a mother just dead from purulent meningitis. He also refers to the more favorable statistics of Pusch, in which forty-three living children were ex-

tracted in 453 operations. V. Hecker saved a child after post-mortem Cesarean section (*Arch. f. Gyn.*, 1876, p. 537). Pinard and Varnier report post-mortem Cesarean section in an eclamptic primipara, and also another case at eight-and-a-half months (*Études d' Anat., obst. norm. et path.*, Paris, 1892, p. 57). Gener extracted a living child recently under similar circumstances (*Cent. f. Gyn.*, 1894, xlii., 1050). In this country the operation has not been done often, although O'Callaghan (*Med. Rec.*, 1891, xxxix., 513) recently operated a dead woman, but without success. The great obstacle to the success of this procedure depends on our inability to locate the exact moment of death, and to operate on a dying woman would be practically hastening maternal death. Breslau (quoted by Charpentier) has arrived at the following conclusions from experiments on animals :

1. The fetus survives the mother in cases of sudden death—as from hemorrhage, asphyxia, apoplexy, etc.

2. The human fetus survives sudden maternal death longer than the animal fetus.

3. There is little chance of saving the child if the operation is deferred longer than fifteen or twenty minutes after maternal death.

4. In death from essential fevers we cannot hope to save the infant; the same is true of deaths from poisons, excepting chloroform.

The operation, then, is indicated in cases of maternal death from pulmonary and cardiac affections, and cerebral embolism previous to the onset of labor. During labor, maternal death previous to dilatation of the cervix, from hemorrhage, exhaustion, eclampsia, or rupture of the uterus, offers the indication for opening the abdomen and removing the child. (Lusk.)

2. CONSTITUTIONAL DISEASES OF THE MOTHER.

These embrace chiefly syphilis, tuberculosis, and malaria. Of these, by far the most important is maternal syphilis. *Syphilis* may result in the premature death and expulsion of the fetus by directly vitiating fetal nutrition. Or a form of fever—called by Lusk “Syphilitic fever”—may be induced, and destroy the child. Or the placenta may undergo degenerative inflammatory changes in the tunica intima of the blood-vessels, or granular degeneration of the placental villi with obliteration of the blood-vessels; or changes may occur, such as described by Frankel, and designated as endometritis placentaris gum-

mosa and endometritis decidualis. The fetus then dies from lack of adequate nutrition.

The prognosis to the child is serious. Of 657 syphilitic females, according to Charpentier, 231 miscarried, while 426 were delivered at term of living or dead children. The fact that children are born alive does not guarantee them free from the disease, for, as is well known, many of these children may develop the characteristic symptoms of the disease several weeks or months after birth and either perish or survive. The writer would like to point out a fact not usually mentioned by authors. As has been pointed out by Fournier, latent syphilis may result in abortion. But the author has had the experience in a number of women whose husbands had latent syphilis—that is, no outward manifestations of a formerly acquired syphilis were evident, and the mothers showed no evidence of the disease—that, although the children were felt to the last moment and the labors were fairly easy, such children were frequently born dead and no amount of effort could succeed in resuscitating them. The author is inclined to explain this phenomenon by the fact of congenital weakness of the fetal heart from the inherited disease, so that these children have not sufficient vitality to resist the ordeal of an ordinary labor.

Syphilis may be acquired before conception. This predisposes most to abortion. Hence the necessity of early, thorough and protracted anti-syphilitic treatment by means of mercury and iodide of potassium after the manner acknowledged by all authorities in modern times. Syphilis may be acquired simultaneously at the moment of conception. Here, again, abortion or premature delivery is the rule. Hence vigorous treatment must again be resorted to, although the result is doubtful. The woman may contract syphilis only after the fourth or fifth month of pregnancy. In these cases delivery is often premature, but treatment offers better prospects. Where syphilis is acquired at the termination of pregnancy there is usually no danger to the child, and treatment is then instituted in the interests of the mother. The fact of syphilis affecting the ovum without affecting the mother has been questioned by many, but we believe the occurrence possible, although it interferes with instituting timely treatment. In all instances where the male has been recently infected with syphilis and the wife has shortly afterwards conceived—whether she present symptoms or not—both ought to be put under a thorough and pro-

longed course of anti-syphilitic treatment. Again, where a woman repeatedly aborts or gives birth to dead children, we agree with Fournier in regarding the parents as probable subjects of latent syphilis, and during the entire course of pregnancy would persist in the use of the same treatment. This eminent authority and others have had successful results by following out this plan, and as the treatment is eminently tonic in character, no harm can accrue from its use. The writer similarly knows of several instances where women have repeatedly aborted four to six times, and then, after a thorough course of treatment, have given birth to healthy children.

Tuberculosis.—Lusk says that the advanced stages of phthisis prevent conception, but in two women whom the author attended in labor, who were suffering from advanced pulmonary phthisis with cavities, one of them gave birth to a decomposed fetus at the end of the seventh month, and the other was delivered at term of a small puny baby which died within a short time. Children born of such mothers are generally feeble. They are said to become first scrofulous and then tuberculous. Ortega (Charpentier) observed 95 tuberculous women in 185 pregnancies; 95 went to term, and 37 ended in miscarriage or premature delivery. How far the offspring of mothers suffering from mild or incipient phthisis are affected has not been determined; although it is claimed that pregnancy hastens its development and progress; but it is quite likely that such children inherit a soil upon which the tubercular process may readily engraft itself in later life.

Malaria.—This disorder has been accused of producing many miscarriages and premature births. According to Göth (*Ztsch. f. Gebtsh. u. Gyn.*, vi., 17), in 46 cases, 19 terminated either in abortion or miscarriage. Some authors claim that the fetus in utero may be attacked by the disease. This has been proved at autopsies by enlarged spleens and malarial pigment granules in the blood and skin of children dying before or immediately after birth. (Max Runge Volkmann's *Samml.*, No. 174, p. 10.) The author knows positively of one lady, subject to chronic malaria, who developed an irregular continuous fever, interrupted by occasional chills, and resulting in premature deliveries on two occasions at seven months. This lady later gave birth to two healthy living children at term. As the malarial cachexia antedated marriage and no other condition was present to account for the

premature births or the fever, the diagnosis was safely made by exclusion.

The treatment of this condition consists in the free exhibition of quinine, and, although many are opposed to the use of this drug on account of its well-known oxytocic qualities, certain authors (Grandin) urge its free use and deny any influence in interrupting pregnancy.

3. ORGANIC DISEASE OF HEART OR KIDNEY.

Organic disease of the heart or kidneys may be responsible for the premature death of the fetus in utero.

Cardiac Diseases.—It is wonderful at times to see how many children a woman with advanced cardiac disease can bear to term and then nurse. The author has had a number of such experiences. One woman with a very pronounced mitral insufficiency and hypertrophy of the heart has successfully given birth to five children, although the author suffered great anxiety for her life with the first. Another lady, who was forbidden marriage on account of advanced heart-disease, successfully gave birth to four living children before compensatory hypertrophy ceased and carried her off. The result to the child is not always, however, so fortunate. One lady, who had given birth to a living child at term, was so affected by the inability of her heart to do increased work, that she was taken with pains during the eighth month, and had to undergo a very difficult labor before she could be delivered of a child which had been dead for some time. The mother herself succumbed twenty-four hours later.

Cardiac disorder is apt to show itself in an acute form during pregnancy as ulcerative endocarditis, which is, of course, fatal to both mother and child. One case of acute ulcerative endocarditis in a still-born child will be found referred to in my list of autopsies, but unfortunately no details regarding the mother were to be had. The chronic forms during pregnancy result in augmented arterial pressure, owing to utero-placental circulation, or to pressure of the uterus on the aorta, or to the plethora of pregnancy, with limitations of the intra-thoracic space by the pressing up of the diaphragm. According to Charpentier, premature delivery and abortion, and the death of the fetus, occur either directly on account of the mother's affection or in consequence of changes in the placenta. Statistics quoted by Charpentier show twenty-one miscarriages among forty-one women with heart

disease of which five were delivered at six months and thirty-seven of the children born alive died before reaching five years. Among 220 cases collected by Courrejol and Porak, 128 only were delivered at term (Charpentier).

The moral learned is that women with advanced heart disease must either not marry or avoid pregnancy in the interests not only of themselves, but of their offspring.

Nephritis, Albuminuria, Eclampsia.—Owing to the unsettled condition of our pathological knowledge we prefer to consider these allied states in one group. Although the uremic or eclamptic state may only develop during or after labor, it may likewise manifest its existence previous to full term at the beginning of labor. Thus, in one case of eclampsia which the writer saw with several other physicians, the convulsions rapidly passing into coma developed during the seventh month of pregnancy. After bi-manual version the mother rapidly emerged and became well; but the child died shortly afterwards of congenital debility. The writer very recently resorted to accouchement forcé in a similar case, but lost the child.

In 52,000 births, Lohlein (*N. Y. Med. Wochensch.* vi., 1894, p. 230) found 325 cases of eclampsia. In 177, or 71 per cent., operative interference was required to deliver the child. Bitter reports 455 cases of eclampsia, of which 30 per cent. terminated prematurely and 26.9 per cent. of the viable children were born alive (*Arch. f. Gynäk.* 1893, p. 165). In 50 cases of eclampsia, Gener reports 16 still-births (*Cent. f. Gyn.*, 1894, xlii., 1050). Although the prognosis as to the mother is bad (14 per cent. mortality), that to the child is worse. According to Lusk fully one-half of the children are born dead. This is probably due, as pointed out by this writer, to the accumulation of carbonic acid gas in the blood of the mother resulting in asphyxia of the unborn child. As this result depends on the number and duration of the attacks, it is evident that the danger to the child is greatly diminished if the eclamptic state only develops at the end of the first stage of labor when it is possible to resort to rapid extraction.

Hoffmeier (Charpentier) has made a careful study of eclampsia alone or occurring in connection with nephritis. In thirty-three cases of nephritis, complicating eclampsia, twenty children were born dead and fifteen were born alive. In 104 cases of nephritis alone sixty-two children were born dead and forty-six living. So that in the total of

137 cases, eighty-two of the children were born dead and sixty-one living. Charpentier (*Arch. de Tocolog.*, 1893, p. 509, or *Am. J. Med. Sc.*, Feby., 1894, p. 222) has recently collected 454 cases of eclampsia and found that 162, or 36.12 per cent., died before or during labor. Depaul found that, in the great majority of cases, women attacked with epileptiform convulsions were confined prematurely. Hall Davis in thirty-six cases found ten still-births (Playfair). In 748 cases of eclampsia collected from various sources, 399 of the children died. The causes of infantile mortality in this disease are attributed by Charpentier to the convulsions directly—for, as claimed by Cazeaux, the convulsions may attack the child in utero—to blood disturbances, to asphyxia, to apoplexy in the brain or cord, to blood poisoning, to peritonitis, to arrest of circulation in the placental blood-vessels, to uremia and to hyperpyrexia.

The prognosis then to the child is pretty bad. Regarding treatment authors are divided. Some favor diuretics, purgatives, venesection and measures of this type (Playfair); others advise the use of large doses of morphine (Lohlein) which are claimed not to be dangerous to the children. Charpentier advises venesection, chloral, forceps, etc., and warns against interference until the parts are dilated or dilatable. Once convulsions have set in, it seems that there can be no question—certainly regarding the interests of the child, and, with good reason, in the interests of the mother also—that the sooner the uterus is emptied and the maternal circulation relieved, the better for both. The writer makes this statement advisedly, knowing that certain authorities claim that it is better not to force matters at such a crisis. Although it has been the sad experience of the writer to lose the mother in a case of eclampsia which only developed several days after delivery, still he is firmly convinced, from experience in a number of other cases, that the rapid emptying of the uterus where spontaneous delivery seemed too distant—by accouchement forcé, version or forceps—has been followed by an immediate relief of the threatening or actual convulsions, and a number of infantile lives were saved which unquestionably would have been lost by temporizing. Therefore, although it is our duty as physicians to concern ourselves primarily with the safety of the mother, we are justified in the presence of this disease to act from a double standpoint by which we make every effort to save the child as well as the

mother. At the Leipsic clinic these principles are followed out thus (B. Krögnig-Cent. f. Gyn., No. xvi, p. 375): Narcotics are only used during actual operations; accouchement forcé is resorted to with the object of hastening delivery; venesection is used for threatening pulmonary œdema.

CHAPTER VI.

MATERNAL CAUSES PRECEDING LABOR—(CONTINUED.)

4. ACUTE DISEASES.

Typhoid, Typhus or Relapsing Fevers.—The mother may suffer from a variety of acute diseases which may terminate in the death of the child previous to birth. Among the chief of these are typhoid, typhus or relapsing fevers. These fevers usually complicate the earlier months of pregnancy (Monatsch. f. Gebtsk., xxxii., 1867, p. 253). Of three hundred and twenty-two cases of typhoid fever occurring during pregnancy, one hundred and eighty-two ended in abortion or premature birth (Charpentier); so that these fevers have a very decided influence in terminating pregnancy prematurely and causing the loss of the child. All writers are agreed that the large infantile mortality is due to hyperpyrexia. Of course the preventive treatment looking toward the safety of the child depends entirely on the treatment of the mother. This is true of all acute or chronic diseases previous to the onset of labor and will not be further entered upon in this essay.

Pneumonia.—The author has seen a number of cases of pneumonia occurring during pregnancy at about the seventh or eighth month. Two cases miscarried at this time resulting in the death of the child, but the amelioration in the condition of the mother was wonderful. In another case, however, the mother miscarried, but eventually died. The life of the child is very much compromised in this disease. Charpentier refers to twenty-eight cases in which the disease developed before the 180th day and terminated in eleven miscarriages. In fifteen cases occurring after the 180th day there were ten premature births. This means that pneumonia during pregnancy causes the premature expulsion of the ovum or child in one-half the cases—a mortality of 50 per cent. According to Speigelberg the death of the fetus is caused by deficient oxygenation of the maternal blood, by placental anemia due to inadequate supply of blood to the left heart, and by the abnormally elevated maternal temperature.

Cholera.—We have been fortunate in recent years to avoid an

epidemic of this disease. According to the researches of Bouchet and Hennig, abortion, in those who survived the disease, occurred in more than one-half the cases during pregnancy. In one hundred and twenty-three cases collected there were seventy-one miscarriages (Charpentier). Lusk says that pregnant women are most prone to this disease in the latter months of pregnancy. The prognosis to children born before the ninth month is almost necessarily fatal.

The fetal pulse has been observed to become feeble and intermittent in this disease. (Hüter, *Monatsch. f. Gebtsk.* xviii., 1862, p. 23.)

Granular degeneration of the fetal placenta and almost complete degeneration of the epithelium covering the villi are said to be active in causing the death of the fetus (Slavjansky-*Arch. f. Gyn.* iv., 1872, p. 293).

Septicemia, occurring prior to the beginning of labor, has been the cause not only of the death of the fetus in utero, but of the mother also after delivery in two cases known to the writer. In one of these cases gangrenous endometritis was present as the underlying cause. Still Loviot recently reports a living child in a case of pre-natal septicemia (*Bull. et Mém. Soc. obst. et gynéc. de Paris*, 1892, p. 12).

Contagious Diseases.—The various contagious diseases, such as variola, scarlatina, rubeola, and erysipelas, may occur during pregnancy and may be responsible for fetal death previous to the time of normal labor. In small-pox of the confluent variety abortion is almost invariably the rule. The child may die previous to birth, or succumb shortly after birth, or be born with the pustules characteristic of this disease. During epidemics all pregnant women should be vaccinated.

Scarlatina during pregnancy is a very rare disease—only seven cases being collected by Olshausen (*Arch. f. Gynäk.* ix., 1876, p. 169). It terminates in abortion or miscarriage in every case (Charpentier).

In fifteen cases of **Measles** occurring during pregnancy there were eight premature births (Bourgeois—Charpentier). It is said to tend to produce metrorrhagia fatal to mother and child (Lusk).

Erysipelas occurring during pregnancy very frequently interrupts this state and terminates in abortion or miscarriage. There are cases on record in which the disease seems to have been carried from the mother to the fetus in utero. (Kaltenbach, *Centralbl. f. Gynäk.*, 1884, No. 44; Lebedeff, *Ztschr. f. Gebtsk. u. Gynäk.*, 1886, xii., p. 321.)

5. CHRONIC DISORDERS OF THE CHEST.

We have elsewhere considered such chronic diseases as syphilis, tuberculosis, malaria, and organic diseases of the heart and kidneys. There are a number of other diseases, however, which deserve a short notice.

Emphysema, Chronic Pleurisy, Chronic Bronchitis and Empyema, deserve a word in passing, because, in the pregnant state, they may cause sufficient disturbance to end prematurely the existence of the unborn child. They are occasional accidental complications of pregnancy, which, according to some authors, may, in the interest of the mother, at times justify the induction of premature labor.

6. DIABETES, ICTERUS, CHOREA, AND POISONING IN LEAD AND TOBACCO WORKERS.

Diabetes complicating pregnancy is a rare condition and few cases are on record (Matthews, Duncan, *Obst. Trans.*, xxiv., p. 256). Hydramnion is frequently present, and, in one case, sugar was detected in the fluid accumulation. In seven out of nineteen pregnancies the child died after reaching a viable age. In two others the child was feeble at birth and died a few hours later. In one case the child was diabetic, so that, taken all in all, the diabetic condition offers a serious prognosis for the child in utero.

Icterus during pregnancy may sometimes occur in epidemics or may precede acute yellow atrophy of the liver, or may be met with in connection with phosphorus poisoning. In epidemic form forty-two out of sixty-eight women miscarried (Charpentier). Davidson (*Monatsch. f. Gebtsk.*, xxx., 1867, p. 465) attributes the fatal influence during pregnancy to impairment of the renal excretory functions, the hydremia of pregnancy, and the impairment of cardiac activity. Icterus often produces abortion by destroying the life of the fetus, as proved by the intense icterus of the dead fetus, biliary acids in its blood, and the exclusion of other causes (Schroeder).

Chorea.—According to Goodell (*Am. J. of Obst.*, viii., p. 168) chorea exercises a baneful influence on the child in utero, in that one-half of the pregnancies are terminated prematurely. In fifty-seven cases of Barnes nineteen terminated in abortion or premature delivery.

Even where the life of the child is not sacrificed it may become affected with the disease.

Lead and Tobacco Workers.—In pregnant women working at lead Constantin Paul (Charpentier) states that seventy-three children were born dead in one hundred and twenty-three pregnancies. In tobacco workers, of which we have many in this country, miscarriages are very frequent, and the children born alive are short-lived. Jacquement noted forty-five cases of abortion and premature delivery among one hundred women working at tobacco, and fifteen died shortly after birth. Of those children born alive fully one-quarter died during the first year. (Kostial—Charpentier.)

7. HYPEREMESIS, AND MATERNAL SHOCKS AND INJURIES.

Hyperemesis.—This is recognized as a very serious complication of pregnancy at times. Although, in the vast majority of cases, vomiting is regarded as a normal concomitant of the pregnant state, this symptom may, at times, become so alarming as not only to jeopardize the life of the child by the straining efforts, but also that of the mother. It becomes important in the interests of the child to check the symptoms, if excessive, by the various means at our disposal. Careful dieting, assisted by the use of drugs, will, in the majority of cases, keep this distressing symptom under control. Where the life of the mother becomes endangered it is considered justifiable to risk the interruption of the pregnancy by dilating the os (Wylie's method), or of actually inducing abortion or premature delivery by cleaning out the uterine cavity. As this means the death of the child, we, as physicians, must use every available means at our command before resorting to this extreme measure.

Maternal Shocks or Injuries are responsible for many abortions, premature deliveries, and still-births. Of one hundred and sixty-seven still-births at term the writer found six attributable directly to maternal shocks or injuries. In the earlier months pregnancy is much more easily interrupted, and it is no exaggeration to claim that a very large proportion of the miscarriages and premature births which the busy practitioner meets with each year are directly traceable to a shock or injury. Hence the necessity of warning the pregnant woman from undertaking journeys in this state, undertaking laborious exercise or work, or in any way straining the body so as to interfere with the

delicate system of blood-circulation existing between the ovum or placenta and the endometrium. Brown recently calls attention to the frequent occurrence of malposition after falls (*Lancet*, 1891, p. 258). Where the mother suffers accidents or blows or kicks directly to the abdomen the child may be instantly killed and expelled at once or not for days. It is just necessary to allude to the premature loss of infantile life from criminal abortion without attempting to expatiate on the subject.

8. EXTRA-UTERINE PREGNANCY.

Extra-Uterine Pregnancy, up to a recent period, implied the necessary death of the fetus. In the early stages of this condition, the sacrifice of the child is at present—in view of the danger to life incurred by the mother—regarded as indisputably justifiable. This is accomplished by the majority of gynecologists chiefly by abdominal section and removal of the entire sac, or a small minority resort to the methods of electrical destruction of the fetus relying on subsequent absorption. If the pregnancy has advanced to a viable stage the opinion prevails, among those best able to judge, to wait until the expiration of pregnancy and then, by performing celiotomy, to endeavor to extract the living child. This practice is more commendable than the old practice of leaving the case to nature in the hope of a lithopedion resulting, for it not only removes the mass at once and spares the mother the risks of absorption from a possible putrefying and liquefying fetus, but regards the interests of the child as well. Werder recently reports a successful case of celiotomy where the fetus was viable (*Med. Rec.*, Nov. 24, 1894, 641).

9. UTERINE ABNORMALITIES.

Abnormal States of the Uterus.—As mentioned elsewhere, inflammation of the uterine mucosa, if it do not prevent conception, frequently causes the premature expulsion of the ovum or fetus. Carcinomatous disease of the pregnant uterus tends to premature expulsion of the fetus (*Playfair*). In carcinoma, Lewes noted forty per cent. abortions in one hundred and twenty cases. Cohnstein found only sixty-eight deliveries at term in one hundred patients (*Charpentier*). Prolapse of the uterus may be responsible for fetal death. In fifty-seven cases referred to by *Charpentier*, nineteen children were born alive, fourteen dead, and twenty-four not noted. A sudden displacement may lead to abortion through uterine congestion and

hemorrhage. Lusk advises immediate replacement by tampons. In a number of cases of prolapsus and displacements, in which the women repeatedly miscarried, the writer successfully resorted to the use of an ordinary Hodge pessary, not removing it until actually labor had set in, although it is not necessary to retain it so long. Hernias of the pregnant uterus—which are chiefly umbilical or ventral—are frequently the cause of abortion or premature delivery. The treatment consists in replacement and retention.

Diseases of the Decidua may prematurely terminate the existence of the ovum and fetus, and are divided by Lusk into three varieties,—endometritis decidua chronica diffusa, End. dec. tuberosa et polyposa, and Endometritis catarrhalis (gravidarum). Although pregnancy may proceed to term in the first, it frequently induces abortion or premature delivery by causing the death of the fetus through interference with its nutrition or by exciting reflex uterine contractions. In the second variety the fetus is generally dead and partially disintegrated. Therefore, there is usually early abortion. The third form, hydorrhœa, chiefly involves the decidua vera. This may also induce abortion or premature delivery.

Hydramnion.—The amniotic liquid may be present in quantity at times too small, at times too large. When present in too small quantity it is of interest to us chiefly because it may lead to feto-amniotic bands which, by mechanical compression, may injure the fetus in various ways or result in spontaneous intra-uterine amputation. It is with the excesses of amniotic liquid, however, that we are chiefly concerned. Hydramnion may be either acute or chronic. Syphilis is frequently associated with it; but the writer, from personal knowledge, is convinced that this is by no means a universal cause. Recent opinions regard the excess of liquid as of fetal origin and the fact of the presence of urea would leave little room for doubt but that the fetal bladder empties itself directly into this liquid. The majority of cases of hydramnion terminate pregnancy prematurely. This is due to the death of the fetus, to separation of the placenta, or to over-distension of the uterine cavity.

The diagnosis of this condition would seem easy, but this is not always the case. The writer saw with another physician a woman, whose statements regarding a history were unreliable. She had an immense distension of the abdomen, causing the most distressing dyspnœa,

preventing the woman from lying down, and only dating back three or four months. With no albumin in the urine the diagnosis of ascites or possible large ovarian cyst was made. There were no symptoms and no suspicion of pregnancy after careful examination by fingers, hands, and stethoscope. As immediate action was indicated, an attempt to relieve the distension through the abdomen was made, but failed because the trocar opened a vein from which the blood oozed. Within twenty-four hours there was a spontaneous gush per vaginam of an immense quantity of amniotic liquid and the patient gave birth to twins of three to four months' development. After passing through an attack of fever she ultimately made a good recovery. This case was seen by a number of able physicians during its course, and not one of them suspected pregnancy.

The prognosis to the child is serious because of malformation, dropsical affections, prematurity, and faulty presentations. According to Lusk nearly one-fourth of the children are lost. McClintock found that of thirty-three cases, nine children were born dead, and of the others born alive ten died within a few hours. Charpentier refers to forty-three mal-presentations (breech twenty-one, shoulder twenty, face two) in one hundred and nine cases. He refers to nine dead children in forty cases collected by Liegener.

The treatment in bad cases, unfortunately, is destructive for the fetus, for, in the interests of the mother, authorities advise puncturing the membranes per vaginam and allowing the amniotic liquid to escape. As this means induction of labor the chances of the immature fetus are very slim. Where possible, if the suffering of the mother is not excessive, it would be advisable to delay the procedure as long as possible. Where interference becomes imperative, it would be advisable to puncture with a small trocar or the aspirator of Dieulafoy, in the hope that, after the excess of liquor had been removed, the opening might close and the child remain in its internal surroundings until safely viable. In a case recently reported by Wœrz (*Cent. f. Gyn.* 17, 1894, 437), the membranes were ruptured with a sound, giving birth to twins, of which one was still-born and the other died in an hour.

Putrefaction of Amniotic Fluid.—In the case of Bordé (*Bull. de Sc. Med. di Bologna*, 1892, 167, 82) the fetus was putrefied and the mother died of sepsis. Briegleb reports a living child in putrefying amniotic fluid (*Centr. f. Gyn.*, 1892, xvi. 571).

10. PLACENTAL ABNORMALITIES.

Placental Lesions.—According to the researches of Dubois (Charpentier), if a large portion of the placenta preserves its structure, little harm will accrue to the fetus. If the placental structure, however, is much disturbed, the children are apt to be born feeble or dead. This is readily understood when we remember that the fetal sustenance depends exclusively on the maternal circulation present in the placenta. In 106 cases of hemorrhage from the separation of a normally situated placenta, collected by Goodell (*Am. J. of Obst.*), only six children out of 107 were born alive. Placental hematomata may impair the nutrition of the fetus and cause its death by direct pressure upon the villi or from laceration of the fetal portion of the placenta with fatal fetal hemorrhage. Inflammations of the placenta may be of various types and lead to its fatty degeneration. The writer has seen several instances of this in women who repeatedly miscarried with dead children. Besides syphilis of the placenta we may get calcareous deposits, fatty degeneration, pigment deposits, cysts, fibromatous or carcinomatous tumors, and myxoma (Lusk.) All of these conditions may seriously compromise the life of the fetus, but, as the risks to the mother are likewise considerable, treatment is directed solely in her interests.

Placenta Previa.—This condition is attended with great danger to the child. More than one-half of the children are lost. The dangers arise from the risk of asphyxia from the loss of maternal blood, from prematurity, or from mal-presentation. King in his statistics from the state of Indiana (1879) found twenty-nine cases of premature delivery, of which eleven children were saved (Playfair). In 856 cases referred to by Charpentier, there were 525 premature deliveries. According to Lusk two out of three children are born dead, and more than one-half of those born living die within the first ten days. The question of treatment will be considered in the next chapter.

CHAPTER VII.

INFANTILE MORTALITY DUE TO MATERNAL CAUSES—(CONTINUED.)

b. DURING LABOR.

We have now reached the most important stage of our work. As the ground to be gone over is very extensive and represents the bulk of the subject-matter contained in text-books on obstetrics the writer proposes to touch the maternal aspect of the subject very lightly and to concern himself chiefly with the child. Every obstruction to labor subjects the child to the danger of losing its life. Therefore it is necessary in a work of this sort to allude to all possible sources of difficult labor and, in this chapter, to those causes emanating from the mother. Such difficulties may arise from: 1, anomalies in uterine contractions; 2, dystocia due to the soft parts; 3, dystocia due to the bony parts.

1. ANOMALIES IN UTERINE CONTRACTIONS.

The labor-pains may be exaggerated or feeble, and both may be of serious import to the child.

Precipitate Labor is usually harmless, but occasionally subjects the child to danger, as the following case will show. A multipara was awakened by strong pains from her sleep and left the bed for the *pôt de chambre* in the belief that her bowels required evacuation. Suddenly during a strong pain the baby dropped to the floor striking on its head. The neighbors rushed in, picked up the silent baby which had a mark on its head, and brought it to. The cord was torn spontaneously, but did not bleed. The child lived sixteen hours, moaning feebly all the time. In another case, the mother, accustomed to slow labor, was sitting over a pail of warm chamomile tea with the supposed object of hastening labor, when, suddenly, during a sharp pain the baby was expelled into the pail, and owed its life to its rapid extraction from surroundings which had fortunately cooled off.

While these cases are exceptional, it is well to remember that precipitate labors offer risks to the child, which, in the majority of cases, ought to be avoided by a little care on the part of the mother and the judicious advice of the attendant. Fischer recently reports several cases of precipitate labor with simultaneous rupture of the umbilical cord. Pfeiffer also reports a similar case with inversion of the uterus (*Am. Med. and Surg. Bull.*, Sept. 15, 1894). Fortunately the rule is that no serious hemorrhage ensues from this accident. Women having this disposition ought to avoid leaving the house when near the termination of pregnancy, and, after the onset of labor, ought to remain in bed.

Protracted Labor.—In one hundred and sixty-seven still-births the writer found thirty-one attributed solely to protracted labor. If the delay occurs in the first stage of labor all observers are agreed that there is little danger to the child. Thus, feeble pains may continue for hours or days without doing harm to the child provided the membranes are unruptured. In one hundred and thirty-three cases collected by Tarnier and others in which the first stage of labor was delayed from twenty-four to sixty hours only eight children were still-born. The treatment, therefore, may be of an expectant nature.

If the delay occurs after the waters have escaped and the cervix is fairly dilated the case becomes fraught with danger for the child after a certain period of time. Thirty years ago V. Huter pointed out that if, toward the close of a protracted labor, a rapid increase in the fetal pulse is made out, approaching death of the child may be safely inferred. While this may be as a rule, the writer would state that his experience justifies him in making exceptions. Quite frequently has it been his experience, after careful attempts at abdominal auscultation with the stethoscope, to fail entirely in discovering a fetal pulse during pregnancy and labor in cases in which a living child was delivered. Still, in cases in which the stage of expulsion is prolonged beyond eight or ten hours, the placental circulation must be disturbed and a rapid and irregular state of the fetal heart action may fairly be attributed to impending death of the child. Jacquemier places the limit of expectancy at eight or ten hours. Charpentier advises forceps delivery if the head has been arrested for an hour or two after reaching the pelvic floor. Emmet advises the use of forceps if, after the os is fully

dilated and membranes ruptured, the accoucheur finds no progress during every quarter of an hour.

As in everything else, judgment must be used. Many women are quite exhausted by the so-called "false pains" which sometimes persist for days before the onset of true labor. In such cases a hypodermic injection of morphine will be of the greatest benefit. By giving these women a chance to rest, their strength will be spared for the ordeal of real labor.

Rook calls attention to contraction of the cervix uteri about the neck of the fetus as a source of danger to the latter and a frequent cause of the prolongation of the second stage of labor. When careful auscultation of the fetal heart sounds combined with the generally delayed state of affairs reveals danger threatening to the child it is our duty to at once interfere and terminate labor. We may assist nature in these cases by a hot bath or hot douche if the membranes are still intact and os not fully dilated. In some cases of uterine inertia the hand in the vagina may act as an irritant and excite labor pains. In other cases abdominal pressure may prove of service. The writer has found a ten-grain dose of quinine very beneficial in many cases accompanied with feeble pains. Against the use of ergot most practitioners are now opposed. In thirty cases of tedious labor in which Hardy gave this drug, only ten children were born alive. This writer observed, after the administration of this drug, the fetal pulsations to drop to 100 per minute and then to intermit. The explanation is simple to any one who has once observed the tetanic condition in which the uterus passes and the evident interference with the fetoplacental circulation which must ensue. In several instances when this drug was administered by midwives, the writer was obliged to immediately put the suffering women under the influence of chloroform until preparations could be made to deliver with forceps.

In many cases of tedious labor the method of fetal expression advised by Kristeller may be resorted to. In several instances, in which women had previously been delivered by forceps and were strongly opposed to their renewed application, the author has successfully made use of this method. By placing the hands firmly over the uterus and following the axis of the parturient canal the work of a feeble uterus can often be assisted to a remarkable extent. The pressure is applied at the beginning of a pain and kept up until it ceases. The writer has

never seen any harm from this—as premature separation of the placenta—but the work it requires from the accoucheur and the pain over the abdomen which it causes the suffering woman render it at times impracticable. We have then resort to that most wonderful of inventions—the obstetric forceps.

According to Playfair, the forceps, about the middle of the present century, were not used oftener than once in 310 labors. Twenty years ago they were used in the same institution as often as once in eight labors. In skilled hands this instrument has assumed such a position in obstetric practice that the lives of thousands of children are now annually saved in this class of cases which formerly must have been sacrificed. Although the writer has resorted to the use of forceps in over a hundred cases of tedious labor with normal vertex presentations, he has not lost over a half-dozen children, and these were chiefly cases too long delayed, or those which required the high application of the instrument. Therefore the writer's experience justifies him in advocating these rules: 1. If the cervix is not fully dilated, the head high, the condition of the child's heart fair, and the pelvis of ample size, the best practice is to wait and assist the expulsive forces by a dose of quinine, a hot bath, and systematic intermittent pressure applied to the fundus of the uterus simultaneously with the labor pains. Under no circumstances should the membranes be ruptured in this stage. 2. If, on the other hand, the head has emerged from the os, the waters have escaped, and labor pains are feeble or recur at long intervals, it is neglect on the part of the accoucheur not to propose the use of forceps. For now delay, although the safety of the mother may not be jeopardized, may mean death to the infant, and we have now reached that stage of modern science that requires us to look out just as carefully for the welfare of the child. The physician who boasts that he rarely needs or uses the obstetric forceps ought to retire from practice, for he belongs to a past age. This does not justify the indiscriminate employment of this instrument just to save time. For there is nothing more dangerous, for instance, to the life of the child than the application of the forceps to the antero-posterior diameter of the fetal skull at the superior straight. But we insist that the accoucheur ought never attend a case of labor without a pair of forceps close at hand and midwives ought to be taught the necessity of calling upon a physician in every case of delayed labor, even if, to their minds,

the presentation seems normal, and no visible obstruction can be made out.

Lastly, it may be well to call attention to the fact, recently pointed out by Remy, that apparent inertia uteri can sometimes be overcome, 1, by allowing more liquor amnii to escape, and, 2, by changing the position of the woman.

Ante-partum Hour-Glass Contraction of the uterus may offer serious obstacles to the birth of the child. Miller recently reported such a case during the second stage of labor, in which the uterus seemed to be divided into two spherical parts, separated by a constriction. By pressure applied to the fundus he succeeded in delivering a living child. Eames refers to a similar case in twins, in which the first child was delivered by forceps, and the second child required chloroform and version. He uses the term "Inter-partum Hour-Glass Contraction." Playfair advises resort to chloroform, and, if necessary, turning, or Cesarian section.

LITERATURE CONCERNING ANOMALIES IN UTERINE CONTRACTIONS.

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 V. HUETER: Fetal Pulse During Labor; *Monatsch. f. Gebtsk.* 1862, xviii. 23.
 ROOK: Contracted Cervix about Neck of Fœtus, etc.; *Ann. Gyn. & Pæd.* 1893-4, vii. 29.
 VAN WATERS: Inertia Uteri; *N. Y. Med. Journ.*, lvii. 701.
 THOMPSON: Abdominal Pressure in Tedious Labor; *Bost. Med. and Surg. Journ.*, 1892, cxxvii. 41.
 REMY: Inertia Uteri; *Central. f. Gyn.* 1894, xxxv. 854.
 MILLER: Ante-partum Hour-Glass Contraction; *Med. News*, 1891, lix. 104.
 EAMES: Inter-partum Hour-Glass Contraction; *Lancet*, 1892, i. 630.
 Also literature on Obstetric Forceps, etc.

CHAPTER VIII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

2. DYSTOCA DUE TO THE SOFT PARTS.

Obstacles to labor, endangering the life of the child, may be met at the outlet in the parturient canal, or within the abdominal cavity.

Persistence of the Hymen may prevent the termination of labor. Ahlfeld recently reports a case and refers to twenty-four observations in twenty years. Walker mentions a case. After dividing the hymen the baby is usually quickly expelled.

Swelling and Oedema of the Vulva have, in a number of the writer's cases, offered sufficient obstruction to the progress of labor to necessitate a resort to forceps. Playfair advises a number of small punctures in such cases.

Thrombi and Hematomata of the Vulva and Vagina before delivery may result fatally to both mother and child (Charpentier). A case of hematoma obstructing labor has recently been reported by Walker.

Atresia of the Vulva, congenital or acquired, may at times cause obstruction. These atresiae are often met with in young female children, and, when congenital, correspond to the preputial adhesions found in the male.

Prolapsus of the Vagina may in rare cases obstruct labor.

Retention of the Urine or Vesical Calculi may prevent normal delivery. The former condition is quite frequently met with and easily remedied if the head is not wedged firmly in the pelvic canal. The latter may require special operative interference. According to Winckel there are twenty-nine cases of vesical calculi on record, all of which were accompanied with more or less serious results.

Fecal Impaction may obstruct delivery. Holländer has recently made a study of the subject, and, besides impacted feces, calls attention to the occasional occurrence of proctocoele, foreign bodies in the rectum, and neoplasms.

Vaginal Hernia may prove a source of obstruction. Cases have been reported in this country by Barker and Hirst.

Vaginal Atresia may be congenital or acquired. In recent litera-

ture we find a case of congenital atresia reported by Vagihita, and Goldberg reports a case of acquired annular stricture of the vagina in a woman in whom the first labor was terminated by forceps, and the second by perforation of the child's skull. Karper reports two cases of cicatricial stenosis of the vagina, requiring Cesarian section. O'Brien, Ciccone, and Gallois also report similar cases requiring operative interference. When the atresia can be relieved by stretching or cutting of bands, this should be done and followed by the application of forceps. When too pronounced, the resort to Cesarian section is justifiable.

Vaginismus and Vaginal Neoplasms may similarly interfere with normal delivery to such an extent as to delay labor and compromise the life of the child. The growths are usually carcinomata or fibromata. Harthill recently reports a case of labor complicated by a large vaginal cyst. Puech reports a similar case.

At the cervix labor may be obstructed by a number of conditions.

The premature escape of the liquor amnii naturally leaves the os rigid and small. If left to nature dilatation must be completed by the presenting part. As a dilating agent the child's head is far inferior to the bag of waters, and labor must be delayed, involving risks to both mother and child. Besides this the localized pressure from the rim of the cervix applied to one portion of the child's head instead of the diffused pressure exerted previous to the escape of the liquor amnii, tends to act detrimentally on the child, predisposing it to local cerebral congestions or hemorrhages. The exaggerated uterine pains, in many of these cases, are fearful at times in intensity, and may also cause sufficient interference with the placental circulation to seriously compromise the life of the child.

In the treatment of these cases the resort to repeated warm douches or baths is frequently of great service. The bags of Barnes or Champetier de Ribes are of unquestionable value in that they imitate the normal forces. One of the oldest and best means at our command, however, is digital dilatation.

With the disinfected fingers the os is gently but firmly stretched in all directions. If there is indication for haste in terminating labor an anæsthetic is given, and, with the hand in the vagina, the number of fingers in the os uteri is progressively increased until the closed fist can enter the dilated opening. This is the so-called accouchement

forcé. After sufficient dilatation, forceps, which act also in dilating the os, or version, may be employed to complete delivery. Unless the danger is imminent, we are opposed, after the cervix is dilated, to the completion of labor under ordinary circumstances, but would advise leaving the case to nature if the pains are strong and the general condition of the mother and child are good. Besides uterine inertia, rigid os, and premature escape of the amniotic fluid, accouchement forcé is called for at times in cases of placenta previa, uremic convulsions, albuminuria and spasmodically contracted uterus. On account of the particularly increased dangers to the child this method is opposed by such authorities as Charpentier, Winckel, Lusk, and Müller.

Rigidity of the cervix may likewise be due to organic changes. These include thrombi of the cervix, cicatrices of various kinds, hypertrophic elongation of the cervix, closure of the os externum, and new growths.

Thrombi of the Cervix are mentioned by authorities on obstetrics as being an occasional cause of delayed labor.

Cicatrices of the Cervix may be traced to syphilis, or to old lacerations, which have contracted in healing (Playfair), or to reparative operations on the cervix (Hooper).

Hypertrophic Elongation of the Cervix, although rare in occurrence, is a very serious matter when present. In the case of a woman having a cervix measuring four to five inches in length, Simpson was obliged to break up the head of the child before delivery was possible. Griffith met two cases during a practice of forty years. In one, with a cervix measuring three inches, labor was protracted, and resulted in rupture of the uterus with the loss of mother and child in fifteen minutes. In the other, a still-born child was delivered with forceps, the mother dying five or six days later. In some reported cases lateral incisions through the cervix several inches in depth were required before delivery could be accomplished. Laroyenne advises amputation of the cervix in such cases. Considering the grave risks which mother and child run in these cases we consider Caesarian section justifiable.

Complete occlusion of the os externum may be due to: (1) True cicatricial atresia or ulcerative adhesion; (2) Simple epithelial atresia or agglutination; (3) Adhesive union of chorionic and amni-

otic membranes with the maternal parts. Mattei found that thirty-six operations were necessary in forty-two patients. In twenty-eight cases of late operative interference seven children were still-born (Bain). In the literature of the last few years cases have been reported by Jardine, Landa, Cochrane, Nash, Righter, Van Zandt, and Bain.

The practice in these cases is to search for the probable site of the os which naturally must have been patent previous to pregnancy, otherwise conception would not have been possible. If the opening can be scraped through with the finger-nail or sound, this is the best practice; otherwise cross incisions must be made with the scalpel, and, if necessary, delivery must be assisted by version or forceps.

LITERATURE CONCERNING DYSTOCIA FROM OBSTRUCTIONS AT VULVA, VAGINA,
OR CERVIX.

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 CUTHBERTSON WALKER: Obstructed Labor from Persistent Hymen; *Br. Med. J.*, 1892, i., 1860.
 ETIENNE: Swelling of Anterior Labia Obstructing Labor; *Arch. de toco et de gynéc.*, 1892, xix, 203.
 WALKER: Hæmatoma of Labia Obstructing Labor; *Br. Med. J.*, 1894, 162.
 HOLLANDER: Obstruction to Labor from Rectal Causes; *Arch. f. Gyn.*, 1893, 148.
 HIRST: Vaginal Enterocele; *Med. News*, 1891, 439.
 BARKER: Vaginal Hernia; *Am. J. of Obst.*, ix.
 YAGIHITA: Congenital Vaginal Atresia; *Index Medicus*, 1892.
 GOLDBERG: Acquired Stricture of the Vagina; *Central. f. Gyn.*, xxiii., 557.
 O'BRIEN: Stricture of the Vagina; *Trans. Texas Med. Ass.*, xxiii., 525.
 KARPER: Cicatricial Stenosis of the Vagina, etc.; *Central. f. Gyn.*, xxiv.
 HARTILL: Vaginal Cyst; *Birmingham Med. Rev.*, 1891, xxx., 103.
 PUECH: Vaginal Cyst; *Arch. de tocol. et de gynéc.*, 1892, xix., 152.
 GALLOIS: Cicatricial Atresia of the Vagina; *Danphiné Med.*, 1891, xv., 245.
 CICCONE: Artificial Section of Perineum; *Prog. Med. de Napoli*, 1891, v, 137.
 MESNARD: Syphilis of the Cervix; *Arch. de tocol.*, etc., 1891, xviii., 19.
 BLANC: Syphilitic Cicatrices of Cervix; *Arch. de tocol.*, etc., 1891, xviii., 241.
 HOOPER: Dystocia after Emmet's Operation; *Aust. Med. J.*, 1892, xiv., 388.
 GRIFFITH: Hypotrophic Elongation of the Cervix; *Br. Med. J.*, 1893, i., 948.
 LAROYENNE: Elongated Cervix; *Central. f. Gyn.*, xxiv., 592.
 JARDINE: Occluded Os; *Br. Med. Jr.*, 1892, i., 962.
 COCHRANE: Occluded Os; *Lancet*, 1892, i., 358.
 NASH: Occluded Os; *Lancet*, 1892, i., 251.
 BAIN: Occluded Os; *Lancet*, 1891, ii., 1093.
 LANDA: Occluded Os; *Rev. de Cien. Med.*, Habana, 1893, viii., 73.
 RIGHTER: Occluded Os; *Trans. Am. Inst. Homeop.*, 1890, xliii., 607.
 VAN ZANDT: Occluded Os; *Texas Cour. Rec. Med.*, 1890-1, viii., 141.

CHAPTER IX.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Growths of the Cervix obstructing labor are chiefly polypoid, carcinomatous, or fibroid. Rowland reports recently a case of labor complicated by a cervical polypus (*Br. Guiana Med. Ann.*, 1891, 123), and Voigt was obliged to do a Porro operation on account of the impaction in the pelvic cavity of a large cervical myoma (*Munich Med. Woch.*, 1893, xl., 409). The most frequent new growth in the cervical region obstructing labor, however, is cancer.

Carcinoma of the Cervix results in abortion in forty per cent. of the cases involved. In seventy cases at term collected by Chantreuil forty-two children were delivered dead. In one hundred and sixteen cases collected by Cohnstein, seventy-four children were born dead (Charpentier). The prognosis, therefore, for the child is very grave. According to Charpentier expectant treatment offers 62.5 per cent. chances of recovery for the child; after the use of forceps the percentage of recoveries is 50 per cent., and after version the percentage is reduced to 12.5 per cent. The trend of modern opinion is to look almost entirely to the interests of the child. Hence Caesarian section is resorted to. That this line of treatment is theoretically correct cannot be denied. The fact that the mother is suffering from a fatal disease is sufficient justification to open the abdomen and save the child at least. If possible, at the same time, the attempt may be made to remove the diseased uterus. The additional risks to the mother due to the operation itself cannot have any more weight than when the woman submits to the removal of the non-pregnant uterus for the same disease. The older treatment consisted in incising the cervix and resorting to forceps or craniotomy by which the child was usually sacrificed. Later the diseased uterus was removed. The modern and more correct treatment is to at once open the abdomen, remove the living child, and, at the same time, the diseased uterus. In the early months it may be justifiable to ampu-

tate the diseased cervix and trust that the pregnancy will not be disturbed, as happened in one of Everke's cases.

LITERATURE CONCERNING CANCER OF THE CERVIX COMPLICATING PREGNANCY AND LABOR.

- CULLINGSWORTH: Cesarean section; child saved, mother lost; *Lancet*, 1893, ii. 1382.
 SUTUGIN: Two cases of Cesarean section for cancer of the uterus; *Index Medicus*, 1890.
 FLÖEL: Carcinoma of Cervix; placenta prævia, weak pains, *Centr. f. Gyn.*, 1891, xv., 657.
 BAGDANIK: Cancer of Cervix and Vagina; Cesarean section; *Centr. f. Gyn.*, 1892, xvi. 97.
 PORAK: Cesarean section for Cancer of the Cervix; *N. Arch. d'obst. et de Gyn.*
 DUNCAN: Epithelioma of the Cervix; Cesarean section; *Middlesex Hosp. Rep.*, 1892, 159.
 LEWIS: Cancer of Cervix; division of anterior lip; forceps; dead child; later vaginal hysterectomy. *The Post Graduate*, June, 1893.
 TARNIER: Cancer of Cervix, etc.; Cesarean section; *Journ. de Sages Femmes*, 1893, xxi. 377.
 HERZFELD: Carcinomatous degenerated fibroid of the cervix; *Allg. Wien. ztg.*, 1892, xxxvii. 312.
 DONALD: Cesarean section for Cancer; *Lancet*, 1893, ii. 510.
 EVERKE: Amputation of Carcinomatous cervix during pregnancy; *Centr. f. Gyn.*, xxiv. 589.

Displacements of the Uterus may interrupt pregnancy or obstruct delivery. The normal anteflexion of pregnancy may be absent and retroflexion present. This may cause congestion, metritis and abortion. When the retroflexed uterus becomes incarcerated, it may be necessary, in the interests of the mother, to induce abortion. Prolapsus of the uterus may come on quite suddenly, and, if not replaced, may lead to uterine congestion, hemorrhage, and abortion. Lawrence recently reports a case of prolapsus of the pregnant uterus with the extra-abdominal delivery at term of a living child (*Br. M. Journ.*, 1892, i. 859). Chaleix reports a case of dystocia in a woman who had undergone the operation of shortening of the round ligaments. (*Gaz. hebd. de sc. m. de Bordeaux*, 1892, xiii. 430.)

Abnormal developments of the Uterus may imperil the child's life during child-birth. Thus, double uterus may cause tedious labor from imperfect muscular development of the pregnant horn, its deviation from the normal axis, and possible obstruction from the unimpregnated horn. V. Dittel recently reports a case of labor in a double uterus and vagina terminating favorably for mother and child. He

refers to a case of Israel in which a woman with such a uterus gave birth to eight children. Layton, however, reports a case of difficult labor with a double uterus. In a case of Burke's the fetus was in one horn and the placenta in the other. In Bordé's case the fetus presented by the breech and was born dead. In a case of malformed uterus and vagina, Ashton did a Porro-Mueller operation in twenty-one minutes, saving mother and child. Gardner reports two cases of transverse presentation in uterus bicornis.

LITERATURE CONCERNING ABNORMAL DEVELOPMENT OF THE UTERUS.

V. DITTEL, JR.: Labor in a Case of Double Uterus and Vagina; *Centr. f. Gyn.*, 1894, xxv. 610.

BURKE: Bifid Uterus; *Br. M. J.*, 1892, 1, 1020.

LAYTON: Dystocia from bifid Uterus; *N. Orleans M. & S. J.*, 1891-2, xix, 412.

BORDE: Bi-lobed and Heart-shaped Uterus, *Bul. d. Sc. med. di Bologna*, 1892, iii. 206.

GARDNER: Uterus Bicornis; *Maryland Med. J.*, 1892, xxvii. 573.

ASHTON: Malformation of Uterus and Vagina; *Med. News*, 1891, lviii. 369.

CHAPTER X.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Placenta Previa.—As nearly two-thirds of the children are born dead and more than one-half of those born alive die within the first few days of life, the grave importance of this complication at once becomes apparent. Most of the children are lost before full term is reached and at full term 58 per cent. die. Thus, in the combined statistics of Simpson, Depaul and Mueller—embracing 1022 cases—59 per cent. of the children were lost (Charpentier). The frequency of mal-presentations has been noted by Simpson, Mueller and others. Individual cases have recently been reported by Christian, Nott and Proben. Out of 1238 cases of placenta previa collected by Simpson and Mueller, 239 presented transversely (Charpentier). That this in itself materially adds to the danger of the child's death can readily be understood. Asphyxia from the loss of maternal blood, and imperfect respiration from partial attachment of the placenta, easily explain the intra-uterine death of the child in most cases.

If left to nature the fetal mortality is least—32 per cent. In cases of artificial delivery the mortality reaches 57.3 per cent. (Charpentier.) Lomer in sixty-five cases reported twenty-three children saved. In spontaneous delivery he places the mortality at 57 per cent.; after version, 73 per cent.; after forceps, 66 per cent. Sickel reported 416 cases of version with a fetal mortality of 60 per cent. Mueller reported ninety-two cases of accouchement forcé followed by version, with a fetal mortality of 62.7 per cent. The same writer reported thirty-four cases treated first by tampon, or colpeurynter, with a fetal mortality of 50 per cent.

From these rather conflicting figures we can deduce this one important fact: that inaction, as well as over-action, are serious to both mother and child. Leaving the case exclusively to nature may mean death to both. In this, as in all complications of labor, we must choose that mode of treatment which, while chiefly protecting the

interests of the mother, will also best subserve the interests of the child. From this point of view we must at once reject exclusive expectancy as dangerous to both. The forcible separation of the placenta by Barnes' method is so very serious to the child—67 to 100 per cent., mortality—without any compensating advantages to the mother, that it must also be rejected. The use of ergot, as pointed out elsewhere, is likewise almost so regularly fatal for the child that we reject its use without apology. *Accouchement forcé* with version or forceps, likewise offers great risks for the child. What plan shall we then pursue?

If the child has reached a viable age and the parents are able to devote themselves to the exacting care of a premature child, one of the best plans to pursue is to tampon the cervix and vagina at the first evidence of decided hemorrhage. This will usually induce labor and check further hemorrhage. The smaller size of the child will render its being born alive more probable, while the risks to the mother will be simultaneously reduced. Thomas saved ten out of eleven women and six children, by resorting to this plan (Grandin). At full term the writer would again advise resort to the tampon. In fifteen cases reported by King, in which the tampon played the principal rôle, thirteen mothers and nine children were saved (Harris). Tomer refers to 178 cases treated by tampon, and followed by version or spontaneous delivery, with a fetal mortality of 60 per cent. and a maternal mortality of only 4.5 per cent. (Charpentier.)

The writer believes the following method to be the most rational, and accompanied with the least danger to mother and child. The hemorrhage having shown itself at a time when the child is known to be viable, the patient is placed on a table, the genitals disinfected, and the speculum introduced. The cervix is now seized with volsellum forceps, and the os packed with a strip of iodoform gauze, supported by a vaginal plug of the same material. In the course of ten or fifteen hours the cervix will usually be found somewhat dilated, and labor pains started. After cleansing the parts with a hot, antiseptic douche, the packing is repeated. After sufficient dilatation, if bleeding assumes a threatening aspect, delivery should be completed by the method of *accouchement forcé*, under anesthesia. The fingers in the cervix are rotated and gradually increased in number, until the entire fist readily enters the os. Now a bi-manual or podalic version should

be performed. If the cervix is sufficiently soft and dilated the child may be at once extracted. As a rule, however, it will be better to bring down a foot and wait, allowing the thigh and buttocks of the child to gradually complete the dilatation. This will likewise usually control bleeding. The anesthetic being stopped, the expulsion of the rest of the child's body may be left to labor-pains, or, in case of haste, rapidly extracted. The writer has resorted to this plan in a number of cases, with almost uniformly successful results to both mother and child.

LITERATURE CONCERNING PLACENTA PREVIA AND ACCOUCHEMENT FORCE.

- MURRAY: Three Cases of Placenta Previa Causing Abortion; Tr. Am. Gyn. Soc. 1890, xv. 360.
- CHRISTIAN: Malpresentations in Placenta Previa; Ann. Gyn. & Pæd., 1890-1, iv. 536.
- NOTT: Placenta Previa; Atlanta Med. and Surg. J., 1890, vii. 672.
- PROBEN: Transverse Presentation in Placenta Previa; Med. Rec., 1891, xxxix. 81.
- LOVIOT: Placenta Previa; Podalic Version; Death of Fetus; Bull. et Mém. Soc., Obst. et Gyn. de Paris, 1892, 188.
- SEGUEIRA: Placenta Previa; Version; Br. Med. Journ., 1893, 519.
- RUEDER: Twelve Cases of Placenta Previa; Münch. Med. Woch., 1893, xl. 619.
- ELIOT: Accouchement Forcé; Journ. of Am. Med. Ass., 1893, xxi. 342.
- GRANDIN: Accouchement Forcé; Tr. Am. Gyn. Soc. 1892, xvii. 166.
- MARX: Accouchement Forcé; Med. Rec., 1894 (Feb. 17), 202.

CHAPTER XI.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Fibroid Tumors of the Uterus constitute one of the most serious forms of new growth which complicate labor from the fetal as well as the maternal standpoint. In about every three cases pregnancy will be interrupted in two. Chabazian (Charpentier) collected 114 cases with the following histories: fifty went to term with ten very difficult labors; eighteen terminated prematurely; sixteen had hemorrhages during pregnancy or later; five suffered rupture of the uterus; five had prolapsus of parts during labor; five showed flattening of the fetus, and in three there was retention of the fetus. From this we can see that the risks to the child are many and serious. Previous to labor the child may be lost through premature birth, or abortion and hemorrhage. During labor the death of the child may be due to obstacles to birth, rupture of the uterus, malpresentations, and malformations. In some cases the tumor is expelled with the child. The writer has had one case in which the tumor—the size of a plum—was evidently broken off during delivery with forceps, but not recognized at the time. On the third day it was spontaneously discharged.

Malpresentations in these cases are so frequent as to deserve a special notice. In three hundred and twenty-six cases referred to by Charpentier and collected from various sources we find ninety-three presenting by the breech and fifty-seven by the shoulder or trunk. The breech presentations, in cases complicated by large tumors, are not favorable for the child.

The infantile mortality in cases of labor complicated by fibroid tumors is very considerable. Susserott, in one hundred and forty-seven cases, places the fetal mortality at sixty-six per cent.; Nauss in two hundred and eighty-seven cases places the mortality at 57.2 per cent. (Charpentier.)

In the treatment of labor in these cases we are again required to consult the welfare of the mother besides that of the child. Authorities differ in regard to the method to be pursued. Of thirty-two cases treated on the expectant plan, Chabazian found that nine mothers

died, twenty-one recovered and two were not noted. Of the children fourteen died, seven survived, and eleven were not noted. In eight extirpations of the growth during pregnancy one mother and three children were lost. In twelve extirpations during labor one mother and five children were lost (two not noted). In five forceps cases, all excepting two children (not noted) recovered. In three versions one mother and one child were lost (one child not noted). In two cases of manual extraction one mother was lost. In a case in which the blunt hook was used both mother and child were lost. These interesting figures are quoted by Charpentier. It is interesting to note that in five embryotomies three mothers and all of the children were lost, and that of six Caesarian sections five mothers and three infants were lost (one not noted). It is needless to add that these last statistics refer to older cases.

Artificial interference is necessary in sixty per cent. of the cases before labor can be terminated. When accessible the growths should be removed. Charpentier rejects induction of labor or Porro's operation. He advises waiting for spontaneous labor, and then, if necessary, resorting to reduction of the size of the fetus or to enucleation of the tumor. Some authorities (Tarnier) advise version, others (Depaul) the forceps. In forty-six forceps-cases (Susserott and Lefour) thirty-one mothers and twenty children were saved. In twenty versions (Susserott) only eight mothers and three children were saved. Therefore, if statistics are worth anything, these figures clearly indicate that in the interests of both mother and child, forceps deserve the preference in appropriate cases.

The results of abdominal section in fibroid tumors referred to by Charpentier have been bad. Of twenty-eight Caesarian sections only four mothers and fifteen children were saved. Of five hysterectomies all the mothers were lost. But these are old statistics and count for little in the present state of abdominal surgery. Within the past three years the writer was able to collect no less than seventeen cases of fibroid tumor complicating pregnancy or labor. Many of these were subjected to abdominal section and quite a number recovered. In four cases the growth was successfully removed during pregnancy. In two cases the tumor did not interrupt pregnancy; but in two others the patients aborted. In one case complicated by placenta previa the fetus was born dead and there was spontaneous displacement of the tumor. Under chloroform a pediculated fibroid was reduced in one

case and followed by craniotomy. Five versions were done, two of the mothers and all of the children being lost. No less than four successful Porro-operations have been done in this time in this class of cases.

The inferences regarding treatment are plain. Small intrapelvic fibroid tumors should be left to nature unless the patient's exhausted condition necessitates interference. If the tumor is pediculated and can readily be reached per vaginam, an attempt may be made to remove it previous to delivery. If the tumor is large and can be reduced, this should be done and forceps applied. Under no circumstances ought version be done, as the mortality of mother and child after this operation is greatest. When the tumor is irreducible, a study of statistics shows that only one course is available, and that is a resort to abdominal section. This offers the very best chance for the child, and in the hands of competent operators, a fair chance for the mother. The modern Porro-operation has been done sufficiently often in these cases, in recent years, to require no apology for its performance. The results will be most favorable when the operation is done under good surroundings and before the condition of the woman has become too much exhausted to withstand the necessary shock.

LITERATURE CONCERNING FIBROID TUMORS OF THE UTERUS COMPLICATING PREGNANCY AND LABOR.

- EVERKE: Two Cases of Myomectomy on the Pregnant Uterus; *Central. f. Gyn.*, 1894, xxiv.
- WURKERT: Myomectomy on Pregnant Uterus; *Centr. f. Gyn.*, 1894, xiii. 320.
- STRATZ: Removal of Fibroid Tumor; Delivery of Living Child Later; *Berlin Klin. Woch.*, 1893, 112.
- BLANC: Dystocia from Fibroid; Spontaneous Displacement; Placenta Previa; Death of Fetus; Paris, 1891, G. Steinheil, 8°, 8.
- KUFFERATH: Pediculated Fibroid; craniotomy; *Clin. Brux.*, 1893, viii. 625.
- LIEBHOLZ: Fibroid; Version; *Berl. Klin. Woch.*, 1892, xli. 1039.
- HUETER: Submucous Myoma; Version; *Berl. Klin. Woch.*, vi. 112.
- HOLLISTER: Submucous Fibroid Complicating Labor; *N. Y. Med. Journ.*, 1892, 383.
- RYAN: Uterine Fibroid and Placenta Previa; *Br. Med. J.*, 1893, i. 65.
- CROFFORD: Fibroid Tumor Complicating Pregnancy; *Trans. Miss. Ass.*, 1893, xxvi. 91.
- PRICE: Fibroid Necessitating Porro's Operation; *Trans. Col. Phys., Phil.*, 1891.
- ROBSON: Successful Porro's Operation for Myoma; *Lancet*, 1893, i. 414.
- DUNN: Fibroid Complicating Pregnancy; *Northwest Lancet*, 1892, xii. 31.
- SUTUGIN: Pregnancy and Labor Complicated by Fibro-myoma; *Index Medicus*, 1892.
- SAMPELAGO: Enormous Fibrous Polypus Causing Dystocia; *Index Medicus*, 1892.
- HERZFELD: Carcinomatous Degenerated Fibroid Causing Dystocia; *Allg. Wien. Med. Ztg.*, 1892, xxxvii. 312.

CHAPTER XII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Ovarian Tumors and Cysts of the Broad Ligament may seriously complicate pregnancy and jeopardize the life of the child during birth. The frequency with which these tumors are met with can be readily understood from the fact that Gordon has been able to collect no less than two hundred and four cases during the pregnant state. From 1891 to 1894 the writer has met no less than twenty cases reported.

In spontaneous deliveries the risks to the child are grave. In twenty-three cases Litzmann and Playfair found that fourteen children and eleven mothers were lost. In ninety-seven cases collected by Doumaison and Litzman forty-nine mothers were lost, and, in the former's forty-one cases, only seventeen children survived (Charpentier).

If the growth is discovered during pregnancy statistics show that the best treatment consists in operation. Stratz refers to eighty-four ovariectomies performed during pregnancy with a maternal mortality of only 9.5 per cent.; and Heiberg to forty-six cases with a maternal mortality of 15 per cent. and a fetal mortality of 50 per cent. (Charpentier.) The latest statistics in this regard are those of Gordon, who collected 176 cases. In these the maternal mortality was only 6.8 per cent.; 122 of the women carried to term; 49 aborted; and 5 died undelivered. In 5 of Gordon's cases operated on during pregnancy, all the mothers recovered, 3 aborted, and 2 went on to term. In intra-ligamentous cysts the pregnancy is, as a rule, disturbed.

What course is to be pursued if the tumor is only discovered at term or during labor? In Litzmann's collection of fifty-six deliveries only thirty-two mothers and nine children were saved (Charpentier). The tumor was punctured in nine cases, and all of the mothers and children were saved. Some writers advise reducing the tumor, and then resorting to forceps, version, or craniotomy. In this country Reynolds advises taxis by upward pressure through the vagina and rectum under ether in the knee-chest position. If this fails he advises Cesarian section with removal of the tumor; or, if the exhaustion is

too intense, he recommends aspiration per vaginam or vaginal ovariectomy. Lomer advises against prolonged delay. He would first try to reduce the tumor. If unsuccessful he would puncture it or fully incise the cyst-wall. In solid ovarian tumors he advises Cesarian section or perforation of the child (Charpentier).

During pregnancy American authorities are unanimously in favor of resorting to ovariectomy. Nearly 70 per cent. of Gordon's uncomplicated cases went on to term. During labor, in view of the recent favorable statistics of Cesarian section, the writer is convinced that, if the tumor is irreducible and the general condition of the patient fair, the best chances for mother and child lie in this operation. If the maternal condition is unfavorable, resort to reduction of the tumor or puncture must be chosen. In one of Reynolds' cases the cyst was ruptured in an attempt to push it up; the child was then turned and extracted, but died several hours later. In another case version was done after reducing the tumor, but the child was still-born. Fleischlen succeeded in delivering a living child with forceps after replacing a large dermoid tumor.

LITERATURE CONCERNING OVARIAN TUMORS, ETC., COMPLICATING PREGNANCY AND LABOR.

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- LOISIN: Dystocia from Dermoid Cysts of the Ovary; *Arch. de Tocol. et de Gynee*, 1891, xviii. 688.
- FLAISCHLEN: Two Cases Complicating Pregnancy and Labor; *Ztsch. f. Gebts. u. Gyn.*, 1893, xxv. 239.
- GRIFFITH: Fibroma of the Ovary; *Trans. Obst. Soc., London*, xxiii. 140.
- RIEDINGER: Interpartum Prolapsed Tumor of the Ovary; *Prag. Med. Woch.*, 1891, xvi. 186.
- REYNOLDS: Two Cases of Ovarian Cysts Obstructing Labor; *Boston Med. and Surg. J.*, cxxvi. 133.
- KING: Labor Obstructed by Ovarian Tumor; *Trans. Am. Gyn. Soc.*, 1893, xviii. 215.
- FISCHER: Dermoid Cyst of the Ovary Causing Dystocia; *Prag. Med. Woch.*, 1893, xviii. 285.
- GORDON: Five Ovariectomies During Pregnancy; *Centr. f. Gyn.*; 1894, xxiii. 566.
- GENER: Child Delivered after Version; Ovariectomy Three Weeks Later; *Centr. f. Gyn.*, 1894, xvi.
- EVERKE: Two Ovariectomies During Pregnancy; *Centr. f. Gyn.*, 1894, xxiv.
- DEWAR: Dermoid Cyst Delaying Delivery; *Lancet*, 1894, i. 19.
- CHIARLIONI: Dystocia from Dermoid Cyst; *Boll. d. Clin.*, 1891, viii. 289.
- TISAI: Rupture of Dermoid Cyst; Peritonitis; Death Five Days following Labor; *Rev. Obst. et Gynee.*, 1892, viii. 151.

CHAPTER XIII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

3. DYSTOCIA DUE TO THE BONY PARTS.

Pelvic tumors may cause dystocia and cost the child its life during the process of birth. They may occur as exostoses, osteosarcoma, malignant growths, spiculæ of bone, or callus after old fractures of the pelvic bones. According to Harris pelvic exostoses have been the cause of obstacles to delivery in eight American Cesarian sections. Five of the children were delivered alive, and four of the women recovered. Herman did a Cesarian section in a case of pelvic osteosarcoma, saving the child, but losing the mother (*Lancet*, 1891, i., 986). Although obstruction to labor from this cause is rare, the consensus of modern opinion is that the best chances for the child as well as the mother lie in the timely performance of Cesarian section.

Deformities of the Pelvis.—Besides excess and diminution in size, some authors describe no less than fourteen or fifteen deformities of the pelvis which contract its lumen and threaten to destroy the life of the child in its attempt to emerge into the world. It is not within the limits of this essay to even attempt a description of these various deformities. We shall only attend to them in their order of importance, and only in so far as they jeopardize the life of the child.

In this country we frequently meet with the generally contracted pelvis, and less so with the rachitic pelvis and those depending on spinal or hip disease or on pelvic tumors. The writer has met at least twenty cases of markedly contracted pelvis in his private practice, and many more of the lesser grades in the City of New York during a period of eight or nine years. Most of these were successfully delivered by forceps or version, but many of the children were lost. Two children became impacted and required perforation. In one case the attending physician performed version and amputated at

the neck; the woman died with the child's head undelivered. In another case the child was lost after a difficult version, and the mother herself died of shock several hours later. With such a lamentable showing, which we believe reflects the experience of most physicians in private practice, is it any wonder that, with increasing years, we look forward to the time when the mass of practitioners will have acquired the proper degree of enlightenment, and, following the dictates of the leaders in the profession, will save the lives of hundreds of unborn children, and, perhaps, mothers now doomed to death? A recent writer lamenting the frequency with which perforation is resorted to, remarks: "If the time comes when the risk to the mother can be proved to be no greater by timely resort to operation, which also considers the life of the fetus, most assuredly will it be our duty to reject absolutely all mutilating operations in case of a living child, other conditions necessary for the successful section or laparo-elytomy being present." (Grandin.)

Different writers place the occurrence of pelvic deformities at 72 to 145 in every 1000 cases. In 10,557 labors Scanzoni found 198 with pelvic contractions, and of these only 65 per cent. of the infants were saved. In 47.4 per cent. of the cases, delivery was spontaneous with fetal mortality of 19.1 per cent. (evidently the lesser grades of contraction). Where instruments for the premature induction of labor were required 61 per cent. of the children were lost. With forceps 32.4 per cent., and after version, 69 per cent. of the children succumbed. Perforation was resorted to 19 times. In 13 cases of generally contracted pelvis observed by Lubac, only 3 infants were saved. The maternal mortality is twice as great as in normal pelves, and that of children is 35 per cent. (Spiegelberg.)

Malpositions are frequent in deformed pelves. In 829 cases collected by Rigaud and Stanesco, 131 were other than vertex, and in 90 there was prolapsus of the cord or limb (Charpentier). Spiegelberg asserts that prolapsus of cord or limb occurs four or five times more frequently than in normal pelves. Presentations of face or shoulders occur also much more frequently.

The dangers to the child arise from prolongation of the labor, premature rupture of the membranes, and prolapsus of cord or limbs. The increased work put on the uterus interferes with the fetal circulation and occasionally causes the premature separation of the placenta

with intra-uterine fetal asphyxia. Besides this, even in vertex cases, we may get excessive caput succedaneum, superficial or deep impressions of the skull, deep overlapping of the sutures, and even, at times, fractures. The researches of Pajot, Michaelis, and Olshausen show various lesions: 1, to the face and head of the child—such as wounds, hemorrhages (extra- and intra-cranial), depression of bones, compression of brain, fractures, and contusions; 2, to the neck—such lesions as rupture of the vertebral column and tearing off the head; 3, to the body—rupture of the vertebræ, contusions of the abdominal viscera, rupture of the cord and lesions of scrotum; 4, to the limbs—fractures, dislocations, separation of the epiphyses and paralyses. Could there be anything more appalling than this list of injuries which a child is subject to in these cases?

The prognosis has been partly considered in a preceding paragraph. The infant mortality is due in great measure to the large proportion of still-births, consequent upon the protraction of labor and the continuous pressure to which the child is subjected. Even in slight degrees of contraction one out of five children is still-born (Playfair), and as the deformity increases, the prognosis becomes worse. Prolapse of the cord occurred 59 times in 414 labors (Stanescio). When the contraction is sufficient to indent the head of the child, 50 per cent. die during or shortly after labor (Schroeder). Frequent malpresentations cause the death of a large number of children in these cases. In seventy-seven cases of spontaneous labor in contracted pelvis—collected by Dohrn, Kummer and Berthold, and Milne—sixty-six of the children were lost. This contrasts strongly with the 407 cases collected by Lusk from various sources with a loss of only fifty-three children, and can only be explained by presuming the latter's cases as having been of the milder type only. According to Charpentier the contractions due to rachitis are the most frequent and give the least unfavorable results; the osteomalacic and funnel-shaped give the worst. In American women, however, the rachitic pelvis is seldom met with. In eight cases of double oblique pelvis, Chantreuil and Choisis noted six dead children. In eleven cases of contraction of the transverse diameter of the brim, seven children were lost. In the Naegele oblique pelvis Litzmann reports the death of thirty-one children out of forty-one cases.

The diagnosis of contracted pelvis deserves some attention. If

there is anything more neglected by the average practitioner than a careful study of the fetal heart preceding and during labor, it is an exact knowledge of the measurements of the pelvis. The description of numerous complex instruments in most text-books may account for this state of affairs. But there can be no question that the life of the unborn child and, to a great extent, that of the mother, depends on the knowledge which the attending accoucheur has in regard to the size of the bony pelvis. The writer has never carried any special apparatus with him and has always been able to form a fair estimate of the size of any pelvis. With two fingers in the vagina—the tip of the middle finger touching the promontory of the sacrum—the point is marked with the index-nail of the other hand at that part of the examining finger just beneath the symphysis pubis. Deducting three-quarters of an inch gives a fairly accurate idea of the measurement of the true conjugate, which is, by far, the most important of all the measurements. The true conjugate in a normal pelvis measures 4 to $4\frac{1}{4}$ inches. As a tape-measure is present in almost every well-regulated house, or can be easily obtained, there is no special difficulty met with so far. For the external measurements the extremities of two long pieces of stiff wire—with a curve resembling that of a carpenter's compass, or, if not at hand, the two blades of ordinary long forceps may be used—are made to touch the various pelvic landmarks. Thus the distance between the two anterior iliac spines would normally measure ten inches. The distance between the centre of the crests of the ilium would measure normally eleven inches. The distance from the symphysis in front to the sacrum behind ought to be about seven and three-quarter inches.

There can be no question but that pelvimetry has been too much neglected with us. Forceps and version have repeatedly been resorted to with resulting death to the child and often to the mother, where a little care in examination in the beginning might easily have shown that they were never indicated. Many a child, and often the mother, too, could have been saved by careful pelvimetry with the resulting decision to elect symphyseotomy or the Cæsarian section long before futile efforts at delivery had so jeopardized the life of both mother and child as to make the operations a hundred-fold more hazardous. The elective Cæsarian section is the only operation of the future in cases of excessive contraction, and the operation of symphy-

seotomy is the one for lesser degrees. Perforation and craniotomy of the living child will have little place in the practice of the best obstetricians and in the text-books of the near future.

LITERATURE CONCERNING DIAGNOSIS, PROGNOSIS, ETC., OF CONTRACTED PELVIS.

Text-Books on Obstetrics of Lusk, Playfair, Schroeder, Spiegelberg, and Charpentier.

DOHRN: Contracted Pelvis; Arch. f. Gyn., xxi. 70.

KUMMER and BERTHOLD: Contracted Pelvis; Archiv. f. Gyn., vi.

MILNE: Contracted Pelvis; Edinb. Med. Journ., xix.

LITZMANN: Naegele Oblique Pelvis; Monatsch. f. Gebtsh., xxiii. 263.

CHAPTER XIV.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

TREATMENT IN CONTRACTED PELVIS.

Expectant treatment offers good prospects for both mother and child, provided the accoucheur has convinced himself that the contraction is slight, and the labor-pains good. The hasty resort to forceps has cost many a child its life. In cases with a conjugate measuring $3\frac{1}{2}$ inches or more there is no necessity to terminate the labor by interference, so long as the child's heart-sounds are good and the labor-pains strong. As Lusk remarks, nature will do the best work with the least expense of infant life and with relatively small maternal mortality. Still Charpentier advises premature induction of labor at $8\frac{1}{2}$ months in these cases. If interference becomes necessary and the head is fixed in the pelvis, it is best to use forceps. If the head is movable above the brim, delivery will be more readily effected and with better prospects for the child by version. This latter operation is also indicated in brow, face and shoulder presentations and in cases of eclampsia and prolapsus of the umbilical cord.

Premature Induction of Labor.—At 7 to 8 months the fetal biparietal diameter measures $3\frac{1}{4}$ inches; at 8 to 9 months, $3\frac{1}{2}$ inches. Hence when the conjugate measures 3 to $3\frac{1}{2}$ inches, the indication from the maternal standpoint would be to induce labor between the 7th and 8th months, or the 32nd to the 34th week (Lusk). While the risks to the mother from this procedure are not serious, if properly done, those to the child are enormous. In this country, particularly, has little attention been given in private practice to the supervision of the prematurely-born infant, and the mortality has consequently been enormous. Litzmann concluded that, even when indicated in the interests of the mother, it offered dubious advantages to the child, and places the fetal mortality at 55.8 per cent. Dohrn reported 15 living children in 25 cases. Kunne induced labor 15 times, saving 12 of the children (Charpentier). Spiegelberg says that

induced labors means a fetal mortality of 66.6 per cent. Hence, from the standpoint of the child, this operation can only be justifiable provided the necessary care and attention can be guaranteed later.

The idea very prevalent among the laity that eight-months' children cannot live is radically false and has been disproved by a large number of observations. Children which weighed less than $3\frac{1}{2}$ pounds have been successfully raised. According to Tarnier 30 per cent. of children weighing only 1,000 to 1,500 grammes (2 to $3\frac{1}{8}$ pounds) can be raised. (Results furnished by the daily weight of children at the breast; Laure, Paris, 1889, 53.) The obstetrician, therefore, who fails to conscientiously devote himself to resorting to every effort which may result in the preservation of the life of the immature infant is guilty of professional neglect. In New York City during the past year an immature child said to have weighed a trifle less than two pounds was successfully reared, after a four-months' residence in an incubator, to the age of seven or eight months, when it finally succumbed.

Besides contracted pelvis, the indications for induction of premature labor may arise from diseases which imperil the life of the mother, as uncontrollable vomiting, enormous abdominal distension from various causes, placenta previa, etc., or in cases in which the child habitually dies previous to the time of labor.

In the induction of premature labor in contracted pelvis—as hinted at in the beginning—the prognosis for the child is not good. In 219 cases referred to by Charpentier, only 73 children were born alive, and 148 were either born dead or died shortly after birth. In Litzmann's table of 34 induced labors, in cases of contracted pelvis, 55.8 per cent. of the children were lost, whereas, in 118 cases of premature spontaneous labor only 7.6 per cent. were lost. This brings strikingly to the front the contrast in the living chances of an immature child after spontaneous and artificial premature delivery. Where the pelvis measured antero-posteriorly 2 to $3\frac{1}{2}$ inches, Rigaud and Stanesco, in fifty-three cases, found that thirty-four of the children were lost after premature induction of labor. In pelves measuring less than 2.3 inches premature labor has always been fatal to the infant.

We can therefore conclude that, under all circumstances, the induction of premature labor offers considerable risks for the child, but

that it offers the best chances the nearer to term it is performed and the larger the pelvis. This means that the less active the intervention and the greater the development of the child, the better the chances for its life.

Without entering into a detailed description of the various methods of inducing labor, we shall content ourselves with stating that at present two methods are chiefly in vogue—that of Krause, by the use of the catheter, and that of Pelzer, by the use of intra-uterine glycerin injections. Although twenty-eight times successful in the hands of Pelzer, Gener, Edgar, and others, the use of glycerin injections has recently given rise to dangerous maternal symptoms in the hands of Pfannenstiel and Embden. With regard to the catheter it may be said that Charpentier resorted to its use twelve times without a failure. Therefore the method per catheter should continue as the preferable of the two. The writer has succeeded in one case in inducing labor by packing the cervix with iodoform gauze. This is perfectly easy of performance, requires no anesthetics or assistants, and is accompanied with no danger at all. In cases of no great urgency it deserves a trial.

The care of the prematurely born child deserves a notice in this work. If born asphyxiated, external irritants should be first tried. If these fail, a catheter should be passed into the larynx, or the Sylvester method of artificial respiration resorted to. These efforts at resuscitation must be renewed from time to time for the first few hours or days. Two or three times daily these children must be bathed, and if the cry is feeble, thoroughly rubbed. The child must be awakened every hour or two and fed at the breast or with the spoon.

Directly after birth the air of the room should be kept at a higher temperature, the baby packed in cotton, and the crib surrounded with hot water in bottles. The Germans use a warm-bath apparatus, which can readily be imitated by placing the child in its wrappings in a small bath-tub, and placing this in an outer, larger bath-tub containing hot water, which is changed every three or four hours. One thermometer next to the baby and one in the water will keep the nurse properly informed of the temperature surrounding the child.

Numerous apparatus have been invented, in the shape of incubators, such as the *Couveuse* of Tarnier, or Baths of Winckel or Cr ed e, which are very ingenious and useful, but unfortunately very difficult

to have at hand in private practice, when wanted. The methods of wrapping the child in cotton or in a pillow and surrounding it with hot water-bottles, or placing it in the double bath-tub arrangement, are so simple in execution that there can be no excuse for their omission. The use of artificial warmth to the premature infant has very much increased the favorable prognosis. The work necessary is considerable, and it is hard often to get the laity to assist, but it is essential for the profession to be concerted in this direction.

The feeding of these children is likewise apt to be troublesome—usually the method of pouring a little mother's milk or diluted cow's milk from the teaspoon will be sufficient, but it must be done at regular intervals of every hour or an hour and a half. Some have advised introducing the milk through the nose, and Tarnier speaks highly of the use of "gavage," by which the milk is introduced directly into the stomach through a soft rubber catheter.

LITERATURE CONCERNING PREMATURE LABOR AND PREMATURE CHILDREN.

- BERTHOLD: Couveuse and Gavage at the Paris Maternity; Paris, 1887.
 TARNIER: Premature Children; *Ann. de Gyn.*, 1885, xxiv. 130.
 WINCKEL: Premature Induction of Labor; *Lehrb. f. Gebtsh.*, 1889, 889.
 LUSK: Text-book on Obstetrics, 342.
 CREDE: Premature Infants; *Arch. f. Gyn.*, xxiv. 1884, 128.
 BUSCHBECK: Induction of Labor; *Arb. a. d. k. Frauenklinik in Dresden, Leipzig*, 1893, i. 93.
 PLAYFAIR: Text-book on Obstetrics, 443.
 CHARPENTIER: Text-book on Obstetrics (Grandin), 177.
 PELZER: Induction of Premature Labor with Glycerine; *Central. f. Gyn.*, 1894, xxii. 634.
 PFANNENSTIEL: Dangers of Glycerine Injections; *Central. f. Gyn.*, 1894, iv.
 EMBDEN: Dangers of Glycerine Injections; *N. Y. Med. Rec.*, July 28th, 1894, 105.
 GENER: Glycerine to Induce Labor; *Cent. f. Gyn.*, 1894, xxvii., 636.

CHAPTER XV.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Forceps.—After their invention there was a time when these instruments were not used oftener than once in 21,867 labors, whereas craniotomy was performed three or four times as frequently as forceps delivery (Playfair). There is nothing in the practice of obstetrics which so tests the skill and judgment of the accoucheur as the use of forceps in contracted pelvis. The skill can readily be acquired by every practitioner. It is the judgment required regarding the proper cases in which to apply forceps which is apt to assume one of two extremes. The too hasty resort to this instrument may result in the death of the child from unexpected difficulties. Besides this the instrument itself, even in the best hands, is associated with undeniable risks. With the knowledge also that spontaneous labor, if not too long delayed, is apt to give the best results for the child in moderate degrees of contracted pelvis, the careful practitioner, watching the fetal heart-beat and character of the pains, will postpone the use of forceps in the hope of a natural birth. The opposite extreme is, however, often as dangerous, for many an infant is lost from timidity and procrastination. He who can exercise "the happy medium" will be blessed with the least infantile mortality.

The dangers to the child after forceps are considerable. Direct injuries frequently occur, such as lacerations of the integument of the scalp and forehead, contusions of the face, facial paralysis, depression or fracture of the cranial bones; or undue pressure of the blades may injure the brain (Hicks and Phillips). Jacobi refers many cases of meningitis and meningo-encephalitis to the use of forceps. The danger to the infant depends on the amount of force used and on its persistency or irregularity. Within the cranium the vessels of the brain or the venous sinuses may be torn (Webster). V. Prenschen met a case of fracture of the roof of the orbit after forceps (Gärtner). In 102 uncomplicated forceps cases Poppel found 61 living children; 36 were delivered asphyxiated, and of these 30 were saved. Sickel col-

lected 6228 forceps deliveries, of which 1069 children were lost. Murphy found that 50 children were lost in 248 forceps cases. Harper found the infantile mortality to vary between one in 26 to 47 cases (Charpentier). In 36 cases Borinsky found that 14 children were lost.

The conditions requisite for the successful employment of forceps are a dilated or dilatable os, ruptured membranes, vertex engaged in the pelvic canal, and slight or moderate contraction of the bony pelvis. Besides this latter condition forceps may be indicated in cases of inertia uteri, resistant perineum, and occipito-posterior presentations of the vertex. When ordinary forces are insufficient to overcome slight obstacles to delivery, or when the interests of mother or child require speedy delivery, forceps are again indicated. It is well at times to employ Walcher's position by which the feet are allowed to hang down, increasing somewhat the antero-posterior diameter of the pelvis.

The application of high forceps is particularly accompanied with grave risks to the child. Williams collected one hundred and nineteen cases of high forceps with a maternal mortality of 40 per cent., and an infantile mortality of 60 per cent. Simpson asserts that one out of three children is lost in contracted pelvis after forceps. So that, Lusk justly observes, the use of forceps under such circumstances is to be regarded as hardly less dangerous than Cæsarian section. When the head is movable above the brim forceps are particularly dangerous for the child, for, if the head becomes impacted, nothing is left but perforation and craniotomy. Braxton Hicks was obliged to resort to version after failing with forceps in four cases, and succeeded in saving three of the children. The writer, within the past year, met with two cases in which, forceps failing, version was substituted and both children were delivered alive.

LITERATURE CONCERNING FORCEPS.

- WILLIAMS: High Forceps; *Am. Journ. of Obst.*, 1879.
 GARTNER: Melæna, etc., after Forceps; *Centrl. f. Gyn.*, 1894, xxix. 69.
 HICKS & PHILLIPS: Injuries to Child after Forceps; *Obst. Trans.* xiii.
 WEBSTER: Rupture of Longitudinal Sinus after Forceps; *Centr. f. Gyn.* 1894, xxxii. 784.
 FENWICK: Forceps; *Internat. Clinic*, 1893, iii. 248.
 Use and Abuse of Forceps; *Charlotte, N. C. Med. Journ.*, 1893, iii. 17.

- NEUGEBAUER: Danger of Forceps etc.; Gaz. Leck. Warsaw, 1893, xiii. 256.
- FURTH: On Forceps Operations; Centr. f. Gyn. 1893, xviii. 927.
- NAGEL: The use of Forceps; Internat. M. Mag, 1892, lxi. 679.
- WARREN: Forceps; Trans. Maine M. Ass., 1892, xi. 168.
- FRY: Forceps; Trans. Wash. Obst. and Gyn. Soc., 1889-90, iii. 79.
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- KOLBERG: Indications and Prognosis of Forceps; Centr. f. Gyn., 1894, xlv. 1135.
- REYNOLDS: Forceps; N. Y. Journ. Gyn. and Obst., 1892, ii. 907.
- PORAK: Danger of applying Forceps, etc.; Rev. Obst. et Gyn. 1893, ix. 119.
- TARNIER: Forceps in Hip Disease; J. de Sages. Femmes, 1893, xxi. 281.
- SWAYNE: Compression of the Umbilical Cord during Delivery by Forceps; Med. Rec., Aug. 11, 1894, 174.

CHAPTER XVI.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Version.—In this country, at least, version is preferred to forceps in moderate degrees of pelvic contraction, with the head movable above the brim. The reason for this lies in the observed fact (Cohnstein) that, after the birth of the shoulders, the head, beginning at the base of the cranium, can better mould itself to the pelvic canal and allow of easier extraction than when the vertex comes first. Lusk places the indications for version at a limit of $2\frac{3}{4}$ to $3\frac{1}{2}$ inches antero-posterior diameter of the pelvis, with sufficient amplitude in the transverse diameter.

The perils to the child after version are many. Fractures of the clavicles and humerus, lacerations of the sterno-cleido-mastoid muscle, rupture through the substance of the vertebræ, extravasations of blood into the cavities of the head and trunk, separation of the condyles from the occiput, and of the squamous portion of the temporal bone from the parietal bone, fractures and depressions of the skull, and rupture of the sinuses of the dura mater, are mentioned by various authors. The life of the child is chiefly endangered by premature respiratory efforts, and the depressing influence exercised upon the fetal heart by pressure at the base of the brain during efforts at extraction.

At the Dresden Clinic, in twenty-five successive versions with extraction in contracted pelves (conjugate measuring 2.8 to 3.2 inches) nearly 90 per cent. of the children were saved. Schatz has practiced version forty or fifty times in contracted pelves, and has usually obtained living children. In these cases the membranes were kept intact, the cervix was allowed to become fully dilated, and the patients were placed in Walcher's position with the extremities hanging down, thus increasing the length of the conjugate by a fraction of an inch. In forty cases of version reported by Korrman, Lœwenhardt, and Goodell, the fetal mortality did not exceed 22 per cent. The reports of other writers are, however, much less encouraging. In

fifty-eight cases of pure narrowing of the conjugate, reported by Borinski, one-half of the children were born dead. In Charpentier's thirty-six cases of contracted pelvis, with a conjugate ranging between $3\frac{1}{10}$ and $3\frac{1}{2}$ inches, no less than 73.3 per cent. of the children were lost. Cephalic versions show the least, podalic versions the highest infantile mortality.

The figures quoted, however, show the fallacy of collected statistics. So much really depends on the nature of the cases collected, the mode of operation, and the personal equation of the operator, that all such figures can only be regarded as having only a limited value.

Still, the decision between version and forceps will greatly depend on circumstances. The most recent authorities reject both in pelvis measuring less than $3\frac{1}{2}$ or 3 inches. If the head is movable above the brim, forceps ought always to give place to version, as offering the better chance for the child. If the brow or face presents, if there is prolapsus of the cord, which happens in 60 per cent. of the cases, or if eclampsia is present, the interests of the child require a prompt resort to version.

The various methods by which version may be effected are chiefly four: external, cephalic, podalic and combined.

External version is the most ancient, having been resorted to by the Japanese and Mexicans. It is alluded to by Hippocrates and the Arabian physicians. According to Pinard it ought to be practised in every case after the eighth month where the vertex is found to lie in one or other iliac fossa or in the upper uterine segment (Charpentier). Although this would be very desirable in all cases of breech, which are particularly serious in primiparæ, Charpentier points out that just in these cases external version is often impracticable. Next to transverse presentation, the indications for this procedure are offered by pelvic deformities discovered at term and abnormal insertion of the placenta. It is apt to be inapplicable in the pelvic presentations of primiparæ, in multiple pregnancy, and in the advanced stages of labor. Playfair limits external version exclusively to transverse presentations.

Internal cephalic version requires one hand in the vagina to seize and draw downward the head while the outer hand pushes the body upward (Busch); or the outer hand pushes the head downward while the hand in the vagina pushes the body upward (D'Outrepoint). These manœuvres are not practicable during labor without anesthesia.

Podalic version was described as far back as the time of Celsus. The indications for its employment are transverse presentation, conditions dangerous to mother or child requiring rapid termination of labor, and pelvic deformity. A good rule is to use that hand the palmar surface of which conveniently corresponds to the anterior surface of the child's body. The foot being seized, the child's body is turned and extracted, or the part seized is allowed to act as a dilator of the cervical canal. The success of the operation depends on thorough dilatation of the cervix, mobility of the fetus, and fair size of the pelvis. A contraction of less than 2.7 inches in the conjugate is a strong contra-indication. Deutsch recommends a method by which the fetus undergoes a movement of rotation about its longitudinal axis and then the feet are disengaged. It is only practicable with much liquor amnii, a small fetus and a non-irritable uterus.

The bi-polar or combined method of Braxton-Hicks consists in passing two fingers in the vagina, lifting the presenting part, and assisting the rotation of the child with the other hand externally. It may replace cephalic or podalic version, but only as a rule at a time preceding the rupture of the membranes with the fetus still movable.

It may be of interest to add a table, from figures given by Charpentier, showing the comparative results to the child after spontaneous labor, version, forceps, and premature labor in cases of contracted pelvis.

TABLE OF INFANTILE MORTALITY IN CONTRACTED PELVIS AFTER

| CONJUGATE. | 1. | | 2. | | 3. | | 4. | |
|--------------------|-------------------|----------------------|----------|----------------------|----------|----------------------|------------------|----------------------|
| | Spontaneous Labor | | Version. | | Forceps. | | Premature Labor. | |
| | Cases | Infantile Mortality. | Cases | Infantile Mortality. | Cases | Infantile Mortality. | Cases | Infantile Mortality. |
| 3½ or more inches. | 216 | 15.74% | 21 | 66.6% | 51 | 54.9% | | |
| 3½ to 3¼ | 84 | 36.9% | 15 | 80.0% | 60 | 31.66% | 17 | 47.0% |
| 3¼ to 2¾ | 11 | 45.45% | 3 | 100.0% | 20 | 60.0% | 18 | 66.66% |
| 2¾ to 2⅝ | 1 | 100.0% | 4 | 100.0% | 5 | 40.0% | 10 | 90.0% |
| 2⅝ to 1¾ | 0 | 0.0% | 0 | 0% | 1 | 100.0% | 5 | 100.0% |

The following table from the same source compares forceps directly with version in contracted pelvis, but of sufficient dimensions to admit of the extraction of a non-mutilated fetus :

INFANTILE MORTALITY IN CONTRACTED PELVIS AFTER VERSION AND FORCEPS.

| | INFANTS. | | | |
|-------------|----------------------|----------------|--------------|-------------------|
| | <i>No. of Cases.</i> | <i>Living.</i> | <i>Dead.</i> | <i>Mortality.</i> |
| Forceps . . | 45 | 24 | 21 | 46.5% |
| Version . . | 20 | 17 | 3 | 15.0% |

From the second table our position is confirmed that in moderate degrees of pelvic contraction with the head movable above the brim the best interests of the child are subserved by a timely resort to version.

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CHAPTER XVII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Symphyseotomy.—Within the past few years—chiefly through the writings of Pinard and Leopold, on the continent, and Harris in this country—the operation of symphyseotomy, as revived by Morisani, has again come into prominence. As its aim is legitimate in its tendency to save both mother and child, it must be regarded as a valuable resource in cases of obstructed labor due to contracted pelvis. As one of the principal alternatives, in doubtful cases, consists in the performance of craniotomy, the serious importance of this practically new operation from the standpoint of the child will very readily be appreciated.

Past statistics have been bad, and later statistics, taken collectively, have not been good. Like most statistics, however, the deductions are fallible for various reasons. The fact that an operator uses no judgment and attempts the operation, as has been done, when the child was known to be dead, does not invalidate the operation in a similar case with a living child, but it increases the fetal mortality. Similarly an inexperienced or clumsy operator, carried away by an excess of zeal, may, through faulty technique, lose both mother and child. Lastly, even surgeons of experience attempting this operation for the first time may meet obstacles which may unfavorably influence the fate of mother and child. Thus even the careful statistics of Neugebauer, who records a maternal mortality of twelve per cent. in two hundred and eight cases operated between 1887 and 1893, or those of Harris, who places the maternal mortality at twelve per cent. and the fetal mortality at twenty per cent., must be taken *cum grano salis*. To be sure, individual operators of ability have had poor success with the operation at times. Thus Richard Braun v. Fernwald recently reports twelve symphyseotomies with four maternal deaths. Of eight children alluded to three were lost. But to counterbalance this discouraging report, we have quite a series of suc-

cessful cases in the practice of others. Take an operator like Morisani himself, and we learn from his latest statistics of fifty-five operations, that he lost only two mothers and three children. Pinard succeeded in saving nineteen out of twenty mothers and most of the children. Zweifel, in twenty-three cases, has saved all the mothers and twenty-one children. Fritsch has done the operation four times, saving all of the mothers and two of the children. Broomall, in this country, reports three cases with the loss of one child. V. Woerz reports ten cases in which one mother was lost and all of the children were saved. In New York City Dr. Edgar has done four symphyseotomies, saving all of the mothers and children. From this especially selected series of one hundred and thirty-one symphyseotomies we get approximately a maternal mortality of six and one-tenth per cent. and a fetal mortality of ten per cent. May we not hope that in the course of time the rate of mortality taken collectively from all sources will not exceed these figures?

The operation is indicated in cases of contracted pelvis, ranging from three and one-half inches (Morisani) down to two and three-fourths inches (Harris) in the conjugate diameter. The operation is contra-indicated in the cases of very feeble or dead children. The indications were very thoroughly discussed at the last International Congress at Rome (1894), and the writer will briefly quote the views of those who took part in the discussion.

Morisani advised the operation in pelves measuring two and three-fourths to three and one-half inches in the conjugate, provided the child was strong and the cervix decidedly open. With a conjugate of three and two-tenths inches he advised trial with the forceps first. He claimed that symphyseotomy can replace the Cesarean section in many cases.

Leopold cautioned the general practitioner not to attempt the operation, and to avoid it in primiparæ. He placed the limits of contraction at three inches to two and two-fifths inches, and advised performing the operation in a hospital only. He considered a conjugate diameter of two and four-fifths inches in flattened pelvis and three inches in justo minor pelvis the lowest limits indicating a symphyseotomy.

Zweifel thought that in time the general practitioner would be able to substitute this operation for perforation.

Sänger, influenced by his excellent results with Cesarian section—twelve cases without a death—was rather disposed to keep the operation of symphyseotomy in the back-ground.

Pinard maintained that an aseptic symphyseotomy was free from danger. He limited the operation to a conjugate of two and four-fifths inches; in cases with a narrower conjugate he advised the Porro operation. He expressed himself as eternally opposed to embryotomy on the living child, and, in appropriate cases, would rather resort to ischio-pubiotomy, or coccygotomy.

Finally, Harris, in this country, advises against symphyseotomy in cases with a very short conjugate. He recommends, in case of operation, no delay, good surroundings, and accurate determination of the size of the pelvis—the lowest limit of which must not be less than two and three-fourths inches.

In doing this operation attention to details is essential for success. With a pelvis of two and three-fourths inches to three inches in the conjugate, in a multipara, and with a larger corresponding diameter in a primipara, with a vigorous child, with the cervix well dilated, and, if possible, the bag of waters unruptured, the patient is placed in Walcher's position under the influence of an anæsthetic, and under the usual aseptic surroundings of every major operation. After the soft tissues have been divided and the symphysis pubes separated, an assistant delivers the child by forceps or version, and the wound is closed and treated on general surgical principles.

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CHAPTER XVIII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Cesarian Section.—In the practice of obstetrics the law will always exist that, in case of obstructed labor, the interests of the mother must always predominate over those of the child. Thus, in looking at the older statistics of Cesarian section with the maternal mortality ranging between fifty-four and sixty per cent. (Mayer, Harris), with a saving of even less than half the children (Harris), we can readily understand why this operation should have fallen into disrepute and craniotomy almost universally resorted to. When we remember that the maternal mortality after this latter operation only amounted to four to twelve per cent. according to different authorities (Determann, Lewers, Leopold), we must grant that our predecessors were right in giving preference to that method of operative interference which only subjected the mother to one-sixth or one-tenth of the dangers of the Cesarian section. But we have entered upon a new era. Selected statistics are making a favorable showing. In the literature of the past four years the writer has found over a hundred successful Cesarian sections reported by individual operators. Sanger alone has done one hundred and twenty Cesarian sections with only seventeen deaths (Olshausen), and his last dozen cases without a single death. Zweifel has lost in eighteen cases only one mother and one child (Harris). Cameron saved nine mothers and ten children in ten operations. In Leopold's ten cases, nine mothers and all of the children were saved (Charpentier). Fritsch has had seven cases without a death (Grandin). Winckel (1889) places the maternal mortality at eight and six-tenths per cent., whereas Harris, later (1893), in one hundred and forty-two European Cesarian sections, in the practice of selected operators, finds a maternal mortality of only seven per cent. This does not deny that general statistics from all sources show a mortality of fourteen to twenty per cent. (Olshausen, Leopold). But if, under select circumstances, we can claim a maternal mortality of

seven per cent., and a fetal mortality of only six per cent., what a wonderful stride we have made! What a wonderful advance can we boast of when, at the close of the nineteenth century, we can claim that we have almost equalized the risks of Cesarean section and Craniotomy from the maternal standpoint, and, at the same time, instead of destroying the life of the child, have given it nearly every chance of life!

The absolute indication, in cases of deformed pelvis, for performing this operation, is an antero posterior diameter of two and one-half inches or less. With a larger conjugate than this, fair chances are offered to mother and child by other procedures—spontaneous labor, induced premature labor, version, forceps and symphyseotomy. Below this limit no woman ought to be allowed to enter upon labor without being prepared for abdominal section. The medical profession must, however, in the interests of children, otherwise hopelessly doomed, learn to deliberately elect the Cesarean section. Take a case, for example, near to full term, with external measurements showing an abnormal state of affairs. Internally we may determine that the pelvis is narrower than normal by one and a half or two inches antero-posteriorly, or perhaps in all directions. With a fetus of average size the presumption is fair that such a child cannot possibly be born alive, and the process of labor may likewise cost the mother her life. In such a case prepare at once for Cesarean section. If no pains are present, induce labor several hours before the operation. According to Olshausen, Cesarean section offers the best chances in cases where the bag of waters is unruptured, and where the previous history excludes the chance of the normal termination of labor.

The method of operation now usually chosen is the so-called "Improved Cesarean Section." The Porro operation has been rejected by most operators, except in cases of rupture of the uterus, because the constriction of the neck of the uterus with an elastic tube is apt to be followed by asphyxia of the child. According to Harris twenty-one per cent. of the children are lost. The laparo-elytrotomy of Thomas is rarely performed. In performing the Improved Cesarean Section of Sanger and Leopold, Garrigues advises: "Antiseptic treatment; early operation; turning uterus out of abdominal cavity; sutures at upper angle of abdominal wall, so as to promptly tie them when the uterus is turned out; gutta-percha tissue behind turned-out uterus;

rubber tube about cervix; uterus to be wrapped in warm cloths so as to avoid shock; uterine suture." Harris says: "Time and technique must go hand in-hand if the death-rate is to reach a lower percentage." This operation can and has been done in about twenty minutes by skillful operators.

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Summary of Treatment in Contracted Pelvis.—What is the proper course to pursue in the different grades of pelvic contraction regarding the best interests of the child as well as those of the mother? In pelves measuring four inches or more in the conjugate the best interests of the child will be subserved by temporizing, keeping a careful watch, however, on the progress of labor, the nature of the labor pains, and the condition of the fetal heart. At three and a half inches in the conjugate, if discovered during pregnancy, induced labor about the end of the thirty-fourth week offers the best chances of a spontaneous delivery; but, unless every attention can be given the child, it is apt to succumb to prematurity. If the contraction is only discovered at the time of labor, the decision between forceps and version must be determined by the condition of mobility or immobility of the fetal head. In pelves ranging between three and a half and two and three-quarter inches, induced labor at the end of the thirty-second week offers a doubtful prognosis for the premature child. During labor, symphyseotomy, followed by forceps or version, offers the child a fair chance of life, although subjecting the mother to grave operative risks. With a

conjugate measuring two and a half inches or less, Cæsarian section offers the only chance for the child with somewhat increased risks over craniotomy for the mother.

Craniotomy.—In the cases considered the condition of mother and child has been presumed to be good. Where this is not the case, particularly if the child be positively dead, then, and then only, can the question of craniotomy come up for consideration. Craniotomy of the living child is still advocated by certain recent writers (Leopold, Rosenberg) under circumstances where the general condition of the mother is precarious. Others are equally opposed to the procedure (Pinard, Grandin). The general drift, however, of modern obstetric surgery is so clear that it will not be many years before perforation of a living child will be regarded as a barbarism of the past, and even perforation of dead children will become an operation of great rarity. There was a time, not many years ago, when craniotomy was resorted to three or four times more frequently than forceps (Playfair), but with the progress of our science we hear less and less of this horrible operation. The only indication to-day for the operations of craniotomy, decapitation, or evisceration, is first and always the certainty of the child's death. Then only in certain cases of large fetal head or body, tumors, monstrosities, impaction after version, etc., is this operation at all justifiable.

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CHAPTER XIX.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

4. RUPTURE OF THE UTERUS.

Although a very rare accident during the progress of labor, rupture of the uterus deserves a moment's notice on account of the grave dangers run by both mother and child. In the writer's experience with over fifteen hundred deliveries, this accident occurred only once, and in such slight degree that, after rapid instrumental delivery, both mother and child were saved. In the practice of medical colleagues the writer, however, knows of two cases in which both children and one mother were lost. Charpentier has collected one hundred and ninety-seven cases of traumatic rupture following version, forceps, various unwise manipulations during labor, and cephalotripsy. This proves how slowly and deliberately the accoucheur must act in deciding upon operative interference during labor.

As a sign of impending rupture of the uterus McClintock has called attention to the cessation of the fetal heart-sounds. This again emphasizes the necessity of auscultating the fetal heart from time to time during labor. The prognosis to the child is almost necessarily fatal from shock, profuse maternal hemorrhage, strangulation of the cord or important fetal parts, and the loss of time in extracting the child. The figures of Ramsbotham and Franqué show two hundred and forty-three fetal deaths in two hundred and sixty-three cases (Charpentier).

Left to nature, one hundred and forty-two children in one hundred and forty-four cases died (Charpentier). Of one hundred and fifty-four children delivered artificially, fifty-seven were saved (Charpentier). If the child is still in the uterus, therefore, its immediate extraction is urgently called for. Even laparotomy is indicated, for it gives the operator a chance to clean out the abdominal cavity of blood and remove the uterus. If the fetus is in the abdominal cavity, this is the only line of treatment possible. In forty cases of laparotomy under these circumstances, twenty-one women and two children were saved (Harris).

NOTE.—A very recent study of nineteen cases of rupture of the uterus has been published by Braun v. Fernwald. (Cent. f. Gyn., 1894, xlv. 1102.)

CHAPTER XX.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

a. PRECEDING LABOR.

During pregnancy the child may lose its life from numerous causes, many of which have been described in detail in the preceding chapter. Their importance justifies a brief recapitulation. Paternal causes emanate from alterations of the semen and are mainly syphilitic in nature. Maternal causes include general diseases, irritability of the uterus, and various lesions connected with the placenta and membranes. Besides these causes, many external influences, traumatism, elevation of maternal temperature, or acceleration of maternal heart-action, and the numerous possible obstructions to the utero-placental circulation, all tend to destroy the life of the child previous to the onset of labor.

On the part of the child itself we may have a series of conditions due to diseased states, multiple pregnancy, or intra-uterine accidents, which may destroy its life or threaten its existence. We shall now proceed to examine these conditions a little more in detail.

1. DISEASES OF THE FETUS IN UTERO.

Peritonitis is one of the most frequent diseases of the fetus previous to birth. Lorain found it present ten times in one hundred and six still-born infants. In one hundred and ninety-three children which were born alive but succumbed after several hours or days the same observer found it present in forty cases. In some of these latter cases meningitis, multiple abscesses, and erysipelas were also present (Charpentier). The so-called "puerperal affection" of the newly-born is characterized by the frequent presence of the lesions of peritonitis. According to Baginsky these children are infected in utero. Other lesions may be present, such as macerated skin, bloody or serous effusions in the cavities of the body, petechiae in the lungs, pericardium and pleura, ecchymosis in the liver and on the surface of the peritoneum, and fatty degeneration of the heart and liver.

The various fevers—as described in another chapter—may affect the fetus in utero. They embrace chiefly malarial fevers, typhoid fever, and the eruptive fevers.

Icterus may affect the fetus in utero, and is usually of fatal import. It may occur in connection with acute yellow atrophy of pregnancy, or be due to inherited syphilis, or any condition obstructing the flow of bile. It represents the "Symptomatic Icterus" (Runge) as distinguished from the "Icterus Neonatorum," which is a far milder condition, and which, as a rule, does not appear before the second day after birth.

The skin and cellular tissues may present a variety of lesions. Besides the characteristic rashes of the eruptive fevers and the lesions of dermatitis, ichthyosis, and pemphigus, we may find superficial or deep tumors (spina bifida, bronchocele, cancer, abscesses, etc.), and purulent ophthalmia.

Scrofulous affections are supposed by some to be of syphilitic origin, but there is reason to believe that they may emanate from other etiological sources. They occur chiefly in the form of congenital goitre—the "Struma Intra-uterina Congenita" of Spiegelberg—which is characterized chiefly by simple parenchymatous hyperplasia.

The bones may be the seat of fractures due to defects in ossification, to non-union of the bony structures, to inflammatory separation of the epiphyses, to non-union of the diaphyses, to maternal injuries during pregnancy, or to congenital rachitis or syphilis. Luxations and spontaneous amputations of limbs have been recorded. Küstner recently calls attention to such amputations resulting from amniotic strings.

The cerebral lesions of the fetus are most frequently represented by hemorrhages, and may be located in the brain substance or meninges. The brain tissue may be hypertrophied, or the seat of hemicephalus (Scanzoni), or there may be atrophy of the brain substance in conjunction with hydrocephalus, or, according to Henoch, with cerebral hemorrhage.

The organs of respiration may be the seat of a number of intra-uterine diseases. Pneumonia, due to aspiration of decomposed amniotic liquid or of secretions from the genital canal, has been described by Küstner. Tuberculosis and emphysema have likewise been known to occur. Alterations of the thymus—chiefly syphilitic

in origin—have been met with. One of the best modern studies regarding the pathological lesions of this gland has been made by A. Jacobi.

The heart and blood-vessels may present a variety of abnormal states. Endocarditis with valvular lesions, pericarditis, dilatation, and adhesions may be found. Northrup, within the past year, reported a case of congenital pulmonary stenosis with incompleteness of the septum ventriculorum, and Droog reported a case of congenital dextro-cardia with hernia of the lung. The blood-vessels may be congenitally incompetent, or thin, or present evidences of disease or alterations in their walls. Among these hereditary syphilis, congenital atheromatous degeneration, fatty and hyaline degeneration, have been described. (Jacobi.)

The digestive tract.—Ulceration and discoloration of the stomach, whitish follicles at the cæcum, enteritis, with every degree of hyperemia of the intestine, bloody extravasations in its walls, intestinal perforations, and entozoa, have all been met with.

The liver and spleen may show the lesions of hepatitis and splenitis, which, as a rule, result from congenital syphilis. These organs may thus be the seat of softening, fatty degeneration, hypertrophy, or induration.

Congenital syphilis may manifest itself in the fetus in the form of superficial affections of the skin and mucous membranes, or as profound lesions involving the viscera and bones. Thus we usually look for rashes (such as pemphigus), oral mucous patches, and fissures at the angles of the lips and at the anus, as superficial evidences of this disease. The deeper lesions regularly involve four organs (Parrot): the liver (Gubler), the lungs (Virchow), the spleen (Parrot), and the thymus gland. The pancreas is frequently diseased (Birch-Hirschfeld). Occasionally lesions are found in the brain, kidneys and intestines. As elsewhere stated, fetal peritonitis is a frequent manifestation of syphilis (Simpson). The bones may show different lesions, which Parrot divides into four grades. The chief of these, according to Post, consists of an osteo-chondritis at the epiphyses, which is so characteristic of congenital syphilis that the diagnosis may be established from its presence alone. Finally, Behrend first described the congenital hemorrhagic form of syphilis, which is characterized by hemorrhage on the surface, in the large cavities, and practically in all

the viscera of the body. It is attributed to a diseased state of the blood-vessels.

Intra-uterine Rachitis, unlike congenital syphilis, cannot be positively traced to inherited disease. It is believed, however, that the impoverished state of the mother during pregnancy may have an important etiological bearing. Up to the present time only four authentic cases have been reported in the United States (Mason). According to Depaul, the fetal extremities are remarkable for their length and volume. The capacity of the thorax is considerable. The long bones are arched. The entire bony system seems to be invaded. Barlow and Bury consider intra-uterine rachitis as a graded disease, varying according to the period of onset and the activity of the morbid process. In certain cases the bones become so fragile as to break very readily. Cases of fetal cretinism, or "so-called fetal rickets," are generally still-born or survive only a short time if born alive. In these cases the most striking feature is the stunted appearance of the limbs in comparison with the size of the trunk. Kaufman very recently again calls attention to cases presenting changes in the cartilages which simulate but are not identical with fetal rachitis.

The diagnosis and, consequently, the treatment of these various diseased processes in utero are, at the present stage of our knowledge, beyond our reach. In a woman, however, who is repeatedly delivered of still-born children, the examination of the fetus and placenta may throw light upon the nature and origin of the disease, and, in certain instances, give us indications for future preventive treatment. Thus, a fetus presenting evidences of rachitis, would give us the clue of putting the mother on careful hygienic and dietetic treatment, with the addition of such drugs as phosphorus or cod-liver oil. The fact of syphilis being discovered in the fetus would give us the clear indication of subjecting both parents to a thorough course of anti-syphilitic treatment. And even with no discoverable cause, the precept of Depaul ought to be followed in those women who repeatedly abort or give birth to successive still-born children, by placing them under a similar course of treatment. Even induction of labor, prior to the expected time of the death of the fetus, is considered justifiable. Where the habitual death of the fetus can be indirectly traced to the mother, from general or local pathological states, the careful physician will search for these causes and map out a corresponding plan of treatment.

LITERATURE CONCERNING DISEASES OF THE FETUS.

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CHAPTER XXI.

FETAL CAUSES PRECEDING LABOR—(CONTINUED.)

2. MULTIPLE PREGNANCY.

The simultaneous presence of two or more fetuses in utero is often responsible for the death of one or more of them previous to the onset of labor. The writer attended a lady in labor during the seventh month of pregnancy, and, after the child was delivered, was surprised to find a second fetus in utero. On its expulsion it was found to be of not more than three or four months' development. In this case evidently the one fetus had died early and, after several months, had induced the expulsion of the second child. Eustace reports two similar cases; one fetus, in the one case, dying four or five days, and, in the second case, fourteen days, before birth. Schultze reports a case of twins in which the one child had reached term, and the second was an undeveloped fetus of six-weeks' growth. Haushalter and Schul have recently reported a case of twin pregnancy, with pulpy transformation of one fetus and atrophy of the corresponding portion of the placenta. The risk of twins becoming twisted in the umbilical cords and strangulated is greatest when they are both in one sac (Herman). Charpentier refers to twelve such cases.

The vitality of twins is naturally below par; but that of triplets is worse. Of one hundred and ninety-two twin births, reported by Reuss from the Würzburg Clinic, fifty-one did not reach full term. It is very seldom in triplets that the three children should survive (Playfair). Congenital debility is responsible usually for their early demise in utero, or shortly after birth. In a case of triplets reported by Buzzanella, one was born living and the other two were in a papyraceous state. In a case of v. Erlach's, one of the children was papyraceous. In a case of Helme's, one of the children was dead previous to birth.

LITERATURE CONCERNING MULTIPLE PREGNANCY.

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3. INTRA-UTERINE ACCIDENTS.

Although *maternal falls and direct injuries* to the abdominal walls may result in the death of the child in utero, the chief causes productive of this result emanate from the umbilical cord or premature detachment of the placenta.

Torsion of the Umbilical Cord occurs most frequently at about the seventh month and chiefly in multiparæ (*Spiegelberg*). When extreme the exaggerated spiral twists may prove fatal to the child by obstructing the circulation in the blood-vessels. *Spaeth* mentions three cases in which this caused the death of the fetus, and the writer has seen one case. The abnormal condition is favored by an unusual length of the cord, the torsion occurring, as a rule, at the umbilical end. Although still permeable, the blood-vessels at the seat of torsion are almost entirely occluded. *Thrombi*, bloody serum in the abdominal cavity of the fetus, œdema, and cystic degeneration of the cord, are frequently met with in these cases (*Lusk*). Although *Martin*, *Schauta*, and others regard the torsion as a post-mortem change and attribute the death of the fetus to syphilis, placental endo-metritis, or hemorrhage, there seems to be good reason to believe that these excessive twists are due in the majority of cases to fetal movements.

Spontaneous rupture of the cord in utero, although exceedingly rare, is possible. *Funke* very recently has published a case of extensive hydramnion, in which the torn cord presented before the os was dilated.

Knots of the cord are said to occur once in two hundred cases. Although frequently harmless, they may, at times, occasion grave or fatal disturbance in the fetal circulation. *Géry* refers to two cases in which

knots caused the death of the fetus. Veit reports the case of an intra-uterine macerated fetus with a knot in the cord and a coil about the neck. Ferrari reports a similar case.

Coiling of the cord about the fetus, when rapidly developed, may, in rare cases, by the interruption in the feto-placental circulation, lead to the child's death. Similarly may a limb become constricted and its circulation cut off, leading to its imperfect growth, or even causing amputation or fetal death. If the constriction involve the neck, strangulation or even amputation of the head may result. Numerous coilings may likewise so interfere with the circulation through the umbilical vessels by direct pressure as to cause the death of the fetus. Nearly half a century ago Krahmer pointed out that, under these circumstances, the child might make premature efforts at respiration in utero and lose its life. Still it is wonderful at times how frequently the cord is found coiled about the child's neck without doing any damage. The writer has delivered living children with three and four coils about the neck. Cases with remarkable convolutions have, within the past few years, been reported by Simpson, Loviot and others.

Stenosis of the umbilical vessels is usually attributed to syphilis (Lusk), and is prejudicial to the fetus in direct proportion to its grade of development.

Ante-partum hemorrhage or Accidental hemorrhage resulting from partial detachment of the placenta offers a bad prognosis for the mother, but a much worse one for the child. Of one hundred and seven children only six were saved (Goodell).

The prognosis of these various conditions is, at times, quite grave for the fetus. In cases of twin pregnancy, Sedlaczek reported ten cases of twists or knots of the cord with coiling of the cord about the fetus in two cases. Of these, six ended in miscarriage, and only six out of the twenty children were born alive. Herman adds six other cases. Of these thirty-two children, in one case the result was unknown, six children were born living and twenty-four children were lost.

The diagnosis and, hence, the preventive treatment of these various conditions are mostly beyond our reach at the present stage of our science. If discovered during labor, the cord constricting the child's neck has been divided between ligatures with the hand in the vagina. After the birth of the head there should be no hesitation in boldly

dividing one or more coils about the neck if the prospect of delivering the child immediately is in doubt, or if it is not possible to gently draw down the cord and disengage it. In a case in which the child's face was black from the strangulation due to four coils tightly constricting the neck, the writer rapidly cut through the four coils with one sweep of the scissors and succeeded in saving the child.

LITERATURE CONCERNING INTRA-UTERINE ACCIDENTS.

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CHAPTER XXII.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

b. DURING LABOR.

The dangers to fetal life emanating from the child itself during the progress of labor are numerous and serious. They embrace dystocia from malpositions or malpresentations of the fetus, prolapse of the umbilical cord, errors in the length of the umbilical cord, multiple pregnancy, prolapse of various parts at one time, excessive development of the fetus, diseased states of the fetal head, neck and body, and constitutional weakness.

1. MALPOSITIONS OR MALPRESENTATIONS OF THE FETUS. VERTEX PRESENTATIONS.

In 97 per cent. of all cases of labor, the child presents with the vertex (Spiegelberg). When the occiput is anterior and the occipito-frontal diameter corresponds with the right sacro-iliac diameter of the maternal pelvis we have what is called the "first position." By imagining the occiput to be anterior or posterior and directed to the right or to the left we have the four varieties of vertex presentations described by most English and American authorities. In vertex cases the prognosis for the child is best, the rate of mortality being only 2 per cent (Dubois). With every deviation from the occipito-anterior presentation the risks to the child increase. The mechanism of labor in vertex cases is thoroughly described in all text-books on obstetrics. It may be mentioned, in passing, that occipito-posterior positions of the vertex, by strong flexion on the trunk, usually become converted into occipito-anterior positions, thus considerably reducing the risks to the child.

Vertex Cases with the Occiput-anterior, in roomy pelves, with good labor pains, require very little assistance from the attending accoucheur. These cases readily deliver themselves, and represent the class in which "meddlesome midwifery" should be scrupulously

avoided in the interests of both mother and child. Where the labor, however, becomes delayed from inefficient labor-pains, or from moderate obstructions in the pelvic strait, after a careful watch on the fetal heart, and after using a proper amount of discretion, it would be gross negligence not to assist such a labor by uterine expression or forceps or version. For over-delay, like over-haste, may cost the child its life; and the happy physician is he whose judgment is so accurately balanced as to keep him in all cases from the one extreme or the other.

Vertex Cases with the Occiput-posterior occur, according to Uvedale West, once in thirty-three labors. The child's life is endangered chiefly from the fact that labor is apt to be slow and tedious. Most authors are agreed that, if discovered early, the case should be left to nature, as spontaneous rotation of the occiput anteriorly will occur in the majority of cases. Here the "non-nocere" method of treatment is peculiarly applicable. Playfair advises against over-active endeavors at assistance, as rotation may occur at a very advanced stage of labor. This rotation does not begin until the fetal head meets with the resistance from the pelvic floor, and becomes strongly flexed. Parry advises assisting this process under chloroform by seizing the vertex and at once effecting rotation. Tarnier attempts to bring the occiput forwards by two fingers placed behind the child's ears. Burns and Smellie try to convert the occiput into a face. Harris advises preserving the bag of waters as long as possible. Meyer recently reports three cases in which he succeeded in rotating the occiput anteriorly, with the hand in the vagina, under chloroform. The writer has also been successful with this manœuvre in several cases without an anesthetic. Although some authors (Lange, Scanzoni, Tyler Smith) advise the use of forceps in performing this rotation; others (Barnes, Schroeder) are just as firmly opposed; while still others (Charpentier, Barnes and Fehling) allow the use of forceps, using simple traction without attempting rotation. The reason for this diversity of opinion lies in the fact that, in using blind force in attempting rotation with the forceps, the body may not accompany the movements of the head, and twisting of the child's neck, with inevitable death, must ensue.

With some modifications the rules recently laid down by S. Marx are fairly safe. If the labor-pains are good, the waters intact, and the

pelvis roomy, expectant treatment is indicated. Interference may be imperative in four sets of cases: First, with the head above the brim an attempt may be made to rotate the head anteriorly with the hand in the vagina, and, if this proves unfeasible, to do a version. Secondly, with the head fixed at the superior strait, this writer advises rotation with the forceps. We are opposed to this procedure on account of the great risk which the child runs of having its head twisted on its neck by the blind force used. Manual rotation anteriorly or version, after pushing up the head, or, if the occiput is fixed, forceps or symphyseotomy, gives the child a much better chance for its life. Thirdly, with the head in the pelvic basin, the resort to Tarnier forceps is advised as a traction force, allowing rotation to occur spontaneously if it will. With this we agree, but we are again opposed to the advice to force rotation if this fails. Fourthly, with the head low down upon the pelvic floor, the use of short, straight forceps is advised to deliver the occiput posteriorly. If the head becomes impacted, the choice lies between symphyseotomy and perforation. Recently Murray, of New York, performed symphyseotomy in such a case, and the interests of the child leave no room to question the propriety of this operation in preference to its alternative—perforation.

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CHAPTER XXIII.

FETAL CAUSES DURING LABOR—(CONTINUED.)

BROW PRESENTATION.

Of thirty-four children presenting by the brow (Lusk), ten were spontaneously delivered without change, of which four were born dead. Ten others became spontaneously converted into face or vertex cases, with the loss of one child. Of the thirteen children extracted with forceps—the brow presenting in nine—two children were lost. In an able paper, recently published by Otto von Weiss, we find the following interesting data regarding infantile mortality in these cases :

| | |
|--|--------------|
| 24 cases, spontaneous conversion to face, infantile mortality, | 17 per cent. |
| 29 cases, spontaneous conversion to vertex, infantile mortality, | 9 “ |
| 73 cases, brow birth point of rotation at superior maxilla, infantile mortality, | 21 “ |
| 15 cases, direct birth of brow without rotation, infantile mortality, | 60 “ |
| 34 cases, brow birth, point of rotation at nose, infantile mortality, | 23 “ |
| 6 cases, version and extraction, infantile mortality, | 40 “ |
| 15 cases, manual conversion to face or vertex, infantile mortality, | 21 “ |
| 22 cases, craniotomy, infantile mortality, | 100 “ |

Lusk states that if the face persists in a posterior position the delivery of a living child is hardly possible. Playfair says that the majority of these cases become spontaneously converted into a vertex or face presentation, depending on the occurrence of flexion or extension. In the former case the prognosis for the child is best, in the latter case the chances of a living child are also good. Spontaneous rotation about the superior maxilla or root of the nose and manual conversions to face or vertex presentations offer fair chances for the child. Spontaneous birth of brow without rotation and delivery after version with extraction offer a bad prognosis for the child.

If the prospect is favorable for a spontaneous conversion to a vertex or face presentation the duty of the accoucheur, in the interests of the child, is to leave the case to nature. If by Baudelocque's method the hand in the vagina can readily convert the brow into a vertex case, this should be attempted before or with the rupture of the bag of waters. The writer found this manœuvre quite easy in the case of a multipara without an anesthetic. With the opposite hand applied externally the manœuvre may be materially assisted. Peters converted three brow cases, and v. Weiss four cases into vertex presentations, and saved all of the children. The method of Schatz aims at substituting the face for the brow by traction on the superior maxilla, with two fingers in the mouth, but is associated with the danger of premature inspiratory efforts on the part of the child. If the head reverts to its former position, forceps may be employed to keep it in place, and rotation may be assisted about the superior maxilla or root of the nose. In mento-posterior positions, which offer the worst prognosis for the child, the attempt should be made, under chloroform, to rotate the chin forwards. In all cases with a living child—previous to a resort to craniotomy—the question of performing symphyseotomy should be considered, and, if necessary, be followed by manual conversion to face or vertex, forceps or version.

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 PATTERSON: Brow in Rickety Pelvis; *Lancet*, 1893, vi. 1185.
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 POLOSSON: Mechanism of Labor in Brow Presentation; *Cent. f. Gyn.*, 1894, xlv. 1134.

FACE PRESENTATION.

According to different authorities face presentation occurs within wide limits of frequency. In English practice it is said to occur once in two hundred and forty-nine to four hundred and ninety-seven labors. In German practice it is said to occur once in one hundred and sixty-nine labors. The writer, in over 1500 deliveries, only met it three times. The infantile mortality is ten to thirteen per cent., and depends principally on cerebral congestion due to pressure on the jugular veins. The average length of labor is said not to exceed by

much that of vertex cases, but is more readily affected by weak pains, contracted pelvis, and rigidity of the parturient canal.

The normal mechanism of labor in face presentation consists of descent and extension—instead of flexion, as in ordinary vertex cases—rotation forwards of the chin beneath the pubic arch, flexion and external rotation. In those cases in which the chin persists in remaining posteriorly, spontaneous delivery is very rare. The face may spontaneously become converted into a vertex which offers a better prognosis for the child, especially in mento-posterior cases.

The methods of treatment recommended by authorities vary. In all cases it is advisable to turn the woman on the side toward which the chin is directed and to avoid rupturing the membranes, as the engagement of the head is usually slow and accomplished with difficulty (Lusk). Playfair states that by temporizing a successful result will occur in the majority of cases. In forty cases treated on the expectant plan Zeller lost only two children, and Boër in eighty cases lost only three or four. Winckel's more recent studies, however, were not so favorable, for in a large number of collected cases he found an infantile mortality of thirteen per cent. V. Weiss treated fifty-eight cases on the expectant plan, but was obliged, owing to the premature escape of the waters and contracted pelvis, to terminate labor in ten by operative procedures.

The dangers of forceps in these cases can be inferred from the fact that of eighteen cases published by Salomon only one living child was extracted.

The older practice of resorting to version is no longer advised by recent writers, except in certain cases of large head with prolapse of a limb or of the cord (Jewell), or in cases in which the membranes rupture early or manual dilatation of the cervix offers especial dangers, or in neglected cases, in which manual flexion is contra-indicated.

The method of Schatz consists in the employment of external manipulations. By first seizing the shoulders and trunk through the abdominal walls and lifting the chest upwards and then pressing it backwards, at the same time raising the breech with the other hand, and finally pressing the breech downwards, the normal flexion of the trunk is restored and the face becomes spontaneously converted into the vertex. But this manœuvre is only applicable previous to the

time of rupture of the membranes and in the absence of abdominal or uterine irritability.

In the Baudelocque-Schatz method an anesthetic is given, if necessary, and the woman is placed in the lateral decubitus. The chin is pressed upwards with one hand in the vagina, while, at the same time, the other hand, pressing externally, forces the occiput downwards. This substitutes flexion for the extension of the head. With the outside hand the chest is pushed backwards and, lastly, the breech downwards. In nine cases treated by this plan, v. Weiss saved all of the mothers and children. Peters converted thirteen face into vertex cases, and lost only one child. Bullitt converted a face into a vertex case and applied forceps, delivering a living child.

In mento-posterior positions it would be great folly to leave the case to nature, although it is claimed that spontaneous delivery is possible (Jewett). The various methods just described, or forcible conversion into a vertex presentation under anesthetics, with the full hand in the vagina, followed by forceps if necessary, or resort to symphyseotomy, should receive careful consideration before proceeding to craniotomy. Symphyseotomy has been done in this country in such cases, and is advised by such writers as Noble and Lusk.

At the nineteenth annual meeting of the American Gynecological Society, the indications for treatment in face presentation were so clearly stated by Reynolds that we quote them in full:

1. Before engagement and previous to rupture of the membranes hope for spontaneous restoration of flexion. Resort to postural treatment and gentle external manipulations.

2. When the membranes have ruptured early, an external or bipolar version should be performed at once, in any case in which the condition of the cervix renders manual dilatation dangerous; but in ordinary conditions manual dilatation should be undertaken, the head flexed by the hand, and subsequently the appropriate operation performed.

3. With the cervix completely dilated and membranes unruptured, with anterior position of the chin, leave the case to nature as long as progress is rapid and the fetal heart is steady; otherwise anesthetize the patient and forcibly flex the head. The posterior position of the occiput so produced should not be left to nature, but should be treated by version or, preferably, rotated to the front. It may then be left to nature or treated by forceps.

4. Posterior positions of the chin should never be left to nature, but should be subjected to immediate manual flexation. The anterior position of the occiput, which then results, may either be left to nature or treated with forceps.

5. In neglected cases, in which manual flexation is contra-indicated, version should be chosen if practicable; if contra-indicated, apply forceps to the face, but see that the chin is anterior.

6. In cases in which the face presentation is due to some other mechanical obstruction, the treatment should be determined by the latter factor. The abdominal methods of delivery are never indicated in uncomplicated face labor.

LITERATURE CONCERNING FACE PRESENTATION.

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INCLINED POSITIONS OF THE VERTEX.

This variety of head presentation is not quite common, and is almost entirely neglected in text-books on obstetrics. Several American writers have described cases (Garrigues, Brothers). The German's allude to it as "Parietal-Bone Presentation." Cazeaux and Tarnier give it a slight notice under the above heading, and American writers allude to its most marked form as "Ear Presentation." The writer has met with at least three cases, and is certain that it is frequently overlooked. Litzmann met with 23 cases in 1200 deliveries, but only one case was extreme, presenting by the ear. As the condition consists of a lateral flexion of the head on the neck, and many of the milder cases rectify themselves through the action of the child's

strained neck-muscles (Michaelis), it will be readily understood why these cases are frequently overlooked.

As many of the children, however, are sacrificed in this presentation, a word regarding diagnosis will be à propos. The discovery of a presenting ear will at once determine the diagnosis. In minor degrees of lateral vertex flexion, the tilted position of the head can at times be felt above the brim, but during labor it descends behind the symphysis. Internal examination reveals the sagittal suture lying almost parallel, and in front of the transverse diameter of the pelvis. Usually the posterior parietal bone is pushed beneath the one lying anteriorly, but occasionally this may be reversed. The caput succedaneum is on the posterior parietal bone.

In large pelves the prognosis is not unfavorable if the labor-pains are strong. Such cases terminate spontaneously. To a certain extent assistance might be rendered by backward pressure applied through the abdomen by the hand or bandage. In a case of pure ear presentation the writer succeeded, with the full hand in the vagina, in seizing the vertex, correcting the lateral flexion, turning the occiput anteriorly, and flexing the head on the neck. After a few pains the child was delivered spontaneously, although labor had been delayed for hours previous to the manœuvre. When such a procedure is not possible, version offers the best prognosis for the child. In five cases left to nature, three children were lost. In five others, in which version was performed, all the children were saved (Veit). The use of forceps is contra-indicated unless the pelvis is unusually roomy, for the head is practically wedged in a transverse diameter. In neglected cases symphyseotomy is indicated, if the child is living, and perforation if the child is dead.

LITERATURE CONCERNING INCLINED POSITION OF THE VERTEX.

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CHAPTER XXIV.

FETAL CAUSES DURING LABOR—(CONTINUED.)

BREECH PRESENTATION.

In one hundred and sixty-seven still-births recorded at the New York Bureau of Vital Statistics, eighteen—or nearly eleven per cent.—presented by the breech. In a published series of two hundred and nine successive labors, von Ramdohr met foot presentations five times. The frequency of presentation by the breech varies between once in fifty-two cases (Churchill) to once in three hundred and eighty-eight cases (Ramsbotham).

Dubois places the infantile mortality at a little over ten per cent. Churchill places the mortality at thirty-one per cent., but Playfair regards this as an exaggeration. When we recall that in vertex cases the mortality does not exceed two per cent. we can readily perceive that a presentation of the breech means considerably increased risks for the child. A few instances from the writer's experience will illustrate these sources of danger.

Case I.—A hospital patient so successfully concealed her pregnant state, while being treated for subacute rheumatism, that her condition was not known until the nurse found her groaning much more than usual, and, on investigation, found the feet and body of a child delivered in bed. Before assistance arrived to complete the delivery the child was dead.

Case II.—A primipara had been in labor all day. In the absence of the attending physician the child was suddenly expelled by the breech, but the head remained undelivered. When assistance arrived a quarter of an hour later it was impossible to resuscitate the child.

Case III.—A primipara was taken with labor-pains during the eighth month. The breech presented with extended thighs. During delivery one femur was broken, and the child was born asphyxiated. After much trouble it was resuscitated, but died after forty-eight hours.

Case IV.—A multipara had six previous confinements, excepting the first, with breech presentations. The membranes ruptured early, and the pulsating umbilical cord presented with the breech. With beginning irregularity in the fetal pulse, after full dilatation of the os, one foot was brought down. The cord at once ceased pulsating, and the child was felt to make several convulsive movements and then become quiet. In less than five minutes the child was delivered dead, and all attempts at resuscitation proved futile.

The dangers to the child are self-evident. The abnormal position of the fetus favors pressure of the cord, coiling of the cord about the child or prolapsus, early and complete escape of the liquor amnii, premature separation of the placenta, in part due to contraction of the uterus during the time in which the bulk of the body is being expelled and arresting placental circulation, or compression of the placenta between the contracted uterus and the hard mass of the fetal skull. Besides all this, the child runs increased risks of getting various injuries. Rugé has collected twenty-nine cases of fractures or other injuries under these circumstances.

All authors are agreed that, after the birth of the body, the dangers to the child are in direct ratio to the time which elapses in the delivery of the after-coming head. The umbilical cord, extending as it does from the umbilicus of the child to the still adherent placenta in utero, must necessarily be subjected to the pressure of the thorax and head of the child against the pelvic bones, as they, in turn, come into the world. If this pressure is sufficient, the blood-supply to the fetus is completely shut off, the fetal blood is no longer properly aerated, the medulla is irritated, and the child makes premature efforts at inspiration. In consequence of this asphyxia results, and, if there is much delay in the birth of the head, it assumes a serious aspect and the child may lose its life.

Theoretically the treatment of breech cases is clear. If it is possible, previous to the rupture of the membranes, to substitute the vertex for the breech, this would at once reduce the dangers to the minimum. As this can only be carried out in multiparæ previous to the rupture of the membranes and descent of the child, we must do our best with the breech presenting. In the first place, it is necessary to try and have the os sufficiently softened and dilated, so that the after-coming head can be delivered in the shortest possible space of

time. To attain this end, protraction of the first stage of labor and preservation of the bag of waters should be encouraged as long as the fetal heart-sounds are distinct and regular. It is advisable to make as few examinations as possible. Counter-pressure with a distended elastic bag against the cervix is advised by some. Even with the os fully dilated it may be well to leave the expulsion of the trunk to nature. Once, however, the body of the child is delivered, there should be no delay in the birth of the head. In assisting the delivery of the after-coming head, it is well again to call attention to the delicate structures of the newly-born, and to caution against making too strong or too persistent traction at the neck. It is well to bear in mind that if the head is firmly caught above the pelvic brim or is tightly grasped by the cervix, violent efforts at traction from below may do more mischief than a few moments' delay, even acknowledging the risk from pressure on the umbilical cord. Dohrn, after podalic version, has called attention to the fact that a long absence of the fetal pulse does not prove absolutely the death of the child, as such children have been successfully brought back to life. Many of these cases present unexpected difficulty in the birth of the shoulders or from extension of the arms above the head. With a little perseverance the lower arm can usually be brought down delivering the same shoulder, and then the same procedure can be repeated with the upper arm. In the cases in which one arm is located behind the child's neck a much greater difficulty is encountered. In a case of this sort, recently met with by the writer, labor could only be terminated by the use of so much force exerted at the affected shoulder that the humerus of the child was fractured. The manœuvre, however, allowed of such a gain in space and time that the child was delivered alive, and, with an appropriate plaster-of-paris splint immediately applied, is to-day in perfect health. At times it may be advisable to apply forceps to the breech, but the risks to the child are numerous. In five hundred and eighty-four cases, at the Paris Clinic, in which forceps were applied to the breech, one hundred and thirty-two children were lost (Charpentier).

When, after delivery of the body, the head is impacted in the pelvis, various methods of procedure are available. After wrapping the child's body in a warmed cloth and placing it on the accoucheur's arm, the hand is introduced in the vagina in such a manner that the

index and middle fingers press to the sides of the child's nose, while the opposite hand forces down the occiput from without. This induces flexion of the child's head, if the dorsum is anterior. The trunk of the child being raised, the face is then made to sweep over the perineum.

In the Smellie-Veit method two fingers in the vagina are passed into the child's mouth, inducing flexion of the head, while the fingers of the other hand placed astraddle over the child's shoulders are used chiefly for traction. This method is said to be accompanied with the least dangers to the child, as the fingers in the mouth keep the jaw flexed and prevent twisting of the head on the neck at the same time that the chief force is applied to the shoulders.

The method of Charpentier de Ribes is applicable to the after-coming head at the brim. In order to determine flexion of the head the inferior maxilla is made the fulcrum. The body of the child is drawn backwards, and finally the hand of an assistant applied over the mother's abdomen expresses the frontal region in the direction of the superior strait.

In these cases, also, the "Prague method" has been extensively used. Scanzoni saved one hundred and seventeen out of one hundred and fifty-two infants by resorting to this plan. In the absence of labor-pains, an assistant must press the head downwards through the abdominal wall. With the dorsum anterior the accoucheur then seizes both feet with one hand and hooks the fingers of the other over the child's shoulders. The traction is first made in a downward direction, and, as the head descends, the extremities and body of the child are elevated more and more toward the abdomen of the mother.

If these means fail, forceps must be applied to the after-coming head, the blades being passed from beneath the child's elevated body. This will at times prove a very difficult task, the instruments slipping quite readily. In such cases, if the child is living and a rapid symphyseotomy can be performed, we think this should be done instead of resorting to the older practice of perforation or decapitation.

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CHAPTER XXV.

FETAL CAUSES DURING LABOR—(CONTINUED.)

TRANSVERSE PRESENTATION.

In the records of one hundred and sixty-seven still-births, examined by the writer, ten were ascribed to transverse presentation. According to Churchill the shoulder presents in one out of two hundred and sixty cases of labor. In two hundred and thirty-five transverse presentations one-half of the children were lost. With such a startling infantile mortality early recognition of this condition and its proper treatment become matters of prime importance.

With lax abdominal walls, even prior to the onset of labor, this presentation can some times be mapped out by external abdominal palpation and corrected by external version, using lateral pressure with a binder to keep the child in place. During labor, the absence of a presenting part per vaginam at first, and later, the discovery of portions of the upper extremity, establish the diagnosis.

As in all other presentations nature makes a strong effort to deliver the child, but only in rare cases succeeds and then usually with the sacrifice of the child. Spontaneous version by which the breech or head is substituted for the shoulder is only possible with the fetus still undescended. When the body of the child becomes firmly wedged in the pelvic canal the only possible natural mode of delivery is by spontaneous evolution or, as the Germans put it, *con duplicate corpore*. This means practically the death-warrant of the child. Out of one hundred and twenty-five cases delivered in this manner one hundred and eleven children were born dead. In this form of delivery, the child's body becomes doubled on itself, and by continuous pressure from above, the head, or more frequently the breech, is delivered followed by the rest of the body.

In no other presentation is it so necessary, particularly in the interests of the child, to make an early diagnosis and institute proper treatment. With early diagnosis the various methods of procedure

are fairly easy in their accomplishment and the chances of delivering a living child are at their best; whereas a late diagnosis, with the arm prolapsed from the vagina and the shoulder wedged firmly in the pelvis, may mean extinction of the child's life from the impaction, or may require destruction of the child by the mutilating operations so abhorred by every conscientious practitioner.

In early cases of labor, as well as preceding labor, the knee-chest position might be tried alone or in conjunction with operative procedures. Or, it is often quite easy, by external manipulation alone, to substitute the head or breech for the shoulder. Or, by the Braxton-Hicks method, with two fingers in the vagina and the other hand working externally through the abdominal walls, it is often possible to change the presentation. These methods are only applicable in the early stages of labor previous to the rupture of the membranes. Although some writers prefer the head with the possible use of forceps later, the majority of practitioners prefer the foot, which allows of the possibility of more rapid delivery. Where the cervix is not fully dilated, it is advisable just to turn by one of these methods, seize a foot, and then wait, allowing the leg and thigh to gradually increase the cervical opening until its size is sufficient for the head to readily be delivered without the great danger to the child of being caught at the neck and strangulated. If the waters have escaped no time should be lost in performing a podalic version. In these operations the writer is convinced that, besides reducing the mother's suffering, the child's life is less endangered by the administration of an anesthetic, which so relaxes the parts as to render the manipulations much easier than without such an agent. Whether both feet or either foot is seized, will, as a rule, make very little difference. Still some writers advise one and some the other method. The writer believes, however, that if it is possible in bringing down one or both feet to make sure, at the same time, that the dorsum of the child is anterior, the danger to the latter will be materially diminished. A source of difficulty in these cases is the tendency of the arms to become extended above the child's head at a time when the operator's hand is apt to be quite fatigued from the task of bringing down a foot. By resting a moment and then re-introducing the hand along the child's abdomen into the uterine cavity and seizing the arm or forearm on the lower side and gently bringing it down it will be possible to deliver it and then repeat the

same procedure on the opposite side. After getting down one foot, by waiting for labor-pains—if there is no especial hurry—the dorsum of the child will usually turn anteriorly. Nagel found this to be the case in eighteen observations. The after-coming head must be treated as described before. If the parts are so tightly wedged that they cannot be pushed backwards and permit of a podalic version, the child's life is practically doomed, and the attendant, who has allowed this condition of affairs to occur, is guilty of criminal negligence or perhaps worse. In these cases, embryotomy or decapitation offers the only method of delivery, and these measures mean death to the child, if it be not dead (which fortunately is usually the case) long before.

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CHAPTER XXVI.

FETAL CAUSES DURING LABOR—(CONTINUED.)

2. PROLAPSE OF UMBILICAL CORD.

Compression of the umbilical cord during child-birth offers one of the gravest dangers to the life of the child. In the 167 still-births elsewhere alluded to, the writer found that forty-seven, or 28 per cent., were traceable to compression of the umbilical cord, and twenty-six, or 15.5 per cent., were solely attributed to prolapsus. These figures indicate that, in over one-quarter of the cases of still-birth from all causes, compression of the umbilical cord plays the chief rôle.

Prolapsus of the funis is said to occur within wide limits of frequency. Churchill estimates its occurrence as once in $446\frac{1}{2}$ labors, whereas Michaelis places it at once in 90 labors. Playfair suggests the lateral decubitus, observed during child-birth in English practice, as responsible for the lesser frequency of this accident in that country.

The infantile mortality varies between 37.6 per cent. (Hecker), and 53 per cent. (Scanzoni, Churchill). In 329 cases, collected from various sources, 263 children were lost (Charpentier). The prognosis to the child is modified by the nature of the presentation, the shape of the pelvis, and the duration of labor. Vertex presentation, associated with prolapse of the cord, offers the greatest danger to the child. When the child presents transversely or by the breech, the danger is considerably lessened. According to Englemann's studies, in vertex cases, 36 per cent. only of the children survive; in shoulder presentations, 50 per cent. of the children are saved; whereas cases presenting by the feet offer the best prognosis for the child, 68 per cent. being saved. In primiparæ the dangers to the child are greater than in multiparæ.

According as compression of the cord occurs rapidly or slowly, the asphyxia of the child may be rapid or slow. The existence of the fetus in utero depends on the removal of its carbonated blood with

excrementitious products, and the supply of fresh oxygenated blood from the placenta through the umbilical cord. Through its arteries and veins the cord at once subserves the double purpose of water-main and sewer. With pressure on the cord the child is in the same condition as a town with its fresh water-supply cut off and its sewer-pipes simultaneously clogged. The blood-vessels become gorged with carbonated blood, the medulla becomes irritated, the child makes efforts at inspiration, foreign bodies are aspirated into the air-passages, the pulmonary arteries become dilated with blood, the blood pressure in the right ventricle becomes lowered, and asphyxia, with finally paralysis of the heart, ensues. If a live pigeon is placed in a closed bell-jar, it becomes asphyxiated from the shutting off of oxygen and the accumulation of carbonic acid gas. The same thing happens with the child in utero whose umbilical cord is subjected to pressure. In either case, if the obstruction is removed early, and fresh air or oxygen supplied, recovery results. If the asphyxiated state has lasted too long, efforts at resuscitation are apt to prove futile.

The causes of prolapsus of the cord are divided by Charpentier into five classes: 1, conditions which render the fetus movable, as abundance of liquor amnii, small size of the fetus, and prolapsus of a limb; 2, causes which allow of a space in which the cord may engage, as want of contraction in the lower uterine segment, as in anomalous conditions with abnormal length of cord or multiparity, or as in pelvic deformities and uterine displacements; 3, causes which bring the cord near the cervix; 4, excessive length of the cord, premature rupture of the membranes, or precipitate escape of the liquor amnii in a woman standing erect; 5, attempts at version by the inexperienced.

The diagnosis of this accident is easy to all but the merest tyro in the practice of medicine. The writer has met with inexperienced practitioners who mistook the rim of the cervix for this condition, or overlooked it when higher up. The round feel of the cord, with its pulsating vessels—if the compression is not excessive—lying in front or to one side of the presenting part is sufficiently diagnostic, and it is the duty of the attending physician to keep a close watch on the character, regularity, and frequency of the pulsations, in the interests of the child's life.

Intelligent supervision and treatment of these cases is imperative if the child is to survive. If possible the physician's first aim should

be to get the cord out of harm's way and avoid compression. If the membranes are still unruptured and only a small coil of the cord has come down, the postural treatment first described by Thomas should be attempted. By placing the woman in the knee-chest position the effect of gravity may be sufficient to allow the cord to sink behind the presenting part. Theoretically the Trendelenberg position ought to be followed by the same result. The writer has elevated the pelvis in three cases and saved the three children. After the escape of the waters the cord can sometimes be pushed up with the hand in the vagina (Duncan, Tildesley) until the presenting part is firmly engaged or delivery accomplished with the aid of forceps. Renshaw has been successful with a moist sponge passed between the presenting part and uterine wall after reducing the prolapsus and leaving the case to nature. Where these means fail the cord may be seized in a looped tape passed through the end of a semi-elastic catheter and pushed out of harm's way, leaving the catheter, if necessary, in situ until the delivery of the child. Special instruments are usually superfluous and are usually not at hand when wanted. In intelligent hands reposition is fairly successful. Michaelis succeeded twenty-one times in thirty-five cases, and La Chapelle succeeded fourteen times in sixteen cases (Charpentier).

Unfortunately in some cases all efforts at reposition fail and, with such failure, the dangers to the child increase very rapidly. Under these circumstances, it is well to watch the pulsations with the fingers on the cord—in the intervals between the pains—and, with evidences of approaching danger, to rapidly complete delivery and rely on efforts at resuscitation. In these cases every preparation must be at hand so that not a moment is lost. This includes hot and cold water in separate basins on chairs at the bedside, warmed diapers or blankets, scissors, string, catheter, etc.

To illustrate the nature of the umbilical pulse in such a case the writer gives the following history taken from his case-book: Multipara, sixth confinement, moderately contracted pelvis requiring usually instrumental delivery. At six A. M. os fully dilated, vertex movable at the brim. At seven A. M. spontaneous rupture of the membranes, head partly engaged, but tilted somewhat laterally with small loop of umbilical cord to the right; pulsations one hundred and twenty per minute, regular and strong. Efforts at reposition during the next half hour by postural treatment, etc., without avail. In spite of

strong pains very little descent. Pulsations much feebler and show great divergence in the count. During pains pulsations feeble and sixty per minute, during intervals pulsations growing feebler and one hundred and thirty to one hundred and fifty per minute. With little probability of rapid, spontaneous termination of labor, and, as the compression of the cord is becoming serious, instrumental interference is advised to which patient readily assents. Being opposed to anesthetics and time being too limited to send for assistance, she is brought to the edge of the bed, the cord pushed back, the forceps carefully applied, and the child rapidly delivered in less than five minutes. The slight asphyxia is readily overcome by a few slaps on the buttocks.

Even in the absence of pulsation of the cord the rule should be to deliver the child as quickly as possible. Playfair and Charpentier claim that, if there is no pulsation in the cord, the child is evidently dead and the case should be left to nature. This teaching is incorrect, as, in exceptional cases, children have been rapidly delivered under these circumstances and resuscitated.

In breech cases where reposition has failed it is well to keep an eye on the pulsations of the cord, and, if there is evidence of danger, to rapidly extract the child in the usual manner. In cases of transverse presentation the danger to the child is least. Previous to rupture of the membranes bi-manual or external version may be attempted so as to get down a foot. With the os fully dilated, after the waters have escaped, a podalic version should be done under chloroform. In one such case the writer did a rapid podalic version fracturing the humerus, but succeeded in saving the child. In vertex cases it is wrong to wait for the natural expulsion of the child in cases of marked interference with the umbilical pulse or in cases of primiparæ. Once the os is fully dilated and the membranes ruptured, the woman should be anesthetized and the question of forceps or version decided on. If the head is not engaged at the brim, version is usually preferable. Forceps offer greater dangers to the child if the cord is prolapsed to any extent and irreducible, because they may include the cord and interrupt the fetal circulation. They offer also the additional disadvantage of tending to slip. Unless, therefore, a small portion of the cord is prolapsed which can readily be pushed up—as in the case narrated—the dangers to the child are greater in delivering with forceps than by resorting to version.

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3. ERRORS IN LENGTH OF THE UMBILICAL CORD.

The normal length of the cord is eighteen inches. The cord may be too long or too short and become a source of danger to the child during the progress of labor. When too long, the chief dangers are from coiling about the neck or body of the child and prolapsus. Such coiling may prove serious even when the cord is of normal length. In exceptional cases the cord has measured as much as sixty inches. Coiling of the cord may result in protracting labor by shortening the distance between the child's body and the placental insertion; or it may prevent flexion of the head on the chest, or it may result in the spontaneous tearing of the cord, separation of the placenta, or the tearing out of the skin about the umbilicus, even opening up the peritoneal cavity. King has collected eleven cases, of which six children were lost. In the treatment of this condition, if the coils are discovered during labor about the child's neck or seem to retract the head during the intervals between the pains, it may be well to insert the hand in the vagina and, with scissors, carefully divide the coils and deliver rapidly; or, if this is not done, labor must be rapidly terminated with forceps, every preparation being at hand for asphyxia.

When too short, the cord, besides offering special dangers to the mother, such as inversion of the uterus, premature separation of the placenta, and protracted labor, becomes likewise of serious import to the child during labor. A fetal mortality of twenty per cent. (Lusk) is sufficient reason for giving these cases a little attention. Cases

have been recorded in which the umbilical cord varied between four and twelve inches in length. With this shortness of the cord the child could only descend to a certain degree beyond which the elasticity of the cord would exert itself, and after the cessation of the pain draw the child up again. Such persistent stretching of the cord is apt to interfere with the circulation in the cord and cause the intra-uterine death of the child. In most cases it has been necessary to apply forceps, which usually was accompanied with premature separation of the placenta. The maternal hemorrhage in some of these cases has been quite alarming. The risks to the child have usually depended on the delay to labor and the stretching or tearing of the cord close to the abdominal wall, even opening up the peritoneal cavity. The marked recession of the head between labor-pains ought to excite suspicion of this condition (Hamill). Cases have been reported by Werder, Mackie, Kiely, Audebert, and others. The treatment, as in all cases where the labor is delayed without visible cause, consists in the artificial termination of labor with forceps. This does not materially increase the maternal danger, and may snatch the child from the dangers of protracted labor..

LITERATURE CONCERNING ERRORS IN LENGTH OF THE UMBILICAL CORD.

AUDEBERT : Dystocia due to shortness of Cord ; *Gaz. Hebdom. de Sc. Méd. de Bordeaux*, 1893 ; xiv. 364 ; *Cent. f. Gyn.*, 1894, xxiv. 592.

CARBONELLI : Dystocia from short Umbilical Cord ; *Stud. di Obst. e Gyné.*, Milan, 1890, 374.

KING : Dystocia from short or Coiled Funis, etc. ; *Am. Journ. Obst.*, 1892, xxvi. 307.

DUDLEY : Labor Complicated by a very long Umbilical Cord ; *Northwest Lancet*, 1893, xiii. 374.

GALLOIS : Consequences of Shortness of Umbilical Cord ; *Dauphine Med.*, 1893, xvii. 245.

THIBAUDET : Dystocia from Congenital shortness of Cord ; *J. de Sc. Méd. de Lille*, 1891, i. 154.

PINARD & VARNIER : Separation of Placenta through Shortness of Cord ; *Etudes d'Anat. Obst. Norm. et Path.*, 1892, 57.

CHAPTER XXVII.

FETAL CAUSES DURING LABOR—(CONTINUED.)

4. MULTIPLE PREGNANCY.

We again allude to the subject here, because of the dangers run by the children during the process of labor. It is well to bear in mind that twins are, as a rule, much smaller in development than single children, and are apt to be much weaker. Hence obstructions during labor may be accompanied with much greater risk for these children than for those of stronger build.

In spite of the rules laid down in text-books on obstetrics, very few practitioners make a diagnosis of multiple pregnancy previous to or even during labor, and it is usually only after the birth of the first child that the true state of affairs is recognized. Still, if two distinct fetal heart-beats, at different regions and with different counts, can be discovered, the diagnosis would be positive.

According to Charpentier both children may present by the vertex, or the first by the breech and the second by the vertex; or the first by the vertex and the second by the breech, or both by the breech; or the first by the vertex and the second by the trunk; or the first by the breech and the second by the trunk; or the first by the trunk and the second by the breech. Loviot recently reports a twin labor with no presentation—both children being freely movable, and requiring double podalic version.

The fetal mortality in multiple pregnancy is considerable—one out of thirteen (Clarke, Playfair). It depends on prematurity, unequal development, and malpositions—the last being the chief source of danger during labor. The figures of Reimann are quoted by most authors. In six cases of double vertex, of the six first born only one survived; of the six last born only two survived; therefore, of twelve children nine were lost. In cases of interlocking of the heads, one of the children is almost necessarily doomed. In such cases the danger arises from the fact that the neck of the first

child on entering the pelvis is subjected to great pressure by the head of the second child, and a similar pressure is exerted on the umbilical cord of the first child by the body of the second. In those cases in which one child presents by the breech and the other by the vertex, the prognosis for the children is much improved. In Reimann's twenty-six cases, three survived of the first born, and nineteen of the second born. Whether these figures represent the exact truth is open to question. The author's experience has been limited to five cases of twins, presenting in various positions, and he has been fortunate in delivering ten living children.

Labor in twin-pregnancy is usually protracted. With vertex presentation, as a rule, no interference is necessary until the cervix is fully dilated and the membranes ruptured. After this, delay means danger to the child, and, if not born within a reasonable period of time, it is proper to apply forceps to the presenting head. If the heads are interlocked, the genu-pectoral, or elevated-hip positions, may first be tried, and if delivery is not possible, the serious question of perforation or decapitation arises. The second child, if not already dead, ought to be delivered alive. After waiting a quarter or half-hour, and with no evidence of spontaneous labor-pains sufficient to effect delivery, interference must be decided on. It is true that in some cases one or two days longer have elapsed before the birth of the second child. But, in the interests of the child, labor ought to be terminated artificially, as the uterus by this time is usually exhausted. It is proper in such cases to resort to uterine friction or expression after rupturing the membranes. If the head of the second child is wedged in the pelvis, and labor-pains have become feeble, it is proper to deliver with forceps. If the head has not entered the pelvic strait, and is movable above the brim, podalic version should be done, as forceps applied under these circumstances offer great dangers for the child. The version is usually quite easy in these cases, as the uterus is large and the parts lax. Where one child presents by the vertex and the other by the breech, it is well to wait a sufficient length of time and allow the case to terminate spontaneously. In case of delay, after entering the pelvic strait, forceps should be applied to the first, and, if necessary, the thigh of the second child can be brought down. In cases of vertex or breech in the first, with shoulder presentation in the second child, it is possible, in rare instances, for a spontaneous

termination. The rule is, however, that besides the usual delay in cases of spontaneous delivery of the first child, the second must be assisted by the accoucheur. In two of the writer's cases, the first child presented by the vertex and required instrumental delivery, while the second child, presenting by the shoulder, required podalic version. All the children were extracted alive.

LITERATURE CONCERNING TWIN LABOR.

- Twin Pregnancy, one breech, the other shoulder; spontaneous delivery of both by breech after spontaneous version of the second; *Rev. Obst. et Gynéc.*, Paris, 1893, ix. 103.
- LOVIOT: Twins; Forceps to first, Version in second; *Bull. et Mém. Soc. Obstet. et Gynéc. de Paris*, 1892, 190.
- DE LANTOUR: Case of Twins; Locked Heads; *New Zeal. Med. Journ.*, 1892, v. 225.
- LATHORP: Twins born fifty-three hours apart; *Am. Lancet*, 1890, xvi. 447.
- O'REILLY: Unusual Case of Twins; *Lancet*, 1892, i. 817.
- ENSOR: Genu-pectoral Position in Certain Unfavorable Presentations; *Br. Med. Jour.*, 1893, 519.
- LOVIOT: Twins; No Presentation; *Bull. et Mem. Soc. Obst. et Gyn. de Paris*, 1892, 126.
- REIMANN: Twins; *Am. J. Obstet.*, 1877, 58.

5. PROLAPSE OF VARIOUS PARTS AT ONE TIME.

Owing to the increased danger to which the life of the child is subjected when the presentation is complicated by the prolapse of the cord or a limb, the subject is deserving of a short notice. Cases complicated by prolapsus of the cord have been considered elsewhere. We are, at present, concerned with those cases in which the presence, at or above the superior strait, of a part of the fetus, which does not belong to the presentation, is discovered. Thus, the head may be associated with the hand, arm, both hands, or a foot. The breech may be associated with the hand or arm. Or the foot, both hands, and the cord may present simultaneously. Such prolapse of the limbs complicating labor is rare. In 17,613 labors Depaul found prolapsus of the extremities alone or with the cord in one hundred and sixty-three. Lachapelle in 15,652 labors met prolapsus of extremities alone or with the cord only forty-five times. The prognosis for the child becomes very serious where several limbs are prolapsed at one time, especially if they become impacted. Not only can such prolapse of members exist previous to labor, but the sudden gush of the liquor amnii previous to

engagement of the vertex or breech may carry down a hand or foot. Also, in efforts at version in shoulder cases, the child's hand in the vagina may remain after bringing down a foot. Or in vertex or face cases the writer, after bringing down a foot, has at times found it extremely difficult to push up the presenting part. These cases are particularly unfortunate, for, besides the vertex or face or hand, the presence of a foot only complicates and makes matters worse for the child unless it is possible to push up the originally presenting part. In cases of prolapsus of one or both arms alongside of the head, previous to rupture of the membranes, the woman should be put in bed and made to assume the knee-chest position. Or the pelvis of the patient should be considerably elevated to simulate the Trendelenberg position and the patient kept on her back. After rupture of the membranes, the entire hand should be introduced in the vagina, and the prolapsed part held above until the descent of the head. If the pelvis is roomy forceps may be used. In one reported case, however, the child's arm became engaged in the fenestrum of the forceps (*Journ. Am. Med. Ass'n*, 1891, xvi. 906). Version may likewise be indicated. Perforation should only be thought of if the child is positively dead. In those cases of breech in which a hand is prolapsed there is usually not much danger, as it can, as a rule, be pushed up before or after the foot comes down. In fact, in cases of transverse presentation with prolapsus of the hand, this is the usual condition present after version.

Prolapsus of hand or foot with face presentation is very ominous for the child. The writer once met a case of face presentation in which podalic version was decided on. After getting down a foot to a certain distance it was impossible to budge the face. This made matters worse than before. As perforation seemed inevitable the foot was returned into the uterine cavity and another effort with the full hand in the uterus was made to convert the face into a vertex. This fortunately succeeded, and, after a few good pains, the child was born.

The simultaneous prolapse of upper and lower extremities usually means the death of the fetus. The only treatment consists in seizing one or both lower limbs and delivering as after version.

Prolapse of one or both feet with the head was met with eighteen times in two hundred and seventy-eight cases (Depaul). Gautier recently reports prolapsus of a foot in a vertex case in which he suc-

ceeded in pushing up the foot (*Cent. f. Gyn.*, 1894, xliii. 1086). If the feet can be pushed up, the head ought to be delivered naturally or if necessary by forceps. If it seems more feasible, the head might be pushed back, the feet drawn down, and the delivery completed as after version.

6. EXCESSIVE DEVELOPMENT OF THE FETUS.

One of the greatest dangers to the life of the child arises from over-development. Although the heads of male children are said to be larger than those of females (Simpson), no trouble is apt to ensue unless the increase in size becomes excessive. Ordinarily a child weighing eight pounds or less will not give rise to much difficulty during the process of birth in a pelvis of normal size. In children weighing ten pounds or more the dangers to the child increase, and, with a weight of fifteen or twenty pounds, the prognosis for the child is practically hopeless if delivery is to be completed in the usual manner through the regular passages. Although the writer has never met a new-born child weighing more than thirteen pounds, authentic cases are on record in which the child's weight varied between fifteen and twenty-three pounds (Charpentier). Recently Maygrier reported the case of a fetus weighing thirteen and a half pounds (*Rév. Obstet. et Gynéc.*, 1891, vii. p. 136), and Harris, one weighing fourteen pounds (*Lancet*, 1892, ii. p. 256). Such excess in size may depend on large parental development, although the author has known parents of only medium build to have children never weighing less than ten pounds. An occasional cause for such excessive development can be traced to protracted pregnancy. Although the normal period of gestation is about two hundred and eighty days, women often carry longer. The writer can report a carefully observed case in which the period of gestation exceeded the normal by nearly six weeks in a primipara. The excessively developed child—unfortunately not weighed—was lost during labor from delay in delivering the shoulders after the head had safely been brought down by forceps. Similar cases have been reported by others. In Harris' case in which the fetus weighed fourteen pounds the pregnancy extended over a period of three hundred and twenty-five days. Loviot recently reports a case in which labor began three hundred and seven days after the last menstrual flow. After manual rotation of the vertex, forceps were applied and a living child, exceed-

ing nine pounds in weight, was delivered (Bull. et Mém. Soc. Obst. et Gynéc. de Paris, 1892, p. 215). When the pelvis is small only moderate increase in the size of the child, combined with absence of rotation in the shoulders, may cause death through delayed delivery.

If the pelvis is large there may be no especial difficulty in the spontaneous birth of a large child. When the disproportion between child and pelvis becomes marked, interference is necessary. The head can usually be brought down without much difficulty with forceps, but the shoulders are apt to cause trouble (Derivaux, St. Louis Courier Med., 1891, iv., p. 59). According to Jacquemier (Charpentier) the arrest of the shoulders during labor may depend on the exaggerated size of the thorax and shoulders, lack of proportion between the body of the fetus and the pelvis, acephalic or anencephalic fetus, and absence of rotation of shoulders from inertia uteri. Many a child loses its life from powerful traction applied to the neck. It will be allowed that at times it is possible to exert a violent amount of traction to the child's neck without tearing the head from the body, and even to see such children survive. But there can be no question that many children are killed by this same procedure, the traction being applied from the head or breech of the child. It is much safer for the child to run the risk of several moments' delay and to wait for labor-pains, or resort to expression, than to make violent efforts at traction. It is true that every moment's asphyxia adds to the danger of intracranial hemorrhage (Jacobi); but, is not the powerful and continued traction to the child's neck an exact counterpart of the forces used in the time-honored method of extinguishing life by hanging?

After the head and neck have been delivered, considerable force can be used by the fingers in the axilla of the underlying shoulder. Even the risk of dislocating or fracturing the humerus should be taken, if the asphyxia is at all threatening, for now the element of time becomes of grave importance. The opposite shoulder can next be rapidly delivered and, lastly, the remainder of the body. In these cases everything should be in readiness for the treatment of asphyxia, so that no time is lost in efforts at resuscitation.

CHAPTER XXVIII.

FETAL CAUSES DURING LABOR—(CONTINUED.)

7. DISEASED STATES OF THE CHILD'S HEAD.

Hydrocephalus was met with fifteen times in 43,545 cases of labor (La Chappelle). According to Merriman it occurs once in nine hundred labors. It consists of cephalic enlargement due to dropsical effusion in the ventricles, membranes, and substance of the brain, with separation of the sutures and fontanelles of the fetal skull. The head may, at times, have a circumference of thirty or thirty-one inches—about five or six inches larger than the adult head. Some women have a habit of giving birth to hydrocephalic children, and syphilis seems to have some etiological influence. As the death of such a child is almost inevitable and not of great moment, the interests of the mother should be chiefly kept in mind. A large proportion of these cases present by the breech, or parts other than the vertex (Scanzoni). In sixty cases Chassinat found forty-one deaths before or during labor, eight deaths before the age of four months, and four children lived longer than four years. Only in spontaneous births can infants survive. If the diagnosis can at all be positively determined, forceps should be resorted to; and, if they fail, craniotomy must be conceded as justifiable.

Ossification of the Cranial Sutures may cause difficulty during child-birth. The writer met one case which presented by the vertex in a laterally flexed position. By manual interference it was readily converted into a vertex presentation. There are, however, few cases on record in which labor was solely obstructed from this cause alone.

Encephalocoele consists of a congenital tumor of the cranium or face—usually associated with brain lesions—and is composed of a diverticulum of brain covered by membranes and contains cerebral fluid. Larger has collected ninety-eight cases (Charpentier), and it is said to occur once in 4,000 or 5,000 labors. As these tumors may

give rise to dystocia, it becomes necessary at times to puncture them previous to death.

LITERATURE CONCERNING DISEASED STATES OF THE CHILD'S HEAD.

- HOPKINSON: Labor Complicated by Congenital Hydrocephalus; *Med. News*, 1892, lxi. 150.
- EVANS: Dystocia due to Hydrocephalus; *Montr. Med. J.*, 1893-4, xxii. 115.
- MON: Embryotomy in Hydrocephalic Fetus; *Rev. di Obst. e Ginec.*, 1890, i. 433.
- VARNIER: Fetal Diseases and Dystocia; *Rev. Prat. d'Obst. et d'Hyg. de l'Enf.*, Paris, 1890, iii. 161.
- BROTHERS: Ear Presentation (Premature Ossification of Skull); *Am. Gyn. Journ.*, Jan., 1892.
- BOARDMAN: Dystocia from Intra-Uterine Hydrocephalus; *Homeop. Journ. Obst.*, 1891, xiii. 206.
- BEJAN: Hydrocephalus causing Rupture of Uterus; *Bul. Soc. de Méd. et Nat. de Jassy*, 1891-2, v. 50.

8. DISEASED STATE OF THE CHILD'S NECK AND BODY.

Tumors of the fetal neck may obstruct labor. Strassman recently reported a case in which the fetus presented by the breech. After the body was born to the navel it refused to come down further, and examination revealed a tumor which, on puncturing, allowed about twenty-five ounces of liquid to escape. After this delivery was easy, and the child lived twenty minutes. The tumor proved to be a hygroma colli, or congenital cyst, of the neck.

Charpentier refers to three cases of *hydrothorax* which caused difficulty during labor. *General anasarca, general emphysema, ascites or effusion in the peritoneal cavity*, may similarly obstruct delivery. At least fifty cases of anasarca complicating labor are on record (Charpentier). In recent literature a number of cases have been reported by Dührssen, Raineri, and others. In one case the peritoneal effusion in a seven-months' fetus was associated with a circumference of sixteen inches at the navel. These cases are usually associated with inflammatory lesions of the peritoneum or of the abdominal organs.

Overdistension of the fetal bladder may similarly obstruct labor and require puncture to enable the completion of labor; Rayner, Schwyzer, and Walther have recently reported such cases. In Schwyzer's case—a seven-months' fetus—forceps were applied, the head, the arm, and scapula torn off, and the abdominal wall bored through by the finger, in order to allow over ten pints of urine to escape. The

circumference of the child's abdomen was estimated to be twenty-six inches. Schroeder has reported twelve cases. The prognosis for the child is fatal, only one child having reached the age of five days.

Enlargement of the fetal viscera may obstruct delivery. In one case of cystic degeneration of the kidneys, the abdomen measured eighteen inches in circumference, and the child had to be partially eviscerated (Fussell). Other enlargements may be due to fibro-cystic degeneration of a retained testicle; enlargement, tumor, or hernia of the liver, uterus, pancreas or spleen; one fetus enclosed within another; aneurism of the aorta; the various forms of monstrosities; and all sorts of tumors—cystic, fatty, vascular, cartilaginous, osseous, carcinomatous, spina bifida, ectopias, hernias, hydatid cysts, and encysted neoplasms (Lusk). Besides these we may occasionally meet with ano-perineal tumors—of which one hundred and sixty-five cases have been collected (Charpentier)—originating from the spinal canal, degeneration of Luschka's gland, sacral hygroma, coccygeal and sacral fibroma, cysts, fibroma, cysto-carcinoma, hydrorrhachus, lipoma, and adult tumors (Charpentier). Two cases of umbilical hernia in the newly-born were recently reported by Berger. They were successfully operated on the second and fourth days after birth. The writer recently observed a case of spontaneous eventration at birth. Besides these enlargements the fetus may obstruct delivery by having ankylosis of the joints, adhesion of the extremities to the trunk or to one another, and rigor mortis.

LITERATURE CONCERNING DISEASED STATES OF THE CHILD'S NECK AND BODY.

- BERGER: Umbilical Hernia in Newly-born Children; *Centr. f. Gyn.*, 1894, xxv.
 BAGOT: Dystocia due to Cyst in Liver of Fetus; *Dublin J. Med. Sc.*, 1892, xciii. 265.
 STRASSMAN: New-born Child with Cystic Tumor of Neck; *Ztsch. f. Gebtsk. u. Gynäk.*, 1894, 200.
 FUSSELL: Cystic Degeneration of Fetal Kidneys; *Med. News*, 1891, lviii. 40.
 RAYNER: Obstruction to Delivery due to Distension of Fetal Bladder; *Br. M. J.*, 1892, ii, 1384.
 SCHWYZER: Obstruction due to Distension of Fetal Bladder; *Arch. f. Gyn.*, 1892, xliii. 333.
 WALTHER: Dystocia due to Distension of Fetal Bladder; *Ztsch. f. Gebts. u. Gyn.*, 1893, xxviii. 333.
 DÜHRSEN: Abnormal Peritoneal Effusion in Seven-months' Fetus; *Zetsch. f. Gebts. u. Gyn.*, 1891, xxi. 484.

RAINERI: Dystocia due to General Edema of Fetus; *Gaz. Med. di Torino*, 1892, xliii. 21.

BROTHERS: Intra-Uterine Rupture of the Anterior Abdominal Wall, etc. *N. Y. Med. J.*, 1895, lxii. 707.

9. CONSTITUTIONAL DEBILITY OF THE FETUS.

In certain cases in which the mother has been the subject of chronic diseases—as tuberculosis, pernicious anemia, syphilis, carcinoma, etc.—or has suffered from persistent vomiting, cholera, typhoid fever, or other debilitating diseases, the nutrition of the fetus will often be seriously interfered with. Many of these children die during pregnancy, or are delivered prematurely. In other cases the state of their vitality is reduced to such a degree that they are unable to withstand the strain of an ordinary labor. Such children may be felt up to the time of labor, and their heart-sounds readily discovered with the stethoscope. Still, after the completion of labor, they will be still-born, and no amount of effort will succeed in resuscitating them. The treatment must naturally be of a preventive character, and employed during the period of pregnancy, according to the indications.

CHAPTER XXIX.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

c. DIRECTLY FOLLOWING LABOR.

Physiology of the new-born child.—Up to the time of birth the fetus is in a condition of apnea. The blood circulates through all portions of the body, but the lungs receive a small supply. From the left heart the blood passes into the aorta directly, to supply chiefly the upper portion of the body, and, to a lesser extent, the lower portion. From the right heart the blood passes into the pulmonary artery, and thence the greatest portion empties itself into the aorta through the ductus arteriosus. As proved by the experiments of Zweifel and Fehling, respiration is carried on at the placenta, where a diffusion of gases takes place. Through the medium of the umbilical arteries and vein the carbonated blood is replaced by oxygenated blood in the fetal circulation.

The first inspiratory effort after birth has been attributed to numerous causes. The oldest theory has ascribed it to the change of temperature—which is usually thirty degrees or more—and is supposed to act on the surface of the child. Preyer and others strongly advocate the theory of peripheral irritation. Lahs calls attention to the sudden or excessive squeezing of the placental blood-channels—due to uterine contraction—through the umbilical vessels toward the fetal heart during or shortly following the birth of the child. Runge and the majority of recent writers believe that the disturbance in the exchange of gases between mother and child and the resulting non-aeration of the fetal blood alone interfere with the existing apnea and cause the first effort at inspiration. It is only fair to add that, after a large series of experiments, Heinricius was forced to the conclusion that all the theories are untenable.

With the first inspiration a number of changes occur in the fetal system. The pulmonary alveoli become filled with air, the lungs expand and assume the function of oxygenating the blood and remov-

ing the carbonic acid gas. The whole mass of blood, instead of one-fourth part, must now pass from the right side of the heart into the lungs, and, after oxygenation, return to the left heart for distribution throughout the entire body. The ductus venosus, foramen ovale, ductus arteriosus, and the umbilical arteries and vein, become practically obliterated. The left ventricle undergoes hypertrophy, the blood-pressure in the aorta sinks, the extra-abdominal portion of the hypogastric arteries ceases to pulsate, and the umbilical vein becomes emptied of its blood through thoracic aspiration. The first breath excites an afflux of blood to the lungs, and a negative pressure develops, which acts as a suction force upon the placental blood, and this continues until the circulatory equilibrium is established (Budin). The retracting and contracting uterus also tends to compress the placenta so that, after the birth of the child, more blood is driven into the circulation (Schücking).

Shortly after birth the meconium is discharged, and in a few days feces appear in the intestinal tract. The pancreas and stomach yield secretions which have the property of emulsifying fats and digesting albumenoid substances—thus rendering the assimilation of milk possible. The kidneys begin to excrete urine of a low specific gravity. New-born children are said to lose seven or eight ounces during the first two or three days, and the original weight at birth is only reached between the fifth and eighth days. This loss in weight is said to be greatest in children of primiparæ, in artificially nourished children, and in such children in whom the umbilical cord has been ligated immediately after birth. Budin claims that the amount of placental blood which enters a child's circulation by delaying umbilical ligation is three ounces more than when the cord is immediately tied. According to physiologists the entire quantity of blood averages one-twelfth to one-fourteenth of the total body weight (Kirke). Therefore in a seven-pound baby, whose entire blood weighs only nine ounces, this must mean a great deal. Schücking, who believes immediate ligation of the cord unjustifiable in any case, observed that by delay new-born children gained one to three ounces more in weight than those in which the cord was immediately tied. Winkler advises delay until after birth of the placenta, making use of uterine massage. There is, however, no use in forcing matters. In one case, after the placenta had been delivered, its contents were forcibly squeezed into

the circulation of the child, causing its death from cardiac over-distension. Some claim that there is a disposition to icterus in children in whom the cord was ligated after the placental circulation had ceased. In eleven careful observations of late and early ligation by the writer, only one case developed jaundice, and that was in a child whose cord had been rapidly ligated. As for the occurrence of dark vomiting, melena, and sanguineous vaginal discharges, said to occur after late ligations (Porak), Lusk very properly doubts the relationship. The writer in eleven successive cases tied the cord immediately or after ten or fifteen minutes. The child was weighed at birth, and again at intervals varying between sixty and eighty-four hours later. The increase or decrease in weight was noted. The following tables show the results:

I. IMMEDIATE LIGATION OF THE UMBILICAL CORD.

| No. | WEIGHT AT BIRTH. | WEIGHT AFTER 60 TO 84 HOURS. | LOSS OR GAIN. |
|-----|------------------|------------------------------|----------------|
| 1 | 10½ pounds. | 10 pounds. | Loss, ½ pound. |
| 2 | 8 " | 8¾ " | Gain, ¾ " |
| 3 | 9 " | 8¾ " | Loss, ¼ " |
| 4 | 8 " | 9 " | Gain, 1 " |
| 5 | 9 " | 8¾ " | Loss, ¼ " |
| 6 | 11½ " | 11 " | Loss, ½ " |

II. DELAYED LIGATION OF THE UMBILICAL CORD.

| No. | WEIGHT AT BIRTH. | WEIGHT AFTER 60 TO 84 HOURS. | LOSS OR GAIN. |
|-----|------------------|------------------------------|-------------------------|
| 1 | 7 pounds. | 8 pounds. | Gain, 1 pound. |
| 2 | 7½ " | 7 " | Loss, ½ " (prem. child) |
| 3 | 9¾ " | 9 " | Loss, ¾ " |
| 4 | 8¼ " | 8½ " | Gain, ¼ " |
| 5 | 6 " | 6 " | Gain, 0 " |

These tables show that in the cases in which the cord was rapidly ligated, the average gain in weight after sixty to eighty-four hours was a fraction of a pound. In the cases in which there was delay in tying the cord the children neither gained nor lost at the end of this time. The writer appreciates that these results fail to correspond with those of Budin, Schücking and others, but gives them for what they

are worth. The most serious objection to their value lies in the fact that the number of observations is too small to draw deductions from. But if a large series of observations should confirm these findings, it will practically make little difference whether the cord is delayed in tying or immediately tied. The fact, however, that the child acquires more blood in its system by waiting is sufficient ground for delaying somewhat the tying of the cord. Whether it is necessary for the welfare of the child to wait until after the placenta has been expelled is strongly doubted by the writer.

The frequency of the fetal heart-beat changes directly after birth. In a number of observations the writer found the pulse at the umbilical cord to vary between one hundred and sixty and one hundred and eighty per minute. After waiting ten minutes the pulse was again counted, and found to have dropped to one hundred and forty-five or one hundred and fifty beats per minute. This pulse acceleration immediately following birth is unquestionably the direct result of labor-pains on the placental circulation, and again emphasizes the necessity of watching the fetal heart during protracted labor.

LITERATURE CONCERNING THE PHYSIOLOGY, ETC., OF THE NEW-BORN.

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- ZWEIFEL: Placental Respiration; *Arch. f. Gyn.*, 1876, ix. 291.
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CHAPTER XXX.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

ASPHYXIA NEONATORUM.

We include this subject under the heading of infantile mortality following labor, because, although respiration is absent, the heart, in the majority of cases, continues to act more or less feebly.

Asphyxia of the new-born has been defined to be an abnormal condition in which an obstruction exists to the absorption of oxygen and elimination of carbonic acid gas. This results in a series of symptoms, the most prominent of which is the absence of respiration (Runge). The child's normal condition in utero is one of apnea. If from any cause, during intra- or extra-uterine life, the supply of oxygen is cut off, the fetal medulla becomes gorged with non-oxygenated blood, and the inspiratory movement is excited. After birth this is the normal condition of affairs. Previous to birth, such interruption of the fetal circulation—due to compression of the umbilical cord, separation of the placenta, etc.—is likewise followed by the attempt to respire; but, instead of air, the child draws mucus, blood, liquor amnii, meconium, etc., into its air-passages. The irritability of the medullary centre diminishes, the respiratory movements are lessened, the heart becomes paralyzed and the fetus dies unless speedily delivered. If delivered with the heart still perceptible, if ever so faint, the condition is called "suspended animation" (Lusk), or intra-uterine asphyxia.

Experiments on animals have proved that the asphyxia of the new-born depends less on the excess of carbonic acid gas in the blood than on the absence of oxygen. This view is adopted by such authorities as Schroeder, Lusk and Runge.

If the interference with placental respiration is only temporary, Schultze claims that the disturbance of the fetal functions due to intra-uterine respiration may be equalized or compensated for in the following manner. After a time the medulla no longer receives arterialized blood, its irritability diminishes, and respiratory efforts cease. Blood

can no longer pass from the right ventricle into the pulmonary circulation. The action of the heart is restored, and if the obstruction is only temporary, the interchange of fetal and maternal blood at the placenta is restored.

Post-natal asphyxia occurs in those children born with blood sufficiently oxygenated, but who are unable to institute pulmonary respiration from congenital debility, prematurity, disease, or pathological states. Some children who do not respire prematurely may be born asphyxiated from slow interference with placental respiration in utero. The amount of oxygen in the fetal blood gradually diminishes, but is at first so trivial that the respiratory centre is not stimulated. When, finally, the deficiency becomes marked, the irritability of the medulla has become so depressed that it is incapable of originating a respiratory impulse. In these cases fetal death, or birth in the condition of asphyxia, occurs without any intra-uterine efforts at respiration (Dohrn).

Etiology and Pathology of Asphyxia Neonatorum.—In the intra-uterine variety of asphyxia the cause of the trouble may emanate from the mother, fetus, or appendages. Compression of the fetal brain from contracted pelvis or the use of forceps may interrupt the placental interchange of gases. Compression of the umbilical cord and separation of the placenta will act directly in interrupting the fetal circulation. Maternal causes may be due to heart or lung disease and any condition resulting in lowering of the blood supply with diminished placental nutrition.

The pathological conditions, in these cases, may be due, 1, to the asphyxia itself, or, 2, to the fact of premature respiration (Runge). The asphyxiated state may be responsible for the liquid state of the blood with engorgement of the right side of the heart, large thoracic vessels, sinuses of the dura mater, blood-vessels of the pia mater, and, particularly, of the liver. Bloody extravasations are met with in the various internal organs, pia mater, pleura, peritoneum, liver, retro-peritoneal connective tissue, kidneys and their capsules, uterus and retina. A case of ruptured hematoma of the liver, in such a case, has, during the past year, been reported by Negri. The pericardial and pleural cavities, in slowly developed cases, may contain blood-stained serum. There may be œdema of the pia mater, scrotum, and connective tissue surrounding the umbilical vein.

From the fact of premature respiration, the trachea and bronchial tubes may be filled with various substances—mucus, amniotic fluid, meconium, vernix caseosa, hairs, epidermis, and fat-cells. The presence of such foreign substances proves the occurrence of intra-uterine respiration. In rare cases foreign bodies may be absent when the nose and mouth have been occluded by the membranes or close apposition to the maternal parts (Lusk). Liquor amnii has been found in the middle ear (Spiegelberg). The stomach may contain air or meconium prematurely swallowed. There may be areas of ecchymoses beneath the pleura and pericardium. Occasionally some air is present in the bronchi. Pulmonary ecchymoses are less frequently met with in intra-uterine asphyxia than in the post-natal variety, but congestion and extravasations in the abdominal and cerebral organs occur with about equal frequency.

The post-natal form of asphyxia consists of a persistence of the normal intra-uterine apnoea after birth. It may depend on malformations, prematurity, or disease of the fetus. Malformations or disease may involve the organs of circulation and respiration, or the nervous system. Pulmonary syphilis (white hepatization), double pleuritic effusions (Spiegelberg), compression of the air-passages, imperfect development of the lungs, defects of the diaphragm, with hernia of stomach and intestines in the pleural cavity (v. Dittel), injuries to the respiratory centre due to labor or instrumental interference, or any condition resulting in a high grade of brain-pressure sufficient to paralyze this centre, and by irritation of the pneumogastric, arrest heart-action—have all been found sufficient to prevent respiration after birth. In the prematurely-born fetus the undue softness of the costal cartilages, combined with the weakness of muscles and nerves, prevents expansion of the thorax. Hence, from all these various causes, the fetal condition of pulmonary atelectasis persists after birth. Even after resuscitation many of these children die after several hours or days.

In this variety of asphyxia the evidences of premature respiration are absent. General atelectasis and various lesions will be discovered post mortem. Even in resuscitated children the degree of atelectasis found will be striking. This fact was pointed out early in this essay. It proves that the snapping inspiratory movements which these children make are of little service in aerating the lungs. Besides

atelectasis, the lungs are large, heavy, and of a dark red color. In those which have breathed, pulmonary congestion and ecchymoses may be absent, and isolated areas of aerated tissue present. As a rule, the posterior portion of the lower lobes are said to be unaerated. Pneumonia is very rare. In twenty-four autopsies in premature children, Runge found pneumonia complicating atelectasis in only two cases. The blood, in this class of children, is dark and uncoagulated. The pulmonary vessels are widely distended. Pulmonary extravasations are said to be more extensive than in cases of asphyxia accompanied by intra-uterine respiration, for the reason that, in the latter, the aspirated fluids offer a certain support to the distended capillaries (Lusk). Obstruction to pulmonary circulation may result in venous congestion of the surface and abdominal organs, giving these children their dark blue color. The same cause may be responsible for the various hemorrhages—conjunctival, meningeal, cerebral.

If the child only died after several days, besides the evidences of imperfect pulmonary aeration, there may be present jaundice, extreme inanition, and œdema of various parts. Occasional bloody extravasations may be found in the brain and other parts. Urate infarctions are said to occur with greater frequency in premature children than in those born at term.

Signs of Asphyxia.—From experiments on animals five signs have been decided on as determining the advent of asphyxia previous to birth. They are: 1, dyspnoea due to premature efforts at inspiration, followed by paralysis of respiration; 2, increase of fetal blood pressure, followed by its diminution; 3, diminished, and later increased frequency of the heart-action; 4, increase in intestinal peristalsis; 5, spasmodic contractions of fetal parts (Runge).

Of these five signs during labor only one or two are practically available: 1, changes in the fetal heart-action, and 2, increased intestinal peristalsis with premature escape of meconium. As this latter condition may follow the use of quinine, or occur normally in breech presentations, we are reduced to the one sign—change in the fetal heart-action.

This again emphasizes the necessity of watching the fetal heart by means of a stethoscope during the progress of labor. Absence of heart-beat does not prove conclusively the death of the child. But, if heard distinctly at first and later feebly or not at all, the presump-

tion is strongly in favor of impending death of the child. Attention has been called to this fact a number of times in this essay, but important truths bear constant repetition. More than thirty years ago v. Hüter made an excellent study of the fetal pulse in two hundred pregnant women. He proved the average normal pulse to be one hundred and thirty-two per minute, and, at times, to become so accelerated by fetal movements as to defy counting. In maternal febrile affections he found the pulse to become continually rapid and, in certain affections, as cholera, to become distinctly intermittent. During hemorrhages he found that it might disappear altogether. He pointed out that, at the beginning of labor, a rapid increase in the fetal pulse was temporary, and only indicated active movements on the part of the child; toward the end of a protracted labor, however, the same increased pulse-rate was a fairly safe indication of approaching fetal death. During labor-pains diminution in the frequency of the fetal heart-beat is normal. To be of value from a diagnostic stand-point, the slowing of the fetal pulse must occur in the intervals between pains and be progressive in character. It then indicates brain-pressure or irritation of the medulla through excess of de-oxygenated blood. Succeeding this, an increase in the fetal heart-beat betokens paralysis of the pneumogastric and, consequently, a more advanced stage of asphyxia. Delivery must now be accomplished at once if the child is to be saved.

The evacuation of the child's bowels—except in breech cases when direct pressure exerts an influence—is due, in part, to relaxation of the sphincters and contraction of the diaphragm, but chiefly to the increased intestinal peristalsis attendant upon asphyxia.

By abdominal auscultation and vaginal touch the "intra-uterine cry," or fetal dyspnoea, has been detected by various observers (Schultze, Kristeller, Boehr). Exceptionally, if the head is low down, it may be possible, with the finger in the rectum, to recognize premature inspiratory efforts (Runge).

The muscular contractions have occasionally been met with in pelvic births. The writer recalls a number of instances in which spasmodic movements followed by quietude on the part of the fetus occurred in cases in which dead children were born.

CHAPTER XXXI.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

Symptoms of Asphyxia Neonatorum.—These may be divided into two sets of cases—those occurring in intra-uterine and post-natal asphyxia. To distinguish between these two varieties of cases after delivery, the detection of bronchial râles will usually be possible in cases in which intra-uterine respiration has occurred.

In intra-uterine asphyxia, directly after birth, although the heart-sounds are perceptible, respiration will be absent or feeble and accompanied with râles, the eyes will be closed, and the extremities will hang motionless and limp. Presently the surface will become cool, the respiratory efforts cease, and, finally, the heart-beats disappear. The cases may be mild (*asphyxia livida*) or severe (*asphyxia pallida*), the dividing line being marked by a loss of tone in the muscular system. In mild cases, the skin will vary in color from deep-blue to blue-red; the features will be puffed and show a painful expression; the conjunctivæ will be injected, with the eyes closed or eyeballs protruding, and the extremities will hang motionless. In severe cases, the complexion will be as pale as wax; the lips will assume a light-blue color; the extremities, head and lower jaw will be loose and flaccid; the sphincters will be relaxed, and the entire appearance of the child will be corpse-like. In milder cases, although the limbs are motionless they are not flabby, and their muscular tone will be preserved so that reflex movements can readily be induced by surface irritation; in severe cases the muscular tone will be entirely absent and no reflexes can be elicited. The heart-action in mild cases will be slow but forcible; in severe cases it will be rapid and feeble. The umbilical vessels will be distended with blood and pulsate strongly in mild cases; whereas, in severe cases the cord will be collapsed and only occasionally pulsate. The respiration in mild cases will be absent or, if feebly present, accompanied with facial, nasal and maxillary action; in severe cases the respiration will be absent, or if

present will, in spite of apparently powerful diaphragmatic contraction, admit little air in the lungs. In the former cases respiration will progressively become stronger; in the latter it may become feebler and soon cease. These respiratory efforts will likewise be marked by an absence of facial contraction. In mild cases efforts at resuscitation may not be required, or will succeed readily, or the child may pass into the second stage. In severe cases the same efforts may prove futile.

The symptoms in post-natal asphyxia during labor are negative. Intra-uterine asphyxia will be excluded by the absence of any change in the frequency of the heart-sounds. Absence of râles after birth will confirm the diagnosis. The asphyxiated state may manifest itself by complete absence of respiration, or a few snapping respiratory efforts accompanied with thoracic retraction. These may soon entirely cease, or continue as an irregular sort of respiration for hours or days. The child may start from its apathetic condition at various intervals and again fall back into its state of torpor. The umbilical vessels are usually well filled with blood and pulsate. The heart-beat is at first normal, later slowed, and finally accelerated. The surface and extremities are reddish-blue, and quickly become cool.

These children die very quickly if there is an error of development or disease of the respiratory organs. Diaphragmatic hernia in young infants has been diagnosticated by excessive rapidity of the respiratory movements (Jacobi), although v. Dittel's case of post-natal asphyxia made no effort at respiration. The truth of the matter is, that the autopsy must be relied on for the positive diagnosis.

Insufficient development accounts for the inability to expand the lungs in premature children. The respiration is feeble, of an occasional snapping character, and marked usually by an absence of râles. The apathetic condition is relieved by periods of soft whining. The skin is reddish-blue, the features turbid, and the surface cold. Œdema of hands and scrotum is occasionally present. Physical examination may reveal dulness at the base of each lung and faint respiratory murmurs. Efforts at nursing are absent or feeble. Jaundice may develop after several days. Rectal temperature is sub-normal. Loss in weight is rapid. A frequent and unfavorable complication preceding death is sclerema.

Differential Diagnosis.—The intra-uterine variety of asphyxia may require differentiation from apnea, anemia, or pressure of the brain. Although Schultze denies the possibility of persistent apnea, Kehrer is a strong believer in its occurrence. Failure to respire, with absence of râles, makes the diagnosis of apnea probable, but beginning respiration alone can absolutely establish the diagnosis.

Anemia of the newly-born may be due to rupture of the blood-vessels of the umbilical cord in cases of insertio velamentosa (Runge). These children may present signs of the second grade of asphyxia, and show the presence of aspirated substances in the air-passages.

Asphyxia due to brain pressure—from hemorrhage, depressed bone, or forceps—is of grave importance. Large hemorrhages in the brain substance cause rapid death. Surface hemorrhage may give rise to symptoms closely resembling asphyxia—slowing of the pulse, absent or superficial respiration; but no foreign substances will be present in the air-passages. Contracted pelvis may cause both asphyxia and cerebral pressure. Thus brain-pressure may slow the pulse, lessen the interchange of gases in the placenta, and induce asphyxia as a secondary result (Schultze). Premature children often present this combination of cerebral hemorrhage and asphyxia. The character of the labor, narrow pelvis, and operative interference will point toward the combination. Such a child, when roused, will rapidly relapse into a somnolent state. The pulse will be slow and full, the respirations irregular, and the general appearance one of mild asphyxia.

The prognosis after asphyxia, during the first eight days of life, is seven times worse than that of children born unasphyxiated (Poppel). The death-rate is in direct proportion to the duration of the asphyxia. Thus children born with coils about the neck or in whom the asphyxia is prolonged from any cause, are apt to have hemorrhages of greater or less extent in the brain. Many cases of idiocy and epilepsy have been traced to asphyxia (Jacobi). Langdon Down refers to the influence of forceps and asphyxia in producing idiocy. Little has collected two hundred cases of spastic rigidity resulting from asphyxia.

The length of the expulsive period of labor, the size of the pelvis, the nature of the presentation, the use of forceps or version, or compression of the umbilical cord, all have a bearing on prognosis. Intra-

uterine asphyxia offers a grave prognosis on account of the presence of foreign substances in the air-passages. When the nose and mouth have been occluded the prognosis is worse, because pulmonary extravasations are more apt to be present (Lusk). The first grade of asphyxia offers a good prognosis; the second grade is more doubtful. The snapping respirations are apt to be misleading, and it is well to bear the advice of Schultze in mind, to avoid long-continued asphyxia and to never be satisfied with partial resuscitation. Aspirated foreign substances interfere with efforts at artificial respiration and tend to excite atelectasis and broncho-pneumonia. Brain-pressure renders the prognosis serious. Therefore asphyxia, after vertex presentation, is more grave than after-breech presentation (Runge). Hemorrhages of the convexity of the brain are less dangerous than those at the base. Small extravasations may become absorbed. The writer had a case of prolonged asphyxia following a very difficult instrumental delivery, in which the child had repeated convulsions during two days, and the diagnosis of traumatic cerebral hemorrhage was made. This child made a rapid recovery, and after a year was in perfect health. Still, in such cases, the risk of subsequent epilepsy or idiocy is considerable.

In cases of post-natal asphyxia the prognosis depends on the cause. Errors in the development of lungs, heart, diaphragm, etc., offer the gravest prognosis. Intra-uterine disease is apt to mar the prognosis. In cases of brain-pressure or injury to the medulla the prognosis is bad. Poppel claims, however, that meningeal hemorrhages never cause death directly from pressure on the medulla, but that they interfere with respiration, and give rise to coma. In cases of premature birth the prognosis depends primarily on the age of the fetus, and, secondarily, on the intelligence of the parents and the amount of care which can be bestowed on the infant. The occurrence of sclerema neonatorum very materially dampens the prognosis.

CHAPTER XXXII.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

Treatment of Asphyxia Neonatorum.—Prophylaxis should be observed in every case of labor, and every preparation should be on hand for possible asphyxia. The character of the labor and the fetal heart-action must be carefully supervised, and at the first evidence of danger to the child it must be delivered as rapidly as is consistent with maternal safety. As the dangers of asphyxia arise chiefly from lack of oxidation of the respiratory centre, lethargic state of the fetal circulation, and, in intra-uterine asphyxia, from blocking of the air-passages, the indications for treatment are sufficiently clear. The air-passages must be cleared and the activity of the medullary and cardiac functions restored by artificial respiration. Above everything else, systematic interference is requisite. Nothing is worse or more common than jumping from one method to another. Cold water dashed on the child, followed by hot, and again by cold over bed-clothes and everything, then friction and a few Sylvester movements made hastily and imperfectly, can only be of service in the mildest cases, but may force aspirated liquids further into the child's air-passages or chill the baby. Method, as in everything else, is indispensable.

When asphyxia is expected, and in all cases where a good nurse is at hand, it is well to have a number of things in readiness previous to the birth of the child, for time is of great moment in these children. On a chair or table a pillow covered with rubber cloth and a warmed napkin is placed, and will serve as the operating table. A bath-tub containing hot water, a pitcher of cold water, and another containing hot water, scissors, string, a number of warm napkins, and a thin elastic catheter (eleven or twelve Fr.) will be all that is necessary.

On the birth of the child it is well to at once proceed to diagnose the grade and variety of the asphyxia while removing the

mucus from the child's throat with the little finger. If the gums react and the finger excites choking or swallowing the case belongs to the first grade of asphyxia, because the reflexes are still present. If no reaction follows the second grade is present.

In all cases of asphyxia it is well at once to tie the cord in two places, cut between the ligatures, and place the child on the operating pillow. Some authorities advise against ligating the cord (Lusk). Others advise allowing blood to escape. But these measures rob the child of blood, or cause the child to lie in wet and unhandy surroundings. The advantages, if any, are not sufficient to counterbalance the comfort and ease which the operator enjoys by having the child entirely away from the bed.

In the first grade of asphyxia, after removing the mucus from the child's throat with the finger or sucking it up through the catheter in the larynx, the child is thrust into a warm bath. The water must neither be too hot nor too cold. These children have emerged from surroundings having a temperature corresponding to blood-heat (about 100° F.), and the bath ought to approach this temperature. The child should be next placed on its pillow and rubbed dry with warm napkins. This process is repeated—bath, rubbing and removal of mucus. If after the second time there is no response, or only an imperfect result, cold water with the hand should be poured over the child, or it should be submerged in a bath of cold water immediately followed by the warm bath, and then dried. If deep inspirations followed by a cry are still absent repeat this process several times—cold bath, hot bath, rubbing, and removal of mucus (Runge). Flaggellation of the nates, rubbing the soles of the feet with a stiff brush, brandy applied to the epigastrium or poured into the throat, may be tried. Laborde recommends forcible rhythmical traction of the tongue. Mild cases will usually respond to these measures, but they must be persisted in for a half hour or longer until the child has a healthy appearance.

In the second grade of asphyxia the finger in the throat has failed to induce reflex movements, and external irritants, therefore, are of little use. The main object of treatment is to bring oxygen to the medulla. In doing this it must never be forgotten that the air-passages may be filled with foreign substances which must first be removed or expelled previous to admitting air into the lungs. Nobiling and others state that even a slight obstruction in the air-passages is sufficient to

prevent air from entering the lungs. Hence whatever plan be followed it must be remembered that the movement of expiration must precede that of inspiration. Some authors prefer the method of introducing a catheter into the child's larynx; others select the Sylvester or Schultze method. Lahs, after a series of experimental investigations, arrived at the conclusion that the largest amount of air could be introduced into the lungs of asphyxiated children only by the methods of Schultze and Sylvester or their modifications. It is well for the accoucheur to be thoroughly and practically acquainted with all the methods.

One of the easiest methods to learn and one of the most universal in its application and accompanied with the least risks of damage to the feeblest children, is the old Sylvester method described as long as forty years ago. The writer has conscientiously resorted to the various newer methods, and, while recognizing their usefulness in selected cases, he is firmly convinced that they offer no advantages over this method, and, in careless hands, offer many more dangers to the child. Sylvester's method may be resorted to in the first grade of asphyxia when the recommended measures have failed, or, in any case, after wrapping the child in a warmed napkin after cleansing the throat of mucus, and directly after tying the cord. The child, wrapped in a warmed napkin, is placed on its back with the shoulders raised, the feet fixed, the tongue drawn forwards, the mucus removed from the throat, and the arms pressed gently and firmly against the sides of the chest to simulate expiration. Now grasping the arms above the elbows they are raised upwards and everted alongside of the head and kept there fully extended for a short time to induce inspiration. By everting the arms Champneys found the effect to be twice as great as when this was not done. The movement of expiration now follows. After several repetitions the child is thrust into a warm bath. The movements are again begun and followed by a warm bath until spontaneous respiration occurs or the case becomes hopeless. Champneys and others, by experimenting on tracheotomized dead children with the aid of the manometer, have found this method to be fully equal to that of Schultze in filling the lungs with air. It avoids chilling the child's body or unintentional injury, as at times happens when the latter method is employed. It has the objection, however, that the dorsal decubitus interferes with the expectoration of foreign substances from the air-passages. The writer partly overcomes this difficulty, during

the movement of expiration, by turning the child on its side. Bain has modified Sylvester's method in the following manner: By placing the hands under the axillæ with the thumbs over the external ends of the clavicles the shoulders are forcibly pressed forwards and then allowed to fall back. With the spirometer he claims to have proved that more air is thus made to enter the lungs. Pacini adds that it is better to draw the arms and shoulders backwards and upwards.

Lusk, Behm, and others think highly of passing the catheter into the larynx. Foreign substances being first sucked up, air is blown into the lungs and this is followed by pressure applied to the thorax. Thus inspiration and expiration are simulated. That this method is not easy, can be inferred from the fact, that, in spite of a large experience in intubating young children, the writer found it impossible, in one instance, to introduce the catheter, and, consequently, instead of into the lungs, the air was blown into the stomach. The dangers to the child from this method are interstitial emphysema, pneumo-thorax (Runge), rupture of the lung (Fritsch), and air in the pericardium (Fritsch). Besides these risks the danger of communicating diseases from the operator's mouth must be borne in mind. Ten children died of tubercular meningitis, after three or four months, in the practice of a tubercular midwife, from the mouth-to-mouth method. Still, in the case of premature children, which can be kept wrapped in cotton or warmed cloths, the catheter offers advantages over the other methods at our command.

The method of Schultze, first described in 1871, has deservedly received recognition all over the world, and is generally in use throughout the German empire. Runge, Wiercinsky, Guelfi, and others have proved that this method is sufficient to force air into the lungs of asphyxiated children. It is applicable to well-developed children born in the second grade of asphyxia. Schultze claims that the movement of inspiration has a mechanical influence on the heart, in that more blood is emptied into the heart from the great veins than from the diastole alone, and thus fresh cardiac activity is excited.

After ligating and cutting the cord, the operator's hands seize both shoulders in such a manner that the thumbs rest on either side of the chest-wall anteriorly, the index fingers rest in the axillæ, whilst the rest of the fingers lie across the back—so that practically the child, with its back toward the operator, swings with the axillæ resting in the

operator's index fingers. In the first movement the child is tossed upwards so that the lower half of its body lies doubled over the upper half. Thus the lumbar spinal region becomes flexed, the head is turned downwards, and the whole weight of the child's body rests on the operator's thumbs. The child's organs, as a result, become compressed, a passive movement of expiration ensues, and the air-passages are cleansed. After a short pause the child's body is swung downwards, the chest expands, and the movement of inspiration occurs. The pectoral muscles, in this movement, draw the superior ribs upwards, the inferior ribs being drawn downwards by the abdominal muscles and the diaphragm on account of the weight of the liver. After several seconds the upward swing is repeated, and then the movements are repeated six or eight times. The child is then immersed in a warm bath and, if necessary, the swingings resumed. Besides admitting air into the lungs, Winkler claims that the Schultze movements allow more blood to gravitate to the brain and assist the circulation and interchange of gases. If successful, the child will pass into the first grade of asphyxia, when alternate hot and cold baths or external irritants may be employed. As long as the heart beats, efforts must persist—swingings alternating with baths. Gibson succeeded in resuscitating a child which he only saw thirty minutes after birth. Even after respiration sets in, efforts must be persisted in until the child presents a vigorous appearance, otherwise these children are apt to lapse into the asphyxiated state and the autopsy after death will show large areas of atelectasis (Runge). The short, snapping inspirations indicate insufficient pulmonary aeration and must not be deemed sufficient. Internally brandy or musk, well diluted, may be given to support the feeble heart.

The objections to Schultze's method are the dangers to the child from striking objects in the room, and violence from careless manipulations in swinging too suddenly or too forcibly, and chilling of the child's body. Winter refers to hemorrhage in the scrotum, fracture of the ribs, and rupture of the liver. Meyer warns against these movements in case of fracture of the clavicle and humerus or other injuries. Kehrer is opposed to the method in children extracted with great difficulty because of the possible aggravation of injuries to the skull, brain, vertebræ, and spinal cord, and because fractures may be displaced and fresh hemorrhages induced. Besides all this, the manip-

ulations are apt to make a bad impression on the relatives and, when fatigued, the operator is not apt to have a trustworthy assistant at hand to resume the movements.

The advantages claimed for this method are, that it cleans out the air-passages, oxygenates the respiratory center, and vivifies the energy of the circulation. Although theoretically better than the Sylvester method in allowing foreign bodies to escape from the air-passages—and even this has been recently denied by Budin—it has no advantages over the latter method in admitting more air into the lungs. In fact Champneys is inclined to give the Sylvester method the first place in this respect. The additional risks of chilling and injuring the child place the method of Schultze, in the writer's estimation, beneath that of Sylvester.

Several other methods are described which may prove of use from time to time. With faradization of the phrenic nerve Pernice (in 1864) succeeded in saving three out of five deeply asphyxiated children. A small faradic battery will certainly induce a deep inspiration, by placing one pole at the side of the neck and the other over the sternum at the insertion of the diaphragm. The writer has had opportunities for testing this fact in several cases of profound asphyxia from illuminating gas and opium poisoning. But, aside from the fact that a battery is not apt to be at hand when wanted, the movement of expiration must be supplied by other methods, and, by the employment of the forced inspiratory efforts alone, foreign bodies may be sucked further down into the air-passages.

The method of Marshall Hall is thus described in the author's words: "Respiration is effected by placing the patient in the prone position, and turning the patient on the side fully, and rather more, alternately. In the former position pressure is made on the thorax and abdomen equal to the weight of the body, and expiration takes place. In the latter, that pressure is removed, and inspiration occurs." This method is considered by most authorities as inferior to the methods of Shultze and Sylvester.

Besides the direct passage of a semi-elastic catheter into the larynx, modifications have been described from time to time. One of the oldest methods consists in placing the operator's mouth over that of the child—a thin cloth intervening—and blowing into the air-passages of the latter. Besides not providing for expiration, this method offers

the objection of forcing foreign bodies deeper into the bronchial tubes and rather distending the stomach with most of the air. Tuberculosis has been communicated to children by this method.

In Forest's method, the child being placed in a vessel of warm water, the head is drawn backwards, causing the cervical vertebræ to be thrown forwards; the hands are drawn upwards, the mouth opens, and air is strongly blown by the operator into the child's lungs. The backward extension of the head is supposed to occlude the œsophagus by the direct pressure of the vertebræ, and thus prevent the entrance of air into the stomach. The expiratory act is induced by throwing the head forward and bringing the arms down to the sides, so as to express the air from the lungs. Unfortunately, the inventor of this method was unsuccessful in the cases in which he resorted to it. It presents, however, a number of good features and deserves further trial. It may be of interest here to note that Howard, in 1881, pointed out that by forcibly extending the head and neck the insensitive epiglottis becomes elevated, and may thus permit air to enter the lungs.

Sharp uses a method of holding the child by the feet with the head and back resting in a downward direction in the other hand, and claims that asphyxiated children can in this manner be brought to gasp. Roberts modifies the method by holding the child perpendicularly head downwards. Goyard saved an asphyxiated child, after spending an hour and a half with other methods, by plunging it into very hot water (50° C.— 122° F.).

Instrumental insufflation is often very difficult to carry out. In France instruments have been devised by Chaussier and Depaul, and also by Ribemont. The writer has neither seen nor used these instruments, but, according to Budin, that of Ribemont is said to serve an excellent purpose in these cases.

In the post-natal variety of asphyxia the usual attempts at resuscitation must be made. In case of failure the causes can only be determined by autopsy. In premature children, skin irritants, insufflation, and perhaps the Sylvester method may be tried. The Schultze movements are distinctly contra-indicated. In fact, v. Hoffmann described a case in which no air was found in the lungs of a premature child post mortem, although the Schultze movements were made after birth. In this case the lungs could easily be inflated by blowing.

In these cases it is not necessary to clean out the throat. After introducing air into the lungs by the methods indicated, it is well to give these children two or three warm baths daily, followed by frictions. Where no asphyxia is present, the writer has avoided bathing the children for a number of days, simply looking after the body-heat and nourishment. Where the children lie in a somnolent state, it may be well to wake the baby from time to time and apply light irritants. Nourishment must be given every hour or two by the spoon, if the child is too weak to nurse. The body-heat must be retained by cotton or pillow packings, hot-water bottles, warm-water apparatus or incubators. The child's vitality must be carefully preserved by all the means described in detail in a former chapter.

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CHAPTER XXXIII.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

PREMATURITY.

Although directly concerned in this essay with infantile death occurring during labor, it may be well to round up our subject with a brief notice of some of the most frequent causes of the death of the child during the first hours or days of life. Among these causes prematurity ranks foremost in importance and fatality. This subject has been thoroughly entered upon elsewhere, and we shall content ourselves at present with emphasizing the fact that, in this country, premature children are very much neglected, especially in private practice. The laity still firmly believe that eight months' children cannot live and make very little effort to preserve them. Excepting in well-equipped hospitals, the majority of the profession fail to devote themselves with sufficient energy and zeal. In this manner the combined disinterestedness of physician and relatives only serves to allow the flickering spark of the feeble infant to rapidly become extinguished. As previously described, these children require unremitting care and attention. The body-heat must be preserved by various external measures. Systematic feeding at regular intervals, with proper liquid nourishment, must be persevered with until sufficient strength is developed to nurse. The feeding of these immature infants on teas—as is constantly done by nurses and mothers—is wrong. In the absence of mother's milk, properly diluted cow's milk should be substituted.

CEREBRAL HEMORRHAGE.

Cerebral hemorrhages are responsible for a large number of infantile deaths during or shortly following the act of labor. The subject has been referred to a number of times in different chapters. Its connection with tedious labor, deformed pelvis, forceps, and any cause producing fetal brain pressure or interrupting the fetal cerebral circulation, has been sufficiently dwelt upon elsewhere. These hemorrhages

may be cerebral, meningeal or subdural. They may be punctate in character, or occur as extravasations of various sizes. They may be few or numerous. They may be found in the substance of the brain or ventricles, or at the base, or on the convexity. The only symptom at birth may be asphyxia, due to the pressure of the extravasated blood; or, per contra, the persistence of the asphyxiated state in the new-born child may result in cerebral hemorrhage. In the latter case the primary slowing of the circulation is followed by stagnation and finally rupture of the blood-vessels, with escape of blood in larger or smaller quantity (Jacobi). In these cases, however, hemorrhages are apt also to be found in other parts of the body (Runge).

Even after emerging from the asphyxiated state, such children may succumb after several hours or days. According to the size and number of the hemorrhages, these children may lie in a torpid state, or be excessively cross, or develop convulsions of greater or lesser severity. The writer has met one case of convulsions in a new-born child repeated for days, after a most difficult instrumental delivery, which seemed to depend on cerebral hemorrhage, yet the child made a perfect recovery, and is alive to-day. In numerous instances, however, he has been able to confirm the observation of Jacobi and others, that many cases of epilepsy and idiocy could be traced to a probable hemorrhage in the brain occurring during or shortly following labor, especially if asphyxia was prolonged, or a coil of the umbilical cord strangulated the child's neck.

The indications for treatment are preventive in the main. During labor prolonged brain pressure should be avoided as much as possible. Impacted children must be delivered as quickly as possible. Forceps and other operative measures must be employed with care. Coils about the neck, if too tight, must be quickly loosened or, at times, cut between ligatures, without waiting for the delivery of the rest of the body. Systematic efforts at resuscitation from the asphyxiated condition must be made without delay.

INJURIES TO THE HEAD AND FACE.

As a rule a certain amount of pressure occurs in all cases during labor resulting in the caput succedaneum, which consists of an exudation of serum due to passive local congestion. When excessive a real hematoma may result. Braun recently reports a case of hematoma

of both parietals complicated with melena (*Centralbl. f. Gyn.*, 1894, xvii. 414). Fractures of the skull may occur spontaneously in small pelves with strong labor-pains, but, in the larger number of cases, they are due to mechanical interference, such as the use of forceps. These children are apt to be excessively cross after birth, and occasionally the symptoms of brain pressure, due to depressed bone and complicating sub-cranial hemorrhage, are present.

The extra-cranial injuries—hematomata and lacerations of the scalp—require little treatment; the former are best left severely alone, the latter are subject to ordinary surgical principles. Fractures, in many cases, regulate themselves, the fetal cranial bones possessing the power of self-adaptation to a wonderful extent. The older methods of surgical intervention were uniformly unsuccessful. In recent times, however, a successful case of trephining and raising the depressed bone on the third day after birth has been reported by Smith (*N. Y. Journ. of Obst.*, May, 1893, 712). Facial paralysis—usually the result of pressure from forceps—is not a serious condition, and spontaneously improves in a short time.

INJURIES TO OTHER PARTS.

Dislocations and fractures are occasionally spontaneous, but usually result from violent efforts at extraction. They may occur legitimately under certain circumstances, in the practice of the most conscientious practitioners. Still, as far as possible, they ought to be avoided. In cases of maternal hemorrhage or convulsions labor must at times be expedited, and it is usually after versions that these injuries occur. Frequently, in the interests of the child—as in cases of intra-uterine asphyxia, displacement of limbs, prolapsus of the cord—the hurried efforts at extraction may produce the same result. After birth such children should be carefully examined and proper treatment at once resorted to. As the prognosis, under these circumstances, is excellent, the criminal negligence of its oversight is apparent. The writer has been sufficiently unfortunate to have met six or eight such cases in his practice, but, under appropriate treatment—usually the reduction and application of a light plaster-of-paris splint in case of fracture—they have uniformly done well.

Injuries to the spinal column and internal organs—such as the kidneys, liver and spleen—have been frequently reported and are

usually fatal. They are of interest from a prophylactic standpoint in emphasizing the fact that the fetus at term can only withstand a limited amount of violence with impunity.

CONGENITAL DISEASES.

Various congenital diseases may be responsible for the death of the child within the first hours or days of life. Congenital debility is usually held responsible for all.

Congenital Rachitis has been sufficiently described elsewhere.

Congenital Syphilis is one of the most important of this group. In many cases the children are premature or still-born; in others the disease only manifests itself some time after birth.

Congenital hydrocephalus, if advanced, usually impedes labor sufficiently to cause the death of the child previous to birth. In some cases the degree of congenital debility is sufficient to early extinguish the life of the child. In exceptional cases growth is not impeded, and such children may grow to adult life with impaired brains.

Congenital deficiencies in the structure of the heart—such as patent foramen ovale or valvular lesions—may give rise to that cyanotic condition of the infantile surface known as the “morbus ceruleus.” Severe grades of patent foramen ovale are apt to prove fatal shortly after birth. The compensatory varieties may persist and admit of growth to adult life. The valvular lesions are usually located in the right side of the heart. The writer has, however, met a number of instances in early infancy of lesions in the left side of the heart—particularly mitral insufficiency. It is interesting to note that one of the cases collected by the writer and referred to in the early part of this essay presented the lesions of ulcerative endocarditis.

Congenital hemophilia or the hemorrhagic diathesis is very exceptionally the cause of infantile death shortly after birth. Townsend recently reported a series of fifty cases on the hemorrhagic disease of the new-born, and concludes the disease to be of an infectious nature, but dependent on a number of causes (*Arch. of Pæd.*, 1894, ix. 559). The writer has had the opportunity of following for years a number of families afflicted with hemophilia in which the children were apparently healthier than the parents. Occasionally, however, new-born children die shortly after birth from uncontrollable spontaneous hemorrhage from the navel or elsewhere—as after the rite of circumcision

—which can fairly be ascribed to this disease. The fact that some of these children survive such hemorrhages and fail to have them repeated in later life is explained by Grandidier in the following manner: He believes that, in the processes of development from fetal to extra-uterine life, the “transitory hemorrhagic diathesis” becomes extinguished with the completion of this change.

Congenital defects of the rectum, mouth, or other parts, may indirectly lead to the early death of the new-born infant. Imperforate anus or rectum will naturally cause the child's death unless very radical treatment be at once resorted to. The careful search for the intestinal pouch and its attachment to the anal orifice offers the only prospect of life for these infants. Fissure of the palate or hare-lip may interfere to such an extent with the nutrition of the infant as to cause its death. Careful feeding during the first few weeks of life, and later proper surgical intervention, will materially improve the prognosis. The writer has, in a number of instances, operated for hare-lip within the first weeks of life with perfect success.

CHAPTER XXXIV.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

UMBILICAL HEMORRHAGE.

Two varieties of umbilical hemorrhage are usually described: 1, from the vessels of the umbilical cord; 2, from the navel-wound. Negligence in tying the cord is usually responsible for the first variety. Although Fürth met only thirteen cases of umbilical hemorrhage in 50,000 new-born children, it is said to occur with much greater frequency. The writer has certainly met with a dozen cases in less than 5,000 new-born children.

In the majority of cases, after ten or fifteen minutes, the blood-pressure in the cord sinks, and, even without a ligature, no serious hemorrhage can take place. This sinking of the blood-pressure can readily be confirmed by any observant accoucheur. Where the muscular layer of the blood-vessels is sufficiently developed it is possible occasionally for hemorrhage to occur. Likewise, in premature children with imperfect respiration, or in full-term asphyxiated children with extensive pulmonary atelectasis, the tension of the umbilical circulation may be sufficient to give rise to dangerous hemorrhage from neglect in properly securing the cord (Runge). The writer has seen cases of spontaneous rupture of the cord which were accompanied with no hemorrhage at all. The mere act of rupturing probably elongates and twists the vessels, thus closing their mouths. A number of cases, however, in which the ligature slipped, were followed by decided hemorrhage, but none of them proved fatal. It is the physician's duty, however, to carefully apply the ligature, and, as a matter of routine, to quietly instruct the nurse how to apply a second one in case of hemorrhage. Occasionally, after the cord has fallen off, slight hemorrhage may come from the vascular stump. In such cases the application of the solid stick of nitrate of silver, an antiseptic powder, or compression, will suffice.

Secondary or idiopathic hemorrhage from the navel-wound is very rare. The writer has only met one case. Authorities state that a few days after birth—most frequently the fifth day—blood begins to gush as from a sponge through the umbilical aperture, and is not controlled by additional ligatures about the cord. This may continue for hours or days and cause the death of the child. The hemorrhage is usually of an intermittent character, and very deceptive regarding the influence of therapeutic measures. It is frequently associated with hemorrhages in other parts (Grandidier). Besides the hemophilic state, this form of umbilical hemorrhage may occur in connection with congenital syphilis, sepsis, and acute fatty degeneration of the newly-born (Buhl's Disease).

In the treatment of the writer's case the use of styptic applications and compression proved futile. Finally, after forty-eight hours, the method of Dubois (recommended nearly fifty years ago) proved successful. Two hare-lip pins were passed at right angles to each other through the circle of skin surrounding the umbilicus. A figure-of-eight silk suture was next passed about each needle, and then, in a circular manner, the silk was wound beneath both and tied. The bleeding ceased immediately and permanently. After several days the needles were removed.

GASTRO-INTESTINAL HEMORRHAGE OR MELENA OF THE NEWLY-BORN.

This disease was originally described by Ebart in 1723. It develops between the first and seventh days after birth, and is characterized by the discharge of dark masses of blood from the stomach and bowel, due to hemorrhage in the gastro-intestinal tract. Over one-half of the children die (Silbermann). It is said to occur once in about seven hundred to one thousand new-born infants. Still, with his vast experience, Henoeh claims to have met with only fourteen cases.

Melena may occur in connection with—1, constitutional or general diseases in the form of secondary gastro-intestinal hemorrhage; and, 2, as a local affection of the gastro-intestinal tract (Runge). The first set of cases include such general diseases as syphilis, sepsis, acute fatty degeneration (Buhl's Disease) and, possibly, hemophilia. The local affections may consist of—1, erosions or ulcerations in the stomach, intestines, or œsophagus (Henoeh), originating in traumatism during

birth; or, 2, they may be due to the changes in circulation after birth (Loranchet); or, 3, to emboli from the umbilical vein, or from a secondary thrombus of the ductus Botalli (Landau); or, 4, to the lodgment of bacilli (Neumann, Rehn).

V. Prenschen divides melena into two similar groups: 1, those occurring in healthy children and due to injuries sustained during labor; and, 2, those occurring in connection with general diseases and not related to labor. Epstein and others have called attention to the relation between sepsis and hemorrhages in the newly-born. Kundrat and Widerhofer refer to four groups of cases in the newly-born with gastro-intestinal hemorrhages: 1, those presenting a healthy appearance with hyperemia of the mucous membranes; 2, those resulting from an interference with the circulation during or following birth; 3, those resulting from pathological changes, as pyemia; 4, those due to hemophilia.

The symptoms usually begin about the second day after birth. Bloody vomiting may occur alone or associated with intestinal hemorrhage. Collapse symptoms from loss of blood soon manifest themselves, and the children may die in twelve to twenty-four hours, or go on to recovery. The writer has seen three cases with the following histories:

Case I. Tenth child, female, difficult labor, child born asphyxiated and over an hour consumed in efforts at resuscitation. Since birth it has been very feeble. Bloody vomiting. Umbilical hemorrhage. No blood elsewhere. After twenty-four hours the pale, exsanguinated and collapsed baby died. Diagnosis, Melena due to traumatism during birth.

Case II. Fourth child, female, labor easy, no coil about the neck, no asphyxia, fairly developed, bright eyes, no jaundice. On the third day blood repeatedly gushed from the mouth in half-cupful quantities, and once a clot was brought out. The diapers contained dark blood mixed with meconium. No bleeding from nose, vagina, or elsewhere. Diagnosis, Melena Neonatorum. In this case the child was kept perfectly quiet and was given cracked ice, lime-water, and iced milk from the spoon. This baby recovered.

Case III. Fifth child, male, labor protracted over several days, difficulty with the shoulders. Born asphyxiated and required vigorous slapping over the nates to effect respiration. Directly after birth the

scrotum was noticed to be large and the seat of a hematoma on the left side. Later in the day a little free hemorrhage occurred from the space between the first and second toes of the right foot. On examination a bluish discoloration was found. The passages were found to be tarry and contained blood. On the third day umbilical hemorrhage set in. The child seemed to be suffering great intra-abdominal pain, from the way it was drawn together—probably from internal hemorrhage or inflammation. Ecchymotic spots appeared over several portions of the surface of the body. Urine showed no blood, but became suppressed. The child died after several days, but no autopsy was granted. As the family history was free from syphilis or hemophilia, the diagnosis of melena, or purpura hemorrhagica, was very probable, with a possible relationship between the two.

The therapeutic indications consist in checking bleeding as far as possible and maintaining the strength of the child. Cold applications to the abdomen—surrounding the upper and lower limbs in flannel at the same time (Henoeh)—iced milk, perchloride of iron (Vogel), and ergot should be tried. It is well to have these children kept on their backs and moved as little as possible.

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CHAPTER XXXV.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

TRISMUS NEONATORUM.

Although Hartigan observed fifteen cases of this disease directly after birth, most cases begin later. The umbilical wound, more rarely other wounds, may become infected, through uncleanness of the hands or dressings, with the bacilli of tetanus (Nicolaiier), resulting in the production of ptomäines (Brieger), the chief of which is tetanin. Very generally distributed, the bacilli of tetanus are chiefly found on the surface of the ground rendered impure by sweepings and dust, as well as in the dirt and dust of dwellings (Beumer). Thus, at times, these bacilli may reach the imperfectly protected navel-wound. Or, the cases may be carried from one to another. The possibility of direct inoculation has been proved experimentally by Nicolaier, Rosenbach, and Kitasato. Or the disease may be carried from the newly-born to the mother (Heinricius). Trismus neonatorum differs from the tetanus of adults in that the spasm of the maxillary muscles is primarily more pronounced, and only later followed by general tetanus.

The disease generally manifests itself between the fifth and twelfth days after birth, is chiefly met with in the poorer or tenement-house districts, and has in certain distant islands—Hebrides, Guianas, Cuba (Labonne, Hartigan)—been found endemic. Certain races—particularly the Negroes—are more frequently affected (Hirsch, Hartigan). During epidemics of puerperal fever, these cases are said to occur more frequently. J. Lewis Smith points to its frequent occurrence in shanties. A series of thirty-seven cases was traced in one town, by Keber, to the practice of a single midwife, who was unable to appreciate the excessive heat of the children's baths with her hand. Injuries to the child's head, cerebral compression, spinal concussion, overlapping of the cranial bones in the occipital region, have all been held responsible for this disease. Hartigan estimates that 25,000 children succumb yearly to this disease in the United States alone.

The first symptom the child presents is difficulty in nursing, which progressively becomes worse until the lower jaw becomes fixed, at a short distance below the upper jaw, and all of the muscles of mastication become hard and strongly contracted. This constitutes the trismus. Later the other muscles of the body become involved, until, finally, the usual picture of tetanus is presented. The writer has met two cases of this disease of which he has notes :

Case I. Baby M., third child. Labor easy, excepting for a little traction of the head to deliver the shoulders. The child was born asphyxiated and passed into a rigid condition lasting several seconds. After vigorous slapping of the nates, respiration set in. Excepting great restlessness, the child presented nothing unusual until the fifth day, when the lower jaw was found to be rigidly drawn up, only admitting of the insertion of the tip of the little finger, and completely interfering with the act of nursing. Presently the entire body became involved in the spasm, and, after thirty-six hours, the child died. It is of decided interest to note that, shortly before this, another newly-born child had died in the same tenement-house, in the care of another physician. The two families were on very neighborly terms.

Case II. Baby R., three days old. Very small child, suggestive of prematurity. Nature of labor not noted. Forty-eight hours after birth it ceased nursing, and passed into a collapsed state. Spasm of the jaws, followed later by general spasmodic condition of the entire body, next appeared. A curious local blueness and congestion of the entire left side of the body was noted. The child died after several days.

These cases, as a rule, offer an unfavorable prognosis, and, after from one to six days, death ensues. The treatment is chiefly prophylactic. Careful aseptic treatment of the navel-wound with sterile gauze or clean soft linen or asepsis in the rite of circumcision, or other operative procedures, is absolutely essential. Education of midwives and medical supervision of nurses are necessary. Only clean towels, clean scissors, clean string, and clean hands, which do not come directly or indirectly in contact with the dust of the room, are permissible near the exposed body of the newly-born child. The temperature of the bath must not exceed 100° F. The physician attending a case of tetanus must be very particular regarding personal disinfection in every other case of labor. As regards medicinal treatment,

chloral ranks most highly in the successful cases reported so far; opium, chloroform, and the bromides have proved less beneficial. In this country Holt succeeded in saving a seventeen days' old baby with eight-grain doses of bromide of potassium, repeated every three hours, until one hundred and twenty-eight grains were given. Extract of calabar bean, amyl nitrite, atropin, musk, and sulphonal have also been used. Frequently repeated warm baths have been recommended. Nourishment offers a serious problem in these cases. Sometimes soft catheters passed into the œsophagus or rectal nutrient enemata are advisable. Wilhite noted depression of the occipital and parietal bones, and succeeded in saving one child by resort to persistent and prolonged lateral decubitus. Baginsky tried to cure one case by hypodermic injections of the blood-serum of an animal rendered immune to tetanus, but failed, as he thinks, from insufficient quantity. In all cases antiseptic treatment of the navel is indicated.

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CHAPTER XXXVI.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

SEPSIS IN THE NEWLY-BORN.

1. From the Navel-Wound.—Although septic processes may develop in any wound on the newly-born child, the most usual site is the navel. Of two hundred and eighty-one children dying at the Munich Maternity, v. Hecker found that one hundred and thirty-eight, or sixty-three per cent., succumbed to infectious processes. According to Baginsky, v. Hecker and others, such infection may occur within the uterus, but is most usually extra-uterine. In 1700 deliveries at the Innsbruck Maternity, Ehrendorfer states that eighty-one children died, and of these sixteen were clearly proven to have been infected at the navel. The careful observations of Eröss in 1000 newly-born children demonstrated the fact that mummification of the cord was the exception and not the rule. He found that six hundred and eighty of these children presented pathological processes which often proved fatal.

Among the local affections of the navel-wound may be mentioned excoriations, fungus, ulcer, abscesses, omphalitis, and gangrene. Eröss found that gangrene of the navel was apt to be very readily followed by systemic infection. Fürth met with one hundred and ninety-one cases of gangrene of the navel, of which one hundred and sixty-nine proved fatal. Since the introduction of antiseptic methods the condition has become infrequent. Mild cases may recover, but severe cases are usually fatal within five days. The gangrenous process may be associated with peritonitis or intestinal gangrene. Profuse hemorrhages, or general septicemia, have at times caused death. Sometimes gangrene is secondary to general septicemia. The treatment of these various conditions is chiefly local, and ordinary antiseptic surgical principles must be followed. Preventive aseptic dressing of the navel is of primary importance. Abscesses must be

incised early. Necrotic and gangrenous tissues must be removed. Fungi must be touched with the solid stick of silver.

In all cases the daily bath should precede the dressing of the navel-wound; then the wound must be cleansed with mild antiseptic solutions, dusted with powders, such as salicylic acid, starch, talcum, iodoform, dermatol, etc., and finally covered with an antiseptic dressing.

Diseases of the umbilical vessels may follow a peripheral inflammation by inward extension, and result in arteritis or phlebitis, with secondary thrombus formation. Inflammation of the arteries is now considered far more serious than that of the veins, on account of its more frequent occurrence. In sixty autopsies of septic infection, emanating from the umbilicus, Birch-Hirschfeld found phlebitis only eleven times, venous thrombi four times, arteritis alone thirty-two times, and arteritis with phlebitis three times. Fürth met arteritis umbilicalis in three hundred and eight cases, of which fifty-eight died. He states that phlebitis umbilicalis is rarely met with, and is more fatal. In fifty-five autopsies in cases of disease of the umbilical vessels in newly-born children, Runge found arteritis present in fifty-four cases—twenty-two being complicated with pneumonia, sixteen with other lesions—and only once did he meet phlebitis, and then only associated with arteritis.

The symptoms present nothing characteristic. The writer recently saw a case in a baby eight days old, in a poor family. The temperature (rectal) was 103° F. The whining baby nursed feebly and had diarrhoea. The umbilical wound was dressed by a slovenly midwife, and presented a suppurating aspect. With no other treatment beyond carefully cleansing the wound and applying a dressing of powdered boracic acid and iodoform gauze, the temperature spontaneously fell to the normal in twenty-four hours, and the child went on to recovery. This was evidently an incipient case. In other cases nothing is suspected until the child suddenly dies. In some the navel presents an inflammatory appearance. Often the child presents nothing but fever, alternating with collapse and wasting, to indicate the existence of sepsis. At times an ulcer of the umbilicus may be present. Therefore every case of diseased navel runs the risk of the development of arteritis by inward extension. In cases of phlebitis the presence of jaundice is said to be characteristic. Occasionally, complicating pneumonia

or peritonitis can be diagnosticated before death. The existence of umbilical inflammation with abscess, associated with arthritis of various joints and a febrile movement, render the diagnosis very probable (Runge). At times, gentle pressure from the symphysis in an upward direction may squeeze out pus from the arteries and render the diagnosis positive.

The infection may originate in a putrefying cord, unclean fingers or instruments, other septic navels (in hospitals), maternal septicemia, or decomposed lochial discharge. The treatment is chiefly prophylactic, and consists in preventing putrefaction of the cord by the dressing, frequent change, dryness of the child, loose clothing, and absolute cleanliness, from the time the cord is first touched until the wound is completely healed. Cholmogoroff found micro-organisms in the cord under all dressings, but concluded that plaster-of-paris dressings offered the best safeguard against pathogenic germs. The actual treatment of the disease is practically nil. Breast-milk and small doses of alcohol must be given internally; the navel must be thoroughly disinfected and dressed antiseptically. Abscesses must be treated surgically.

2. Cases Originating from Sources other than the Navel.—Accidental injuries or operations with unclean instruments—for mammary abscess, tongue-tie, or circumcision—may be followed by sepsis. Abrasions of the buccal mucous membrane, or slight injuries to the anus, may be followed by the same result. The mucous membrane of the female genitals may be the seat of diphtheria or gangrene. In many cases of sepsis of the newly-born no local cause of infection can be discovered. During intra-uterine life, when the mother is suffering from septicemia, the child may become infected from the placenta or from the amniotic fluid. In some cases the premature rupture of the membranes admitting air into the uterus may cause putrefaction of the liquor amnii without disturbing the mother's health, whereas the fetus, through premature inspiration of this liquid, may acquire septic pneumonia. In this connection Légy, during the past year, reports the interesting case of a child which lived ten hours with imperfect respiration. The autopsy showed fibrin and sanguinolent fluid in the pleural cavities, with streptococci. During the last month of pregnancy the mother acquired a violent vaginitis. Three days preceding delivery the waters ruptured, and the author believes that in this

manner the infection was carried upwards to the child. It is only proper to add that the writer, as well as others, has had cases of children which had breathed prematurely in foul-smelling liquor amnii, and which, after resuscitation, presented no symptoms of sepsis.

Miller has claimed that septic poisons may be transmitted to the child from the mother's milk. Bacteriologically it has been found that the milk of women suffering from septicemia may contain pathogenic micro-organisms (Escherich), but this has been contested by others (Bumm). More recently Cohn and Neumann claimed that the milk of healthy women may contain bacteria, and, during the past year, Ringel has published confirmatory views. The mouths of nursing infants, according to the last observer, contain corresponding bacteria in their secretions. The writer has seen large numbers of children continue nursing during puerperal fevers without any harm. In thirty-six newly-born children which had died from septicemia, Runge found that in thirty the infection came from the navel, and in three from accidental injuries.

The local symptoms, in those cases not originating from the navel, depend on the site of entrance of the poison, but are usually associated with suppurating or decomposing processes. Epstein calls attention to the mucous membrane of the mouth as a source of infection of the newly-born. He distinguishes the lesions present as septic catarrh, septic croup, and septic diphtheria. These processes may extend to the intestinal tract and give rise to deeper lesions. The most robust children may rapidly die. Metastatic inflammations and extravasations may occur. The constitutional symptoms and the changes in the distant organs are the same as those occurring in connection with sepsis from the navel. Peritonitis, pneumonia, pleurisy, abscesses in the joints and elsewhere may all be present. Progress may be slow or rapid. Fever with collapse, skin rashes, meningitis, gastro-enteritis, may present their various symptoms.

The prognosis is bad. Prophylaxis is again the most important element in the treatment. Operations must be thoroughly aseptic. Children must be rapidly resuscitated at birth and foreign bodies removed from the air passages. Care in cleansing the mouths of newly-born children must be exercised. Actual treatment must be based on antiseptic surgical principles.

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CHAPTER XXXVII.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

ERYSIPELAS OF THE NEWLY-BORN.

During intra-uterine life or shortly after birth it is possible for the child to become infected with erysipelas from the mother. Henoch divides the cases into two sets: 1, those due to puerperal infection from maternal sepsis; 2, those due to an injury on the child's body. The umbilicus is the most frequent point of origin of this disease. Still, injuries or operations about the anus or genitals may become infected with the poison. In some children sepsis and erysipelas are associated from the beginning. This form is fatal (Atkinson), but is questioned by Gusserow. Healthy children may become infected from the midwife, mother, nurse, or physician. These cases may likewise prove fatal, but the autopsy fails to show the presence of sepsis as in the former set of cases.

It has been fairly proven that maternal erysipelas during the pregnant state may invade the uterine cavity and lead to abortion (Hervieux, Wardwell). Schoenfeld reports the case of a child infected on the fourth day after being put to the breast of a mother who had just recovered from an attack of erysipelas.

The local appearances in the newly-born are not different from those shown by the disease in later life. It is said to spread more rapidly. Occasionally portions of the skin may become gangrenous. The constitutional symptoms include hyperpyrexia, restlessness, collapse, and, after several days, death.

In new-born infants the prognosis of erysipelas is very gloomy. Prophylaxis plays a most important rôle in this disease. With the first evidence of maternal erysipelas the child must be removed to other parts. Physicians attending cases of erysipelas must be particularly careful in regard to thorough disinfection before approaching the child's navel or other wounds. Besides nourishment and alcoholic stimulants, the local treatment consists in the employment of lead and

opium wash externally, or repeated painting of the diseased surface with compound tincture of benzoin. Carbolic acid washes must be avoided in new-born children on account of the great danger of poisoning by absorption.

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ICTERUS OF THE NEWLY-BORN.

Of six hundred and ninety new-born children studied by Kehrer, four hundred and seventy-four acquired icterus during the first eight days of life, and, in seventy, the icterus was extreme. The jaundice may be idiopathic, or merely one symptom of a variety of disorders. Some authors—like Kehrer—believe that icterus owes its origin to mechanical causes in the liver, as congenital narrowing of the gall-passages, insufficient contraction of the ductus choledicus, etc. Others (Virchow, Violet, Hofmeier) believe that changes in the blood-cells are responsible for the jaundice. Hofmeier has called attention to the almost constant presence of uric acid infarctions in the kidneys and albumin in the urine in icteric children. He believes that this distinctly indicates an interference in the nutritive processes of the newly-born with resulting icterus. Runge is probably nearest the truth in allowing both a hematogenic and hepatogenic origin for this disease.

The usual form of icterus neonatorum is idiopathic. It is a mild disorder and quickly disappears. It differs from the obstructive jaundice of adults, in that the surface of the body becomes discolored before the conjunctivæ. During the icteric state the children lose in weight. The urine may present the characteristic golden-yellow color of jaundice, and the stools may be clay-colored. The treatment consists in rapid resuscitation if born asphyxiated. Premature children require particular attention. Syrup of rhubarb is a popular and useful remedy. Calomel, in doses of gr. $\frac{1}{20}$, is a useful hepatic stimulant.

Icterus, however, may be a prominent symptom in a variety of conditions, such as sepsis of the newly-born, duodenal catarrh, hepatic syphilis, obliteration of the bile-passages, acute fatty degeneration (Buhl's Disease), or congenital cirrhosis of the liver. Some of the children may be born jaundiced, but usually the icterus appears at various periods after birth. In acute yellow atrophy of pregnancy, the fetus may be also jaundiced. In all these cases the jaundice is very marked, and the children present a very sick appearance. Positive diagnosis is practically impossible, and treatment is apt to be of little service. Still, nourishment and stimulation must be pushed.

LITERATURE CONCERNING ICTERUS OF THE NEWLY-BORN.

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 RUNGE: Diseases of the First Days of Life.

ACUTE FATTY DEGENERATION OF THE NEWLY-BORN (BUHL'S DISEASE).

In 1861 Buhl first described this disease as a parenchymatous inflammation terminating in fatty degeneration of the heart, liver and kidneys. Hemorrhages may arise from the navel, stomach, or intestines. Ecchymosis may be found in the skin, and bloody extravasations may be discovered in the brain. The etiology of the disease is obscure. Runge believes the disease to be a sort of septic infection, with no perceptible changes at the portal of entrance of the poison. Baginsky suggests that the three diseases—acute fatty degeneration, epidemic hemoglobinuria, and icterus—being related physiologically and etiologically, ought to be regarded as different grades of the one pathological process under the heading, "Malignant Icterus of the Newly-Born."

The clinical picture may be introduced by asphyxia at birth. Efforts at resuscitation may be followed by partial success or by complete failure. Thus many cases are readily overlooked and such deaths are usually attributed to asphyxia. Those children which survive may have bloody stools, bloody vomit, and, frequently, after the cord comes away, bleeding from the navel. The skin is at first cyanotic, and later jaundiced. Hemorrhages may occur in the various mucous membranes and skin. Œdema may appear. Collapse rapidly sets in,

and, within a fortnight, these children usually die. Bigelow lost eight out of ten cases (Baginsky). The diseases may occur in groups of cases. Thus Ashby met three cases in one family (Biedert).

The diagnosis can only be positively determined with the microscope, and there can be no doubt that, in this country as well as in Europe, most cases are overlooked and such deaths are wrongfully attributed to congenital debility, or umbilical hemorrhage, or melena. Poisoning by arsenic and phosphorus must be excluded by chemical tests. Sepsis of the newly-born must be excluded. Hecker states that microscopically it is next to impossible to distinguish this disease from deaths by suffocation. Hence, from a forensic standpoint, all such cases must be examined by the microscope.

The prognosis has hitherto been practically hopeless. In the treatment the indications are to overcome asphyxia, to check hemorrhage, and to preserve the strength.

LITERATURE CONCERNING ACUTE FATTY DEGENERATION OF THE NEWLY-BORN.

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VOGEL and BIEDERT: Text-book on Diseases of Children.

RUNGE: Diseases of the First Days of Life.

EPIDEMIC HEMOGLOBINURIA WITH JAUNDICE OF THE NEWLY-BORN (WINCKEL'S DISEASE.)

In 1879 Winckel observed an epidemic of this disease affecting twenty-three new-born children, of which nineteen died. Wolcenzynski recently reported two epidemics of the same disease, involving twelve children, of whom eleven died. Baginsky has met two cases sporadically.

About the fourth day these children are noticed to become cyanotic, icteric and restless. The respiration becomes rapid, without marked acceleration of the pulse or elevation of the temperature. The characteristic feature of the disease is the light-brown color of the urine, due to hemoglobin. Albumin and epithelial cells may also be present. The blood shows an increase in the number of white cells. Convulsions may later develop, and be followed by death.

The post-mortem examination may reveal cyanosis and jaundice of the skin. Disease of the umbilical vessels is almost uniformly absent.

The kidneys are the seat of a characteristic lesion; the cortical substance is discolored brown and spotted with small hemorrhages, the pyramidal substance is dark-red or striped with delicate dark lines, converging to the papillæ. The discoloration is due to the filling up of the straight urinary tubules with granular crystals of hemoglobin. No blood globules are found. Punctate hemorrhages may be discovered in the pericardium, pleura, endocardium, kidneys, meninges, capsule of the liver, and in the mucous membrane of the stomach and intestine. The spleen may be enlarged, hard in consistency, and dark-red in color. Fatty degeneration may be present in the larger viscera.

Bacteriologically, Birch-Hirschfeld refer to the presence of micrococci in Winckel's cases. Wolczynski again refers to the bacterium *coli communis* as the characteristic micro-organism present in the effused blood or thrombi, which, on inoculation, proved fatal to animals within twelve to seventy-two hours.

In the epidemics referred to, water used in the bath or in washing the babies' mouths was regarded as the probable source of the trouble. The disease is apt to be confounded most with Buhl's disease, with which it presents many points in common. Epstein believes the disease to be a septic infection, beginning in the gastro-intestinal tract.

The treatment must be entirely of a prophylactic nature. On substituting sterilized borated water in cleansing the babies' mouths for the well water in which the bacteria were proved to be present, Wolczynski reports that no further cases developed.

LITERATURE CONCERNING HEMOGLOBINURIA WITH JAUNDICE OF THE NEWLY-BORN.

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NOTE.—The writer, as the shrewd reader will have observed, has had no experience with the diseases last described, and has drawn freely upon others for his statements. He has included them, however, in this essay because they are so little heard of in this country, and in the hope that those in charge of large maternities will be on the look-out for them.

CHAPTER XXXVIII.

PREVENTION OF INFANTILE MORTALITY; GENERAL CONSIDERATIONS.

Although it is becoming the rule at obstetric clinics and in the practice of the best obstetricians to look after the condition of pregnant women during the months previous to labor, still, in by far the largest, preponderating mass of women, nothing is undertaken or done up to the time of labor. That this is wrong even those who have had little experience will concede, when it is remembered how much can be learned by the skilled hand and ear of the careful physician. We are not directly concerned in this work with the influence of such an examination on the future welfare of the mother; but, as her interests are intimately connected with the welfare of the future offspring, it is well to note just what can be learned by such an examination.

If the pregnant woman makes her appearance before the seventh month a careful history should first be elicited. The age of the patient, primiparity or multiparity or previous occurrence of miscarriages should be noted. The nature of previous labors should be inquired after. Symptoms of blood dyscrasiæ, as syphilis or anemia, should be sought for, and, if found, appropriate treatment should be instituted. The condition of the stomach and bowels should concern us. After looking at the general build of our patient—whether tall or short, obese or slim, œdematous or not—it is our duty to examine the lungs, heart and viscera as far as accessible. Having found these normal, a very important fact to note is the condition of the kidneys, not only once, but repeatedly; for only during the past year has it been the writer's experience to meet a case in which the urine was absolutely free from albumin at the first examination, but within less than two weeks showed 80 or 90 per cent. of this foreign element.

The most important feature of the examination, however, is the one directed toward the uterus and its contents. The shape of the abdomen should be noted and the question of hydramnion considered. Even the question of a true intra-uterine pregnancy, as distinguished from extra-uterine, must be kept in mind. Not only that, but the occurrence of an extra- combined with intra-uterine pregnancy should not be lost sight of, for such cases are on record. The local examina-

tion per vaginam will give valuable information regarding the size of the bony pelvis and the structure of the soft parts, presence of tumors, etc.; this should be supplemented by external measurements. Regarding the child, the examination per abdomen is, in the writer's experience, not reliable unless in cases of thin abdominal walls. The stethoscope will, however, in most cases, determine the fetal heart-beat, the strength and rapidity of which should be noted. Per vaginam it will be possible, as a rule, to map out the fetal head, and its absence will be pretty strong evidence of a mal-presentation. The existence of twins has, in the writer's experience, been one of the most difficult things to determine before actual labor has set in. But, if two fetal heart-beats at different points and with different counts can be heard, the inference can be relied on as fairly positive.

Having looked after the interests of the child indirectly through attending to the general welfare of the mother, having decided that the passages are sufficiently large to permit the labor to go to term without risking the life of the child, having decided that no malposition or maternal dyscrasia makes it desirable to prematurely terminate pregnancy in the interests of either mother or child, we can safely allow pregnancy to go on to term. And here the writer would make a suggestion in regard to those rare cases in which women have gone beyond term. It is, in effect, that it is justifiable in primiparæ, or even in multiparæ with partly contracted pelvis (even though slight), to induce labor at the end of two hundred and eighty days, and, although we have never yet carried out this practice, we believe that experience justifies such a course. For example, the writer recently had a primipara of fair build pass three weeks longer than the expected time, which had been carefully calculated beforehand. The waters broke early, labor was tedious, and after seventy-two hours, with a woman completely exhausted and a pulse-rate of one hundred and twenty per minute (fetal heart barely perceptible)—Tarnier forceps under chloroform were applied to a head impacted in the pelvic strait and not emerged from the cervix. With moderate traction, after twenty minutes, the head was delivered fairly easily, but the shoulders and body were so largely developed that a dangerous amount of traction was required on the child's neck to extract it. The child was excessively large, like a three-months' baby, and profoundly cyanotic. It began to gasp and breathe after a paroxysmal fashion. This con-

tinued for eight hours, and then the baby died. This experience has been repeated a number of times in former years in women who later gave birth to living children without trouble, and we think we are justified, in similar instances, to terminate labor at the end of two hundred and eighty days in the hope of having a smaller child which will live, and, certainly, with less danger to the mother. The old cry of meddling midwifery will undoubtedly be raised, and the interference will be opposed by the laity; but we, as physicians, with our present knowledge of aseptic methods, have the right to learn from our past experiences and formulate new lines of departure for our future behavior.

During labor the welfare of the child has been sufficiently considered in this essay.

After birth the dangers to the child have not entirely passed, and it is wrong to follow the general practice of handing the baby to the nurse and giving it no further attention. The physician should see that the water of the bath is near to blood-heat (100° F.), and not merely lukewarm, as the nurses like to have it. For these babies have left surroundings with a temperature of 100° (F.), and to thrust them suddenly into a bath of 80° (F.) or less may mean pneumonia and death. But it is well to avoid excessive heat, as cases of tetanus have been traced to this cause. Similarly must the cord be personally supervised by the physician to prevent the premature death of the child from tetanus, or hemorrhage, or sepsis. And all that is here necessary is simple cleanliness. A pair of clean scissors rendered aseptic by boiling several minutes, clean thread from a new spool, and a piece of clean soft linen, are all that is necessary. In a hospital, dried sterilized gauze would be readily obtainable and more suitable. After the mouth and eyes have been attended to, the physician should even keep an eye on the clothing of the baby and the temperature of the room in which it is to be kept. And only here, not before, does the immediate responsibility of the physician cease.

In prematurely born or weakly children the physician should devote himself persistently and devotedly to every detail of surroundings and nourishment, until all danger has passed, as described elsewhere. In asphyxiated children, resuscitated, the character of the breathing must receive the most solicitous attention during the first hours and days of life.

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