The pathology and treatment of childbed : a treatise for physicians and students / By F. Winckel. From the second German edition. ... Translated by James R. Chadwick.

Contributors

Winckel, Franz Karl Ludwig Wilhelm, 1837-1911.
Chadwick, James R. 1844-1905
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Publication/Creation

1876

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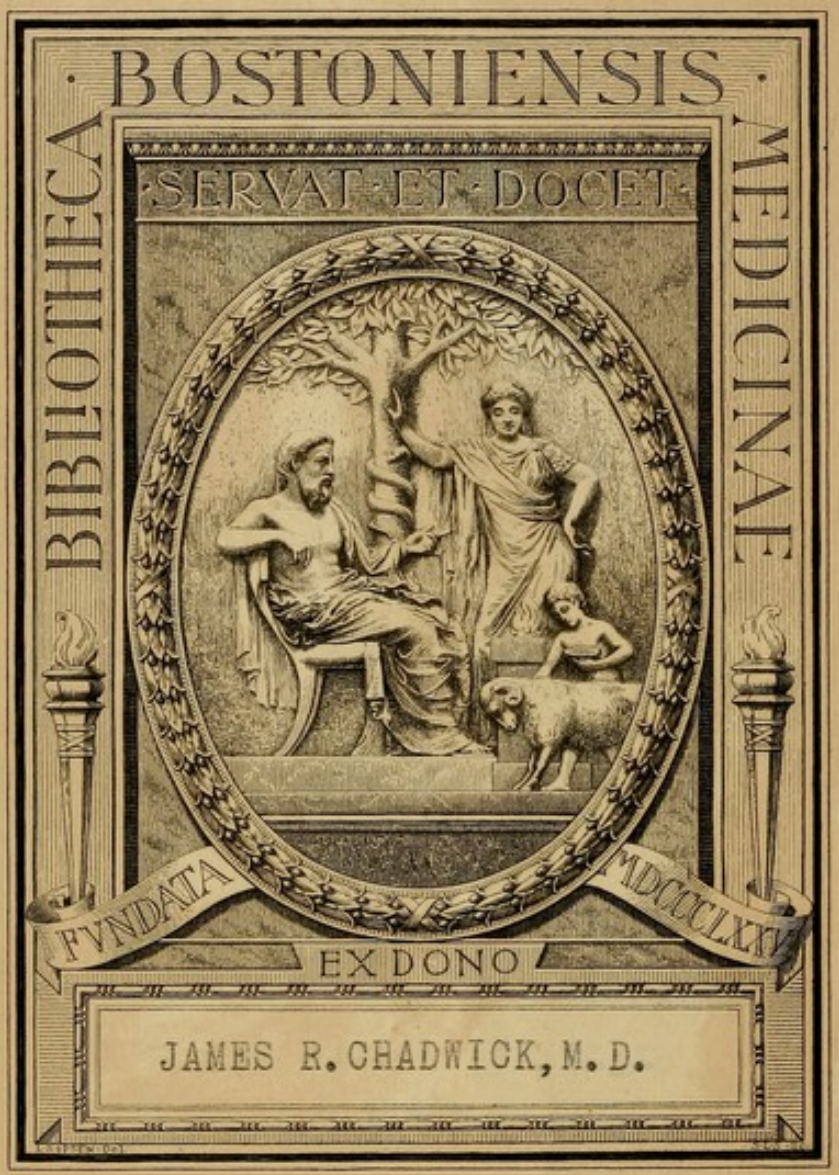
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THE

PATHOLOGY AND TREATMENT

OF

CHILDBED:

A TREATISE

FOR

PHYSICIANS AND STUDENTS.

BY

DR. F. WINCKEL,

FORMERLY PROFESSOR AND DIRECTOR OF THE GYNECOLOGICAL CLINIC
AT THE UNIVERSITY OF ROSTOCK.

FROM THE SECOND GERMAN EDITION,

WITH MANY ADDITIONAL NOTES BY THE AUTHOR.

TRANSLATED BY

JAMES R. CHADWICK, M.D.,

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PHILADELPHIA:
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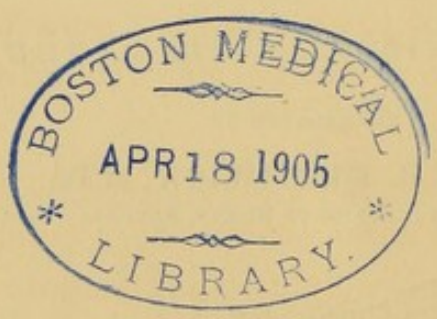

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705 Jayne Street.

TRANSLATOR'S NOTE.

THE treatise of Dr. Winckel is, in Germany, the standard authority in this branch of medicine, and will, I trust, prove a valuable addition to American medical literature, in that it presents in the most impartial manner the views of all the distinguished men who have contributed to a better appreciation of the pathology and treatment of the Diseases of Childbed.

In this American Edition it has been thought expedient to omit one or two of the cases, and a table showing the "Condition of the Genital Organs in 100 Lying-in Women at the time of their discharge from the Establishment." The space thus gained has been used to accommodate considerable additions kindly made by the author to bring this Edition abreast of recent advances in medicine.

The markings of the temperature have been converted from the Centigrade into the Fahrenheit system of notation.

The decimal system of weights and measures has been retained with a view to familiarizing the Profession with this system, and thus aiding to secure its adoption in this country.

To Dr. Arthur H. Nichols, of this city, I am indebted for a thorough revision of my manuscript.

JAMES R. CHADWICK.

BOSTON, March 1, 1876.

PREFACE TO THE SECOND EDITION.

The chapters upon uterine diphtheria, puerperal thrombosis, and the etiology of puerperal fever epidemics have been in many respects altered. Some portions have been entirely re-written. In place of puerperal ichorrhemia, the forms and nomenclature of the severe puerperal fevers are discussed in Chapter VI. of the first section.

Puerperal salpingitis and oophoritis are no longer treated specially, but, in consideration of Breisky's criticism on the first edition of this work, are included under the head of peritonitis.

The records of cases before appended have been enlarged by the introduction of Nos. 9, 13, 15, 19, 20, 23, 24, 37, and 50, many practitioners having assured me that the cases reported have proved very instructive.

Where authors have been quoted in the text, the places where they expressed their opinions are designated either in the bibliographical list appended to that chapter, or to one of those immediately preceding.

The printing of this second edition began in February, 1869, so that only the literature up to the end of the year 1868, and a small number of the publications of the year 1869 were available.

I trust that the alterations and additions may prove useful, and that the book may more and more fulfil the end for which it was designed.

THE AUTHOR.

Rostock, end of July, 1869.

PREFACE TO THE FIRST EDITION.

The writer of the present treatise had been devoting himself for many years to the special study of the puerperal diseases, when this predilection was strengthened by his appointment to the Rostock Lying-in Establishment. Since the opportunities of showing interesting cases of childbirth, or of women's diseases, are not of daily occurrence in the small gynecological clinics, it naturally results, that the normal and abnormal childbeds are observed much more assiduously. The necessity of bringing this part of gynecological instruction into prominence causes us to recognize at once the fact that, in the modern treatises and manuals, the pathology and treatment of childbed are far from being thoroughly understood. In most of the obstetrical books used by students, such as those of Busch, Kilian, Hohl, Spiegelberg, Scanzoni's compendium and Naegele and Grenser, this part is entirely omitted; it is also wanting in the works upon the diseases of women that have been most popular among the German students, such as Scanzoni's and Langenbeck's translation of West. In the more extensive obstetrical treatises, like Scanzoni's for instance, only the most important affections of childbed are briefly given in outline, the justice of which is not apparent, or else are, as in the work of C. Braun (1857), dogmatically and superficially condensed into a small space. In other volumes upon the diseases of women, they have only been here and there touched upon (Kiwisch). This neglect is not confined to German writers alone, but English and French works of this same description also suffer from the like defect (Tyler Smith, Meadows, Velpeau, Cazeaux, etc.).

For the above reasons, it is often perplexing to determine what book to recommend for the study of the puerperal diseases, especially as the older monographs by Helm (1839),

Kiwisch (1840–1842), Berndt, Jr. (1846), no longer answer to the present requirements of science. It is, moreover, in the last 20 years that our knowledge of the diseases peculiar to lying-in women has been particularly extended and enriched by a number of remarkable investigations, so that it seems to me high time that the fruits of these assiduous labors should be brought within the reach of practitioners and students.

With this view, I began to deliver lectures upon these topics as early as the winter term of 1864–65, and repeated them in the ensuing year. All the chapters have been discussed with my students at the same length as they here appear, except several of the smaller divisions (eclampsia, mental diseases, and skin diseases); they have therefore been subjected during these 18 months to a repeated thorough revision and reconsideration, so that I now no longer hesitate to give them a wider circulation.

In not following the classifications of Kiwisch into epidemic and sporadic diseases, or that of Berndt into puerperal fever and inflammations, I have manifestly deferred to the universally accepted views of the present day, that every disease must be classified according to its pathologico-anatomical characteristics, and not according to the mode of its appearance. On the other hand, puerperal diseases are not so restricted in their location and extent, that they can be divided according to the organs which they involve. Affections of several organs, for instance, of the external genitals and the vagina, of the vaginal cul-de-sac and the vaginal portion, etc., very frequently concur to make up a certain type of disease, because, as a rule, the same causes unite to produce them all, for the further reason that the outlines of the separate organs are less sharply definable in the beginning of childbed than at other times.

I have appended to each chapter a short summary of its literature, but as the authors prior to 1840 have all been fully quoted by Kiwisch and Berndt, I have confined my notices to the writers of the last 25 years. And even of these, mention could not be made of all, owing to the constant increase in the volume of literature. Many of the works cited were unfortunately not accessible to me in the original, so that I had to

content myself with the abstracts in Schmidt's Jahrbücher. It would also have been prolix to name all the articles that have appeared upon the several diseases, so that the names of those authors only have been given whose works have been consulted in the preparation of that chapter.

In appending records of cases, I had a threefold object in view. First of all, typical cases are meant to be given to students for comparison with other cases; a few cases were inserted as contributions to the settlement of mooted points, (examinations of the pulse, temperature, and urine, and the etiology of epidemic puerperal diseases); finally, many are introduced to enrich the literature of rare affections (lesions of the vagina, diseases of the symphyses, thrombosis of the genitals).

In conclusion, I would add a word of apology for having discussed several diseases but briefly in the following pages. Ruptures of the uterus, for instance, which are essentially complications of delivery, are considered only in connection with the numerous other lesions of the genitals in lying-in women; they are, of course, only inserted because of their occurrence in puerperæ, in order not to leave that important chapter incomplete. In the same way, displacements of the womb, with the exception of inversion, are touched upon in the most concise manner possible, because they are very properly considered at great length in the treatises upon women's diseases.

I have avoided, when possible, all far-fetched deductions and unprofitable hypotheses, which would be quite out of place in such a manual. Instead of adducing arguments, I have endeavored to set forth clearly all well authenticated principles that are based upon experience; to acquire new facts, and corroborate old ones, often by means of very tedious researches. For the above-mentioned reasons, the author craves indulgence, if important works in any department have been overlooked.

I submit the result of many years' labor to my colleagues, in the hope that it may prove a welcome counsellor to many, and to others a lever for the execution of new works in this important domain of pathology.

THE AUTHOR.

Rostock, August, 1866.

CONTENTS.

PAGE

Introduction 17
Short Summary of the objective appearances in healthy lying-in women 18
Normal state of the Genital Organs 18
" " " Lochia 19
" " " Breasts, and the secretion of milk 20
" " " Pulse 20
" " " Respiration 22
" " " Temperature 22
" " " Functions of the Kidneys 25
" " " Functions of the Skin 26
" " " Functions of the Intestines 27
" weight of the body 27
General Etiology of the Diseases of Childbed 27
Predisposing causes 28
Immediate causes 32
The frequency of puerperal diseases 35
The mortality of women in childbed 36
I. In private dwellings 37
II. In lying-in establishments 38
General Treatment of the Diseases of Childbed 39
1. Antiphlogistic: Venesection 39
Local abstraction of blood from the uterus . 41
2. Injections into the uterus 43

SECTION I.

PUERPERAL AFFECTIONS OF THE EXTERNAL AND INTERNAL GENITAL ORGANS.

CHAPTER I.

GENITAL LESIONS OF LYING-IN WOMEN.

I. Lesions of the pubes and vaginal orifice 49
Ruptures of the perineum 49
Other injuries of these parts 61

PAGE

II. Lesions of the middle portion of the vagina 62
Not communicating with the neighbouring organs . . . 62
Case No. 1. Wounds of the vagina inflicted by the forceps; paravaginal abscess, with burrowing of the pus toward the perineum 67
Lesions of the vagina communicating with the neighbouring organs 69
Urinary fistula of the vagina 69
Case No. 2. Utero-vesico-vaginal fistula, owing to a contracted pelvis, face-presentation, and application of the forceps . 81
Case No. 3. Vesico-vaginal fistula, after cephalotripsy on a patient with a contracted pelvis 82
Fecal fistulæ 84
Case No. 4. Recto-vaginal fistula occurring spontaneously during delivery; recovery without operation 88
Lesions of the vaginal cul-de-sac and of the uterus . . . 89
Case No. 5. Deep fissures in the os uteri; peritonitis incipiens; recovery 98
Case No. 6. Deep fissure in the os uteri; threatening peritonitis; recovery 98
Case No. 7. Gangrenous perforation of the cervix, due to attrition in a patient with a universally contracted pelvis; septicemia; death 99

CHAPTER II.

DISPLACEMENTS OF THE VAGINA AND UTERUS.

I. Versions and flexions of the uterus 102
II. Descent and prolapse of the uterus 108
III. Depression and inversion of the uterus 110
Case No. 8. Complete inversion of the uterus; amputation with the écraseur; death in four days 120

CHAPTER III.

HEMORRHAGES FROM THE GENITAL ORGANS OF WOMEN IN CHILDBED.

I. Hemorrhages with discharge of blood from the genital organs . 122
Case No. 9. Precipitate delivery; profuse external and internal flooding, which was arrested by plugging with cotton soaked in a solution of chloride of iron 141
II. Internal hemorrhages 142
Hæmatoma (thrombus) vulvæ et vaginæ 142
Case No. 10. Hæmatoma of the vulva on the right side; complete absorption in ten days 152
Case No. 11. Hæmatoma on the right side; spontaneous rupture; recovery 153

PAGE

Case No. 12. Hæmatoma on the left side; decomposition; recovery 154
Case No. 13. Hæmatoma on the right side; spontaneous double perforation; recovery 155
Internal uterine hemorrhage; hæmatoma uteri; placental polyps 156

CHAPTER IV.

INFLAMMATION OF THE GENITAL ORGANS IN CHILDBED.

I. Inflammation of the vulva and vagina; puerperal ulcers . . 163
II. Catarrhal inflammation of the vagina and inner surface of the uterus 168
Case No. 14. Endometritis from retained portions of the membranes; injections into the uterus; recovery . . . 175
Case No. 15. Septicemia from decomposition of portions of the membranes retained in the uterus; injections into the latter; recovery 177
III. Inflammation of the mucous membrane of the tubes . . . 179
IV. Inflammation of the ovaries 180
V. Perimetritis and peritonitis 180
Case No. 16. Sporadic idiopathic peritonitis; recovery . . . 199
Case No. 17. Phlegmonous metritis and peritonitis; death . . 201
VI. Puerperal phlegmon and thrombosis of the lymphatics . . . 203
Metritis, parametritis, phlegmone pelvis 203
Case No. 18. Parametritis; recovery 215
Case No. 19. Parametritis; death from fatty degeneration of the heart 221
Vaginitis. Diphtheritic endometritis. Diffuse abdominal phlegmon 223
Case No. 20. Uterine diphtheria developed before the commencement of labor; diffuse peritonitis; death 237
Case No. 21. Uterine diphtheria developed during labor; death . 243
Case No. 22. Uterine diphtheria developed after delivery; recovery 246

CHAPTER V.

PUERPERAL THROMBOSIS AND METASTATIC PYEMIA.

I. Of the uterine veins (metrophlebitis) 249
Case No. 23. Metastatic puerperal pyemia, with phlegmasia alba dolens 267
Case No. 24. Metastatic puerperal septico-pyemia; abscesses in the liver, spleen, and kidneys 275
Case No. 25. Metastatic pyemia; phlegmasia alba; recovery . 281
II. Of the femoral veins (phlegmasia alba dolens) 283
Case No. 26. Metastatic puerperal pyemia; numerous metastatic deposits; phlegmasia alba; death on the thirty-ninth day 296
Case No. 27. Phlegmasia alba; recovery; femoral phlegmon . 300

CHAPTER VI.

PAGE

NOMENCLATURE AND VARIETIES OF THE INFECTIOUS PUERPERAL DISEASES 306

Case No. 28. Septicemia: death 310

CHAPTER VII.

ETIOLOGY OF THE SO-CALLED PUERPERAL FEVER.

Historical review of former theories 312
The true causes 322
Of the sporadic cases 323
Case No. 29. A sporadic case of puerperal fever 328
Of its epidemic dissemination 331
Cases No. 30–35. An epidemic of puerperal fever 349

APPENDIX.

The causes of sudden death in childbed 359
Case No. 36. Sudden death in childbed 360

SECTION II.

PUERPERAL DISEASES OF THE BREASTS.

CHAPTER I.

DISEASES OF THE NIPPLES 365

CHAPTER II.

DISEASES OF THE INTEGUMENT OF THE BREAST AND OF THE SUBMAMMARY CONNECTIVE TISSUE; PARAMASTITIS . . 373

Case No. 37. Submammary mastitis 376

CHAPTER III.

INFLAMMATION OF THE MAMMARY GLAND . . 378

CHAPTER IV.

IRREGULARITIES IN THE SECRETION OF MILK . . 388

Case No. 38. Apoplectic retinitis in a nursing woman . . . 395

APPENDIX.

PAGE

THE SO-CALLED MILK FEVER 398

Case No. 39. Hyperæmia of the breasts; endometritis colli; *vulgo*, milk-fever 403

SECTION III.

AFFECTIONS OF OTHER ORGANS OCCURRING IN CONNECTION WITH CHILDBED.

CHAPTER I.

AFFECTIONS OF THE URETHRA AND BLADDER.

I. Hyperemia and inflammation 405
II. Neuroses 410

CHAPTER II.

AFFECTIONS OF THE ARTICULAR LIGAMENTS OF THE PELVIS.

I. Hyperemia and inflammation 413
II. Forcible separation of the pelvic synchondroses 418
Case No. 40. Inflammation of the symphysis pubis . . . 419
Case No. 41. Inflammation of the symphysis pubis . . . 420

CHAPTER III.

NEURALGIA AND PARALYSIS OF THE LOWER EXTREMITIES. 422

Case No. 42. Sciatica 428
Case No. 43. Neuralgia of the anterior cutaneous nerve of the thigh 430
Case No. 44. Neuralgia of the deep peroneal nerve . . . 431

CHAPTER IV.

PUERPERAL ECLAMPSIA 434

CHAPTER V.

MENTAL AFFECTIONS OF LYING-IN WOMEN . . 443

1. Symptomatic 445
2. Due to the aggravation of a predisposition 446

PAGE

3. Idiopathic puerperal mania 448
Case No. 45. Mania during labor 449
Case No. 46. Symptomatic puerperal mania 458
Case No. 47. Hereditary puerperal mania 458
Case No. 48. Puerperal mania due to anemia 461
Case No. 49. Puerperal mania due to meningitis is omitted

CHAPTER VI.

SKIN DISEASES OF LYING-IN WOMEN.

1. Erysipelas 462
Case No. 50. Puerperal erysipelas in the face 464
2. Scarlatina 466
3. Puerperal variola 469
Miliaria 472

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THE PATHOLOGY AND TREATMENT OF CHILDBED.

INTRODUCTION.

There is scarcely a condition in the life of woman which approaches nearer the boundary between health and disease than that of childbed; and no process shows more clearly the absence of well-defined lines separating physiology from pathology; but, while indicating that these are merely relative, the puerperal is manifestly but a physiological state of female development.

In consequence of the sudden and extensive alteration in the general condition of the woman, and in all her functions; in consequence, moreover, of the changes in many organs, amounting even to complete transformation of their pre-existing forms and relations—all of which phenomena regularly occur in childbed—disturbances of these processes very readily and frequently arise; for this reason it is peculiarly difficult to draw a line between the really ill and the healthy. No wonder, then, that the views of normal childbed diverge so greatly, and that conditions which, at other times, would be unhesitatingly designated as pathological, have been included by many within the physiological domain of childbed.

One course is calculated above all others to give a conventional type of health and disease in the puerperal state, and that is the careful study of all the conditions and symptoms presented by a lying-in woman, so that, in addition to good

health, subjectively speaking, we may recognize such a physical condition as would not only justify our inferring a sufficiently sound preservation of the several organs, but even a further proper development of the same. In this way very satisfactory advances have been made of late years. These recent observations will be discussed at greater length, because they are still but imperfectly set forth in most of the obstetrical treatises, in spite of their great importance in the diagnosis of childbed pathology.

Let us, then, briefly glance at the objective appearances in healthy lying-in women, so far as these have been accurately determined, and turn at once to *the normal condition of the external and internal genital organs in childbed.*

The fundus uteri stands, immediately after the completion of delivery, a little below the navel, but again rises to its level after some hours. Then commences its gradual diminution, which proceeds so rapidly, that on the 5th or 6th day the fundus is scarcely the width of a hand above the anterior brim of the pelvis, and from the 10th to the 14th day is only as high as the superior plane. The external os, which is at first completely open, closes gradually; the vaginal portion lifts itself little by little from the vaginal cul-de-sac, and in 4–6 weeks attains its former length. The position of the uterus during this period of involution, as is shown by the tables given below, is often somewhat inclined forwards. The lips of the os are more or less excoriated in the first 11–14 days, and display fissures, which slowly cicatrize. In only a small proportion (8–10 per cent.) of perfectly healthy women in childbed are the lips of the os quite smooth and free from excoriations. The period, in which the almost complete return of the uterus to its former size is perfected, seems to extend to the end of the second month, since the entire involution of the placental site does not occupy more than 7–9 weeks.[1] This involution of the uterus is, in great measure, affected by its own contractions, which, still recurring rhythmically after delivery, are felt as after-pains by multiparæ, and by primiparæ

[1] A. Hegar, Pathologie u. Therapie der Placentarretention, Berlin, 1862, pp. 19, 23.

solely when the organ is diseased, or contains something abnormal. The duration of the after-pains is 1–4 days, but often longer; they are normal when not excessively painful, when they make their appearance without fever, and when they succeed each other after regular but ever-increasing pauses. The *vagina*, at first wide, smooth, flabby, almost devoid of folds, and moderately reddened, displays, as a rule, slight lesions of the mucous membrane, especially about its entrance; this is almost as common in multiparæ as in those who have been delivered for the first time; the vulva generally gapes somewhat in its posterior half. These lesions are sometimes wanting in multiparæ. The corrugations of the vagina develop little by little, but are less numerous than before, and the vagina, as well as the external genital organs, generally remains somewhat wider than before pregnancy.

The lochia,[1] or genital excretions which escape from the vagina during the early hours, and occasionally during the whole first day of childbed, consists of *pure blood* mingled with coagulated fibrin. Later, this becomes serous, has an alkaline reaction, is mixed with vaginal mucus, and exhibits under the microscope blood corpuscles, epithelial scales, mucous corpuscles, and retained fragments of the decidua and often of the placenta. The chemical constituents are albumen, mucin, saponaceous fat, several forms of the chlorides, an alkaline phosphate, iron, and salts of lime. From the 5th to the 7th or 8th day, the secretion is often of a serous character, the blood corpuscles diminish in quantity, and pus corpuscles take their place; the lochia finally becomes white or gray, has a neutral or acid reaction, a creamy consistency, and, after the 8th or 9th day, exhibits under the microscope, in addition to its former constituents, spindle-shaped and caudate corpuscles of young connective tissues and crystals of cholesterin. It decreases in quantity for 2–3 weeks, finally becomes clear like glass, transparent, and, after an indefinite period, completely disappears. The amount of the lochial secretion is, according to Gassner's[2]

[1] Wertheimer, Virchow's Archiv, Bd. xxi. pp. 314-536.

[2] U. K. Gassner, Monatsschrift für Geburtskunde, etc. Bd. xix. p. 51.

admirable researches, greater in non-nursing than in nursing women; the mean quantity of the bloody lochia from the 1st to the 3d day = 1 kilogramme; that of the serous lochia, from the 4th to the 5th day = 0.28 kilogramme; and that of the white lochia from the 6th to the 8th day post-partum = 0.205 kilogramme, so that within the first 8 days, women in childbed lose through the lochia 1.485 kilogramme in weight. The entire amount in those who were nursing was = 1.085 kilogramme, and in those who were not nursing = 1.88 kilogramme.

The following is worthy of notice in reference to the *normal condition of the breasts, and of the lacteal secretion.* The mammary secretion gradually increases after delivery; the breasts swell on the 2d or 3d day, often to quite large dimensions, so that the woman is conscious of a certain weight, distension, and stretching; then the flow of milk becomes greater, and the breasts shrink. If the child be not nursed, the supply of milk soon fails, and, from the 5th to the 8th day, the breasts become softer and more shrunken, until at length—it may be after weeks—the secretion entirely ceases. In those who are nursing, the mean quantity of milk in 24 hours amounts to 1300 grms., yet Gassner[1] found on an average (in 3 puerperæ) only 215 kgr. within the first 8 days.

In healthy lying-in women, manifold changes in the functions of the other organs of the body correspond to these conditions of the genital organs. Blot[2] was the first to show (and that quite recently), that healthy puerperal women have a more or less retarded pulse, its frequency varying, for the most part, between 44 and 60, and at times even falling below 35. The period of the retardation lasts from 10 to 14 days, is commonly longer when the retardation is more pronounced, begins within the first 24 hours after delivery, and often continues to be very distinctly marked up to the time of the appearance of the so-called milk fever. Even severe after-pains have no sensible effect upon its frequency. The retardation prevails more frequently among multiparæ than among primiparæ.

[1] U. K. Gassner, loc. cit.

[2] Blot, Bulletin de l'Academie de Médecine, xxviii. pp. 925-927.

This phenomenon is not due to nervous exhaustion; the sphygmographic researches made by Blot in conjunction with Marey, have demonstrated, that it is dependent upon an *increase of the arterial tension after delivery.*

I can corroborate to a large extent these statements, but would raise the upper limit somewhat—from 44 to 70—and would add that in the last 100 puerperæ whom I examined, there were at least 15 who exhibited this retardation of the pulse for quite a long period. Four of these had been delivered for the first time, 8 for the second, and 2 for the third; in 6 of them the duration was 11 or 12 days. Here I must interpose the remark, that the most trivial pathological condition is capable of correcting this retardation, or preventing its appearance. On the other hand, I cannot admit that it is found *only* in women who are in perfect health, for I have repeatedly met with it in a very marked degree where puerperal ulcers were present, accompanied by considerable œdema of the organs of generation. I have been at times greatly surprised by the discovery of the above-mentioned condition in cases where the slow rate of the pulse had led me to infer a sound state of health, and the genital organs were, therefore, only incidentally examined. The pulse generally returns to its former frequence when the women leave their beds. The smallest number of beats which I have recorded is 46; this occurred in the mornings of the 4th and 7th days. The woman —who had been delivered for the 2d time—had, for example, the following pulse for the first 12 days:—

M.	E.	M.	E	M.	E.	M.	E.	M.	E.	M.	E.
1) —	57.	2) 50,	54.	3) 54,	52.	4) 46,	52.	5) 48,	56.	6) 52,	48.
7) 46,	50.	8) 48,	56.	9) 52,	55.	10) 54,	58.	11) 52,	54.	12) 50.	

Baumfelder[1] found an average of 58–72 beats, the minimum being between 48 and 68, and the maximum between 66 and 100. He remarks, in reference to the course of the pulse, that it attains its maximum on the morning of the 1st, or, at the latest, on the 3d day, falling irregularly to its normal beat at

[1] Baumfelder, Beiträge zu den Beobachtungen der Körperwärme, der Puls- und Respirationsfrequenz im Wochenbett. In. Diss., Leipzig, 1867, pp. 20, 21.

the end of the 5th day, and reaching its lowest point on the evening of the 7th.

So far as relates to the *respiration* and pulmonary capacity of healthy women in childbed, 14–18 inspirations per minute forms the usual rate; sometimes I have met with nearly the same frequence throughout the whole early part of childbed. For instance, in one puerpera, within the first 14 days, I counted, at 16 different times, only 16 respirations per minute, once 17, and six times 18. The capacity of the lungs after delivery increases, as a rule, in comparison with what it was during the pregnancy; less frequently it decreases, and sometimes remains the same. Dohrn[1] found an average increase of 338 c. c. in 60 per cent., and an average decrease of 221 c. c. in 26 per cent.; the capacity remained the same in 14 per cent. The increase appeared less frequently and was less marked in primiparæ than in multiparæ, which Dohrn attributes to the fact of the former being less deeply affected by the act of delivery and its consequences, and also to their possessing in childbed comparatively less muscular power than those who have been previously confined. As these results are based upon a greater number of observations (100 persons), they are certainly more reliable than those of Wintrich, Küchenmeister, and Fabius, who found the amount of expiration after birth the same as before, or even less.

Equally important is the *range of temperature* in normal childbed. By the numerous researches of O. von Grünewaldt,[2] Dohrn and Wolf,[3] Schroeder,[4] Baumfelder,[5] and my own,[6] it has been fully established that, within the first 12 hours after birth, a slight elevation occurs, as a rule, yet its altitude seldom, if ever, exceeds the normal fluctuation. In the second

[1] Dohrn in der In. Diss von H. Reinhardt; Ueber den Einfluss des Puerperiums auf Thoraxform und Lungencapacität, Marburg, 1865, 28 pp., und Monatsschr. f. Gebk. xxviii. pp. 457–462.

[2] O. von Grünewaldt, Petersburger Med. Zeitschrift, Bd. v. p. 1, 1863.

[3] Dohrn in der Inauguraldissertation von O. Wolf; Beiträge zur Kenntniss des Verhaltens der Eigenwärme im Wochenbett, Marburg, 1866.

[4] Schroeder, Schwangerschaft, Geburt und Wochenbett, Bonn, 1867, pp. 177–185.

[5] Loc. cit.

[6] Monatsschrift für Geburtskunde, Bd. xxii. pp. 328–339.

12 hours a slight reduction generally takes place. The above elevation may be easily overlooked, if, after a delivery in the evening, the first measurement be taken in the morning; it will, however, be very apparent should it coincide in time with the regular elevation between night and morning, or midday and evening. In the former case, an unimportant decrease of temperature will sometimes be found when compared with the first measurement.

After the temperature has once fallen off at the end of the first 24 hours, a gradual elevation is commonly observed. The evening temperature is higher, as a rule, than the morning, yet the daily fluctuations are small. This elevation usually keeps pace with the development of the lacteal secretion, and diminishes as soon as the latter is fully established, or begins to disappear in those who do not nurse. In perfectly normal cases the difference between the recorded maximum and minimum points scarcely amounts to more than the usual fluctuations of the bodily heat; that is to say, *the temperature of lying-in women does not fluctuate more than that of healthy persons in general.* The mean temperature of puerperæ is, nevertheless, somewhat higher, on the average, than that of other healthy individuals, since its normal limits lie between 99° and 100.8° F. According to the researches of O. Wolf, which have been recently corroborated by those of Schramm,[1] it is not improbable that the average temperature is somewhat higher during an abundant secretion of milk in primiparæ, than in multiparæ, and such as have a deficiency of milk.

In my opinion, we should adhere rigorously to the above-designated limits of temperature, and not admit that in normal childbed the temperature may range as high as 104° F., as Hecker, Grünewaldt, and recently Lehmann[2] and Schroeder assert. This rule, corroborated also by Wolf (*loc. cit.*, p. 36), that the elevation of temperature, due to the secretion of milk, does not exceed 0.9° F., illustrates most beautifully the mas-

[1] J. Schramm, Zur Milchfieberfrage. Separatabdruck aus Scanzoni's Beiträgen, Bd. v. pp. 11–15.

[2] Lehmann, Nederlandsch Tydschrift voor Geneeskunde. Jahrgang 1865. Separatabdruck, p. 4.

terly manner in which the functions of the several organs of the body harmonize and work together, for, *in spite of the enormous revolution which takes place at this time, no trace of a deviation from the recognized hygienic laws of other individuals can be demonstrated.* Of course, exceptions to a rule are universally to be found, and are especially common among puerperal women, inasmuch as they are peculiarly exposed to noxious influences. The above law remains, nevertheless, unimpeachable, and we must, at the outset, as in so many puerperal affections hereafter to be described, lay stress upon this point, *that childbed exhibits no special condition in this respect*, and that all endeavors to demonstrate the existence of such conditions must prove futile. I will freely admit that the above-mentioned normal type is seldom perfectly observed in lying-in establishments. Yet a number of such cases may at any time be produced, even though the hygienic condition in general is, as will be shown by figures later, much worse in lying-in establishments than in private dwellings; for this reason we are quite justified in believing that the typical normal condition will be much more frequently met with in the latter than in the former. This condition occurs, according to my experience, in 10 per cent. of puerperæ in lying-in establishments. Schroeder's figures accord very nearly with mine in that respect; he found the normal type 19 times in 135 cases, and gives as his highest limit 100.8° F. Grünewaldt fixes upon 101.8° F. as the maximum limit. This will explain his statement that, of 432 women whose temperatures were taken in the St. Petersburg institution for midwives, the heat of the body remained normal in 261. This limit seems to me to be put too high. I am more inclined to entire agreement with Schroeder, when he says that the temperatures of childbed, which exceed 100.8° F., are certainly very common, yet a cause for the elevation may always be discovered on careful examination.

The similar slight elevations of temperature in healthy puerperal women, which have thus received corroboration from all sides, may, on the one hand, be dependent upon the lesions of the genital organs, that are almost constantly present, and seldom heal by first intention; and, on the other

hand, may be ascribed to the non-inflammatory increase in the transformation of tissues. This last, which persists for some time, is induced partly by the post-partum involution and functional regeneration of many important organs, and partly by the new and excessive secretions of the skin, the breasts, and, as we shall soon see, of the kidneys.

With reference to the *state of the urinary secretion* in healthy women during childbed, Gassner (*loc. cit.*, pp. 51, 52) was the first to show that there is considerable diuresis. He mentions one puerpera, who suffered from enormous œdema of the lower extremities, and passed in childbed 10 kilogrammes (!) of very limpid urine within the first twenty-four hours. To Gassner's assertion that the degree of diuresis must necessarily be proportionate to the amount of œdema present, we can only reply that the secretion of urine is always decidedly increased in childbed, and that women who have had no œdema may also secrete enormous quantities of urine. According to my researches,[1] which have been recently repeated and corroborated in about 200 puerperæ, the amount of urine is *considerably* increased in the first days after delivery, and chiefly within the first two to twenty-four hours. The augmentation of the urinary secretion is also much greater in childbed than during pregnancy. The urine is clear, with little sediment, of very low specific gravity, and is generally bright yellow. The absolute elimination of urea, phosphoric acid, and sulphuric acid, is somewhat diminished; that of chloride of soda slightly, or not at all. As the involution of the genital organs progresses, the amount of urine gradually sinks to its usual limit; its specific gravity rises; its color becomes yellow, and the elimination of Ur., PO_5, and SO_3 equals that of healthy individuals. It is a very interesting fact that the elimination of Ur., NaCl, PO_5, and SO_3, in healthy puerperæ, keeps pace with the curve of the temperature. The mean weight of the urine evacuated by a healthy puerperal woman in the first six days amounts to 11,160 grammes. The mean specific gravity is 1010. The mean quantity of urine for each day amounts,

[1] Studien über den Stoffwechsel bei der Geburt und im Wochenbett. Rostock, 1865, pp. 65–83.

according to my latest calculations, where the average of 12 cases was taken, to—1st day, 2025 c. c.; 2d day, 2271; 3d day, 1735; 4th day, 1772; 5th day, 1832; 6th day, 1949 c. c. The urine of healthy puerperæ not unfrequently contains a small amount of albumen.

The chief function, therefore, of the kidneys during childbed is to eliminate a considerable quantity of water from the organism. Moreover, it cannot be questioned, that a more abundant discharge of the products of oxidation occurs through the urine, accompanying the slight decrease in the amount of urea, PO_5, and SO_3 given off during the 24 hours, as compared with that found during pregnancy; for otherwise, the amounts of these substances would have to be far more diminished than they now are by the loss of blood, the excessive perspirations, the slightly nitrogenous nature of the diet, and the perfect physical and mental repose.

Next to the kidneys and breasts, *the entire skin*, by its greatly increased activity, also takes part in the involution of the genital organs. This hypersecretion generally makes its appearance a few hours after delivery, and is greatest during the first 5–6 days. I am inclined to attribute to this phenomenon a still greater significance, as does also Gassner, who believes that what is eliminated from the body by perspiration through the skin is at once, or soon after, replaced by absorption of the fluids imbibed. Unfortunately, we have as yet no approximate knowledge of the quantity of fluid which may be given off by the skin during childbed, yet it is certain that it may exceed 1000 grms. an hour. Furthermore it must be distinctly borne in mind, that great activity of the skin may take the place of the diminished lacteal and renal secretions. This fact is very important, because it teaches that an unusual condition of any one of the secretions cannot be properly estimated, until all three have been carefully examined and compared with each other. Nature has very different ways of effecting its several aims, and the fact just mentioned, as well as the one quoted above from Gassner—that the lochia is disproportionately more abundant in non-nursing than in nursing women—are proofs of the shortsightedness of those who assert that a deficiency in the lacteal secretion, or

a diminution of the lochia, must of themselves produce injurious results, a view which is not yet fully relinquished, although no one can say what noxious elements might be retained as a consequence of such an abnormally deficient secretion.

In regard to the *alimentary canal*, it is known that women in childbed have, as a rule, no dejections during the first 2–4 days; the reasons are as follows—during the process of labor, an evacuation of the bowels is generally brought on by means of an enema;—the women lie very quietly the first part of the time;—they take little or no solid nutriment, and in addition the elimination of fluids by the other organs is considerable;—furthermore, the peristaltic action of the intestines is diminished, and thus the transportation of the fecal masses present is more slowly effected—finally, the relaxed abdominal walls are often not in condition to press out the fecal accumulations, even when they have reached the rectum. The demand for solid food, as well as the appetite generally, is wanting during the early days in consequence of the great loss of fluid, and the diminished peristaltic action; the call is principally for an abundance of drink.

The average loss of weight in the first 8 days after delivery amounts to a twelfth part of the mother's weight, and stands in direct proportion to the size of the new-born child (Gassner, *loc. cit.*, pp. 66–67); this loss is due to the puerperal secretions and excretions, especially to the flow of the lochia and the milk; furthermore, to the increased elimination through the kidneys and skin, as well as to the involution of the genital organs. In healthy individuals this loss of substance is all replaced in 3 or 4 weeks.

From the objective conditions of healthy women, let us turn to a short review of the

GENERAL ETIOLOGY OF THE DISEASES OF CHILDBED.

However easy and healthy the pregnancy and delivery may have been, however happily they may have run their course, yet every lying-in woman is in high degree *predisposed* to puerperal affections. The pathetic utterance of an old gyne-

cologist, Chambon de Montaux, that woman is a being whom nature has, through all ages, allowed to walk upon the edge of an abyss that is ever ready to swallow her up, surely has a peculiar significance in childbed. For who is not familiar with those extremely rapid diseases, which, within a few days or even hours, carry off the strongest women in their very prime, so that with amazement and terror he beholds their sudden end—their instantaneous and unexpected disappearance from the family circle.

The *causes* of the numerous affections which attend childbed are principally dependent upon the *changes in the genital organs induced by the birth.* It is not the location, and the manner of closure, of the placental site, which alone render possible hemorrhages, of which we have but slight external signs; it is the frequent lesions of the cervix uteri, of the vagina, and of the external genital organs that are peculiarly liable to lead to diseases. Although in the normal course of delivery these lesions are wont to be trivial and to consist merely in slight lacerations of the mucous membrane, yet they derive great significance from being, for a number of days, continually exposed to the influence of the lochia, which has often been retained for some time in the vagina owing to its curvature and the early contraction of its orifice. Shreds of the decidua, and often pieces of the chorion and amnion, are mingled with the lochia; these readily decompose at a temperature of 98.5°–100.5° F., and may thus cause irritation and infection of the wounded places. The tabular statement of the condition of the genital organs in 100 lying-in women gives us in figures a conception of how often puerperæ are exposed to the possibility of such affections, and of the predisposition to disease, not only among primiparæ, but also among multiparæ; it moreover shows us that the lesions occur not in one place alone, but in many localities at the same time. We there find them in 28 of the former class, and in 35 of the latter (24 with the second child, 6 with the third, 3 with the fourth, 1 with the fifth, and 1 with the sixth), in greater or lesser number at the vaginal orifice. Excoriations occurred on the lips of the os uteri 65 times in 100 persons, as follows:—

On the anterior lip alone	13 times	(4 times in case of 1st child, 4 of 2d, 3 of 3d, 1 of 4th, 1 of 6th).
" " posterior "	7 times	(3 of 1st, 2 of 2d, 2 of 3d).
" both at once	45 times	(10 of 1st, 27 of 2d, 3 of 3d, 3 of 4th, 1 of 5th, 1 of 6th).

Schroeder (Virchow's *Archiv*, *loc. cit.*, p. 268) found distinct ruptures through the substance of the mucous membrane at the vaginal orifice in 89 (!) out of 93 puerperæ.

Since, at the time when the internal genital organs are in process of involution, the mucous membrane, as well as the muscles of the uterus, are being in part formed anew, the affections of that organ not only cause an interruption in that process, but also interfere with the regeneration, and thus become doubly dangerous for the puerperal, as well as for the later periods. On the other hand, new maladies easily arise from the sequelæ of the original affections; or the predisposition to disease is so intensified that quite trivial disturbances may acquire serious importance. An example may render this more clear. If a uterus soon after birth flags in its contraction, a hemorrhage ensues from the site of the placental attachment; if the flow is considerable, it enfeebles the woman, diminishes the already weak contractile power of the uterus, and thus becomes the cause not only of later hemorrhages, but also of deficient involution of the organ, for powerful contractions are absolutely indispensable for a normal involution. Subsequent floodings take place because in retarded involution the placental site forms a point of slight resistance for an unusually long time, and because, by its contractions, the uterus commonly supplies the *vis-à-tergo* needed by the valveless internal spermatic veins, which often become enormously distended during the pregnancy;—should these contractions therefore fail or be feeble, the uterus will, from this very deficiency, be again subject to passive congestions, etc.

A further predisposition to puerperal affections is to be found in the great activity and hyperemia of the skin, which is especially marked in the beginning of childbed. A cold, which must so often serve as scape-goat in etiology, plays at all events no insignificant rôle in lying-in women. There is no question that a considerable change of temperature and a great radiation of heat may be much more quickly induced

in them, owing to the congestion of the skin and violent perspiration, than in non-pregnant women. These conditions very easily give rise to a chill, and the hyperemia of the internal organs, especially of the internal genitals, accompanying this may lead to further troubles. Such causes are more applicable to lying-in women than to others, for the reason that their persons must of necessity be frequently more or less exposed, as when putting the child to the breast, bathing the genital organs—and because they are often severely chilled, without being uncovered, from their clothing being saturated with perspiration and the escape of milk.

In addition to the skin, *the breasts*, by their increasing activity, augment the capacity for disease in puerperal women.

Furthermore, a certain tendency to morbid action may be assigned to the *state of the intestines*, for the diminished peristaltic action, and the causes mentioned on page 27, which regularly produce an accumulation of feces in the first days of childbed, may alone lead to severe affections. It may be that the futile efforts of the intestines to propel the fecal masses induce an inflammatory action, or that the absorption of putrid matters from the decomposing feces may give rise to severe disturbances.[1]

That the *quality of the blood* in puerperal women—in former times supposed to be gradually modified during the pregnancy till it reached a certain state—is in itself a predisposition to disease, was a theory formerly accepted. An increase of the water, a moderate increase of the fibrin and of the white corpuscles, as well as of the fats containing phosphorus, are, it is well known, established as authentic alterations in the blood of pregnant women. Kiwisch imputed the origin of most puerperal diseases to a sero-fibrinous plethora; Scanzoni has more recently introduced the abnormally large amount of fibrin—the hyperinosis of puerperæ—into his etiology of puerperal fever, overlooking the fact that this increase of fibrin is, in reality, but moderate; that, moreover, in spite of that peculiarity of the blood, by far the greatest number of

[1] See Schmidt's Jahrbücher, Bd. 63, p. 198, and J. Poppel, über Coprostasis im Wochenbett. Monatsschrift für Geburtskunde., Bd. xxv. pp. 306–311.

pregnant women are perfectly well during the last months; and that the augmentation of the fluid elements is not active, but due rather to the impoverishment of the blood through the loss of its solid constituents. It must be borne in mind that the discharges of the uterus, kidneys, skin, and breasts are so enormous at this time, and the elimination of water, fibrin, and fats through these secretions is so abundant, that the composition of the blood becomes very quickly changed, and those same noxious elements are eliminated in large quantities. At the very most, then, a hyperinosis would be present only in the first days of childbed, and in such puerperæ alone as had lost but little fluid by the uterus, skin, or breasts. On the other hand, there generally remains a certain degree of anemia as a predisposing quality of the blood in puerperal women. Whenever a marked degree of anemia is present, and has, as is usual, been afterwards converted into hydremia by the speedy admission of fluids and salts into the blood, the puerperæ affected are, at all events, liable to serous effusions and secretions, to disturbances of nutrition and regeneration, especially of the genital organs. This only applies to the higher grades of that blood-change, and is not much more prevalent among puerperal women than among other individuals who have met with great losses of blood. In women otherwise healthy, on the other hand, the slighter degrees of this affection that are so common, correct themselves with great rapidity; it must, in fact, be admitted that this anemia is, under normal conditions, often absent; and that, even when present, it is more often attributable to diseases already existing, or to such as may have been developed in childbed. Finally, the idea that a general dyscrasia of the blood can be entertained as a remote cause of the more severe puerperal affections, must be abandoned in proportion as we gain a deeper conviction that purely local disturbances of nutrition lie at the foundation of all diseases. The truth of this statement is made evident by the fact that cases are becoming less and less common in which the autopsy reveals an entire absence of local organic affections; and also for the reason, that in cases where blood-poisoning can be clearly

proved, the source of infection is usually local, and may be traced to the genital organs.

In reference to the most frequent immediate causes of the puerperal affections, *catching cold* has already been sufficiently emphasized on pages 29 and 30. *Errors of diet* are most deserving of mention next in order. It is evident that light and sufficient, yet not too nitrogenous food, is required for the first three or four days; but the assertion that "a woman in childbed must hunger and sweat," which I heard uttered by a colleague not long since, is certainly unjustifiable at the present day. As if we had to expel some unknown poison from the blood! Can we truly blame the poor starving women if they surreptitiously overload their stomachs afterwards? Too rigorous fasting and sweating are decidedly injurious, since by exhausting the strength of the woman, the requisite involution and simultaneous regeneration of the genital organs are surely retarded. Hence arise so many versions and flexions among women of the upper classes, who, because they seldom nurse their children, often fast for a long time in the hopes of diminishing and cutting off by starvation the secretion of milk. On the other hand, the use of articles of food that are difficult of digestion, or that cause flatulence, are injurious, from the relaxed state of the abdominal walls, and the torpor of the intestinal canal.

Many a woman afterwards attributes any existing trouble to the *premature physical efforts made in childbed. The too early* abandonment of the bed is often fraught with serious consequences. That which is of necessity done by the poor, because of household cares and want of assistance, is practised by those more favorably situated, in order to make a display of their good physical condition at the expense of their strength. In lying-in establishments this taxing of the strength is more common than is supposed; the women do not understand why they must keep the recumbent posture so long, and deem the caution of the physician but exaggerated anxiety, and forthwith transgress his orders. Many sudden febrile affections, many secondary hemorrhages upon the 6th or 7th days of childbed, arise from this want of obedience, and, in spite of all denial, we may look to this, in a large number of cases, as the cause

of those high and sudden elevations of temperature, which soon remit after absolute repose, and in which no previous local affection has been present. It must not be thought that this occurs only in case of lying-in women of the lower classes. I have repeatedly met the same in well-to-do puerperæ, in whom such shortsightedness would not have been suspected. Hemorrhage, displacements of the uterus and vagina, sudden syncope, even thrombi and emboli may result from such efforts. Besides the abandonment of the bed, all violent strainings of the abdominal walls even in the bed, are dangerous, such as lifting the child from a distant cradle, arranging the hair, frequently and suddenly sitting up, great straining during defecation, micturition, etc.

Just as physical rest is requisite in the early part of childbed, even so is mental repose indispensable. It is easier, however, to talk of banishing everything that *might excite or depress the spirits of a woman in childbed* than to effect it. But at all events, we can, without much trouble, exclude from the chamber the visits of strangers, which are sure to agitate, exhaust, lead to much conversation and long stories, and hinder the prompt relief of all wants at the proper moment. Almost every lying-in woman has, nevertheless, visits over which the physician has no control. It must not be forgotten, also, how many women are anxious about the sex of their infant long before its birth—how bitterly they are disappointed, in the first moment of childbed, if, in place of the anxiously awaited boy, a girl again makes her appearance. It must be remembered how many a mother is startled by every cry of her darling, what anxiety this may cause her at night, and how often she is robbed of her much-needed repose by unfounded fears respecting its health. Among the educated at the present age, many a woman in labor takes a heavy burden of cares with her into childbed—a terror of the much-dreaded childbed fever. The senseless tales of female friends, of midwives, and of nurses, about their experiences with others, do much to keep these apprehensions alive; such anxious women are often found going over their whole condition with the most painful care, in order to satisfy themselves whether they have not to encounter that much-feared foe. Still other conditions, which

lie completely beyond the domain of medical prophylaxis, are the conjugal relations. "We must reflect," says Leubuscher very appropriately, "how many marriages drag themselves painfully along only harmonious to outward appearances, where the birth of a child, instead of exciting joyous emotions, is felt to be only a stronger fetter to hold together a detested and inwardly severed partnership."

In lying-in establishments, also, the mental influences to which puerperal women are exposed are of no small importance, nor are they numerically less. It is true that the women are rarely ashamed of their position, or experience any sorrow at their disgrace, even though unmarried; but their tranquillity is all the more frequently destroyed by grief at the faithlessness of their seducers—by anxiety about their own and the child's sustenance—by solicitude about securing a good situation as wet-nurse—by efforts to provide for their offspring—and, even at times, by dread of the penalties which await them from the police.

The consequences, therefore, of violent mental emotions in childbed are not to be underrated; the most trivial excitement may lead to the most violent scene. The state of puerperal resembles, in many respects, that of hysterical women; the violent exertions put forth during labor, the loss of blood, the profuse perspirations—to which pains in the genital organs and breasts are often superadded—render them far more susceptible to irritating influences, and more seriously affected thereby than other healthy persons are wont to be. But the effects of this irritation are much worse in puerperal than in hysterical women. The most common sequelæ of violent mental emotions are chills, high fever, floodings, deficient secretion of milk, loss of appetite, headaches, and, in the worst cases, positive mental derangement.

Furthermore, it cannot fail to strike us, that in the case of puerperal women, a long train of morbific causes depends upon the deportment of their attendants, the midwives, and even the physicians. During confinement, the nurse or midwife may expose a woman to much danger in the preparation of the couch, the ordering of the diet, by the unnecessary expo-

sure of the person, and by too much piling on and tucking in of the clothes. They may also inflict much pain in changing the linen, in giving the sponge bath, in their treatment of the breasts, in administering purgatives, injections, and enemata. These deleterious influences, we are sorry to confess, are difficult of remedy. That the physician can do much harm by operating too early, and by an awkward handling of his instruments, etc., is not less true. More dreadful than the lesions thus induced, is the infection of puerperal women by the midwives and physicians; but this we can only mention at this time, and will discuss it in detail further on. If then it were asked, *what affections among puerperal women are induced by the above causes, and to what extent these affections prevail*, the records of the large lying-in establishments would afford us a succinct reply. Unfortunately, however, in this respect the reports are generally imperfect, as is evident from the compilation made by Sickel;[1] many of them, in spite of their greater exactitude, are unserviceable, because the prevalence of several diseases is made to appear greater than the facts justify, owing to the severe intercurrent epidemics of puerperal fever. These errors are only to be eliminated by reviewing the diseases of childbed, which have appeared in a lying-in establishment in the course of a long series of years, and excluding those seasons in which epidemics have prevailed. As this would not be possible with the above-named records, I have confined myself to showing the prevalence of such diseases of the genital organs and breasts of puerperal women, as have been observed in the Rostock lying-in establishment within the past 28 years. From 1836 to Oct. 1st, 1864, 933 births occurred in our institution, and notes of 816 childbeds have been kept in the record book. These give the following results.[2]

[1] Schmidt's Jahrbücher, Bd. lxxxviii. p. 114.

[2] Brummerstädt, Bericht über die Rostocker Central-Hebammen-Lehr-Anstalt. Rostock, 1866 pp. 129-130.

1. Rupture of the perineum	78
2. Diseases of the nipples	71
3. Puerperal ulcers	59
4. Hemorrhages	51
5. Mastitis	50
6. Endometritis	41
7. Ischuria	30
8. Peritonitis	29
9. Excoriations and ulcers of the os uteri	29
10. Displacements of the sexual organs	27
11. Metritris with thrombosis of the lymphatics	10
" " " of the veins	4
" " phlegmasia alba dolens	1
" " parametritis	14
	29
12. Mania	4
13. Eclampsia	2

Besides these, there occurred 45 diseases which were not directly connected with childbed, to wit: intermittent fever 11 times; typhoid fever 4 times; gastric fever 7 times; intermitting gastralgia once; Asiatic cholera once; acute bronchitis 3 times; acute articular rheumatism twice; pulmonary tuberculosis twice; purpura once; abscess of a lymphatic gland once; diarrhœa twice; pneumonia once; erysipelas 4 times; scarlet fever 4 times; purpura hæmorrhagica once; perinephritis with psoas abscess once. Omitting these affections, we have a total of 500 lying-in women more or less diseased, that is to say, $\frac{5}{8}$ of all that were under treatment. Nevertheless the sanitary condition was, on the whole, good during these years. In the 28 years 31 died, = 3.36 per cent.

These figures illustrate the remarks made at the outset, and prove how true are the words of Eisenmann: "The curse which Moses put in the mouth of our Creator, 'in sorrow thou shalt bring forth children,' falls far short of expressing all the misery, suffering, and danger which womankind has had to endure in the act of propagation."

The question of the *mortality among women in childbed* may, on the contrary, be answered in much larger figures; that false deductions may not be made, however, we must distinguish puerperal women in private dwellings from those in lying-in establishments.

With reference to the ratio of mortality among puerperæ, the tabulated statement of S. Merriman deserves mention. Taking the death lists of London from 1656 to 1810, he found a falling off in the rate of mortality from 1 in 36 to 1 in 118 women; this is, however, not strictly correct, for in the 17th century many births were not registered in consequence of the state of religious affairs, and, therefore, this rate of mortality is probably too great. For this reason I have not made use of the table, but give only the following figures:—

I. *The Mortality of Lying-in Women in Private Dwellings.*

Country or city.	No. of women delivered.	Deaths	Per thousand.	Author.
St. Petersburg, in 15 years.	209,582	1403	7 : 1000	Hugenberger, das Puerperalfieber. Separatabdruck aus dem Petersburger med. Zeitschrift, p. 37.
Paris, 1861 and 1862.	87,277	488	5.6 : 1000	Gaz. des Hôpitaux, 1866. No. 38, p. 157.
London, (1858) Policlinic.	2,418	8	3 : 1000	Monatsschrift für Geburtskunde, Bd. xv. 399.
Norway, (1851.)	46,259	374	8 : 1000	Monatsschrift für Geburtskunde, Bd. ii. 410.
Clarke, in his private practice.	3,147	22	7 : 1000	Neue Zeitschrift für Geburtskunde, xxviii. 53.
Priv. practice of a single physician	10,190	87	8.5 : 1000	Merriman, Synopsis of various kinds of Difficult Parturition, pp. 338 and 339.
Do. 1786–1800.	2,982	30	10.4 : 1000	
	361,855	2412	6.6 : 1000 = 1 : 150	

The mean number per thousand corresponds so nearly with that found by Marc d'Espine for Geneva (8.7), Belgium (6), Prussia (7), and England (1838–41 : 8–8.8, 1847–50 : 5–6), and again with Hegar's[1] for Baden (1851–63 1 death in 131 puerperæ = 7.63 per thousand), that we may regard the rate of mortality of lying-in women in private dwellings[2] as sufficiently established at .6–.7 per 100, or 6–7 per 1000.

[1] *Hegar*, Die Sterblichkeit während Schwangerschaft, Geburt, und Wochenbett. Freiburg, 1868, pp. 25, 26.

[2] *Lefort* (Gaz. des Hôpit., 1866, p. 152) found in 934,781 women in childbed, who were delivered in the various cities, only 4405 deaths, or 1 in 212, and in 888,312, who had been delivered in hospitals, 30,594 deaths, or 1 in 29, = 34.4 per 1000.

II. *The Mortality of Puerperal Women in Lying-in Establishments.*[1]

Place and time.	Births.	Deaths.	Per thousand.	Author.
1. London:				
a. City of Lond. in 15 years,	7,030	90	21.16 : 1000	Spiegelberg, Monatsschrift für Geburtskunde. Bd. vii. p. 201.
b. Gen. Lying-in Hosp. in 22 yrs.	4,426	140		Do. p. 203.
c. Brit. Lying-in Hosp. in 15 yrs.	1,625	17		Do. p. 207.
d. Queen Lying-in Hosp. in 35 yrs.	7,736	202		Brodie, Monatsschrift, xxv. Supplementheft, p. 386.
2. Dublin Rotunda in 87 years,	169,748	2066	12 : 1000	Gusserow, Monatsschrift, xxiv. 260.
3. Paris:				
1802–1862 *a.* Maternité,	160,704	8124	48.37 : 1000	Tarnier-Husson, Gazette des Hôpitaux, No. 38, 1866, p. 151.
b. Cliniques,	24,295	1143		
c. Hôtel Dieu,	25,314	831		
d. Saint-Louis,	19,038	780		
e. " Antoine,	5,204	349		
f. Lariboisière,	5,022	395		
4. St. Petersburg:				
a. Heb.-Anstalt in 15 years,	8,036	306	38.1 : 1000	Hugenberger, das Puerperalfieber im St. Petersburger Hebammen Institut. 1862, pp. 1 and 37.
b. The other Gebärhäuser.	17,675	811	46 : 1000	
5. Wien Gebärklinik in 65 years,	204,243	7873	38 : 1000	Marc d'Espine, Gazette des Hôpit., p. 213, 1858.
6. Leipzig in 49 yrs.	5,731	109	19.2 : 1000	Credé, Monatsschrift, xv. 192.
7. Berlin, 1829–35,	1,454	25	25.8 : 1000	Busch. Neue Zeitschrift für Geb., v. 83, xxviii. 62. Monatsschrift, iii.; do. viii. 363.
1836–41,	1,349	27		
1842–47,	1,025	47		
8. Dresden in 50 years,	15,356	373	24.2 : 1000	Grenser, Monatsschrift, xxvii. 158.
9. Würzburg in 40 years,	6,139	101	16.4 : 1000	Hofmann, Neue Zeitschrift für Geburtskunde. Bd. xxii. p. 7.
10. Mayence in 42 years,	7,739	41	5.2 : 1000	Kilian, F. M., Neue Zeitschrift, xxx. pp. 214,215.
11. Osnabrück in 30 years,	1,400	10	7.1 : 1000	Richard, Monatsschrift. Bd. viii. 29.
12. Rostock in 28 years,	933	31	33.6 : 1000	Brummerstaedt, Bericht über die Rostocker Anstalt. Rostock, 1866. Tables to p. 3.
Total,	701,122	23819	= 34 : 1000	

[1] For obvious reasons only those lying-in establishments are mentioned whose records of mortality cover at least a decade.

If to these we add Arneth's[1] figures for 1849, taken from the 40 lying-in establishments of the Austrian States, exclusive of Hungary—382 deaths in 16,358 deliveries, therefore 1 in 43, or 23.2 per 1000—we can rely upon the results of more than half a million deliveries in institutions to justify the assertion that the average mortality of puerperal women in them is 30 per 1000,[2] *i. e.*, *in general*, 4–5 *times as many women in childbed die in lying-in establishments as in private dwellings.* A perusal of the above-mentioned reports will at once show that most of those who died succumbed to the so-called puerperal fever. To be sure, there are institutions (as, for example, at Mayence and Osnabrück) that have kept far below this rate of mortality, and in which the sanitary condition has been quite as favorable as in private dwellings; unfortunately, these only form exceptions, and may pass as notable instances that such establishments may contribute to the welfare of mankind, without exposing those who seek their aid to greater dangers than would be encountered elsewhere. In conclusion, it will not be inappropriate to insert here a few observations upon

THE GENERAL TREATMENT OF THE DISEASES OF CHILDBED;

it being necessary to discuss at this point several topics at greater length than could properly be done under the separate heads. We will begin with

1. The *antiphlogistic treatment* of puerperal inflammations. Of the remedies in use, blood-letting is of chief interest to us. It is known that by venesection the watery constituents of the blood, the white corpuscles, and the fibrin are increased, whereas the red blood-corpuscles are diminished. A quality of blood, precisely analogous to that of pregnant and puerperal women, is, therefore, induced by bleeding, or the condition already present is aggravated. Thus it is scarcely to be questioned that the other injurious results of venesection—such as

[1] Arneth, Die Geburtshülfe in Frankreich, Grossbritannien und Irland. Wien, 1853, p. 178.

[2] This number corresponds very nearly to Lefort's, given on page 37, and to that found by C. Braun (Klinik, p. 450); the latter, it is true, has included the records of Berlin (6 yrs.), Dresden, Göttingen (each 3 yrs.), Stuttgart (1 yr.), and is computed from only half of the above number (371,859 deliveries).

great exhaustion, a very tedious convalescence, and permanent disturbances of nutrition—must show themselves very quickly in lying-in women. We know, moreover, that blood-letting *ad deliquium* merely effects a reduction of 1°–1.5° F. in the temperature, and in ordinary bleeding no change or, perhaps, even a slight elevation occurs; observations of the temperature in placenta prævia also show no decrease; and, besides, we find that puerperal women are more frequently taken ill when they have met with a loss of blood than at other times. If, then, the local effect of venesection cannot be highly commended, its influence as a febrifuge is also of little value; in fact, its worth is still questionable, since we can hardly drain a puerperal woman of blood to a state of syncope without thereby incurring the risk of cardiac paralysis. There only remains then the derivative action, which works by diminishing the hyperemia of the medulla oblongata, and also by relaxing spasmodically contracted muscles. But we are hardly warranted in accepting this last state as an indication for bleeding, if the same effect can with certainty be obtained through other means, and *without extracting from a woman in childbed so much of her most vital fluid.* This is now, at all events, possible, for, in the application of cold, especially ice, in the use of small local abstractions of blood, and in the administration of digitalis, quinine, etc., we have been at least equally fortunate in our results. Blood-letting has been principally employed in puerperal peritonitis, and, of course, before exudation has taken place. Hugenberger (*loc. cit.*, p. 55) states that, in St. Petersburg from 1845–50, this mode of treatment was attended with favorable results in 64 cases of metro-peritonitis (there was but 1 lb. of blood drawn, however); in that, only every 4th terminated fatally, instead of every 3d. But since the year 1850, allowing even for the individual characteristics and greater intensity of the disease in every instance, yet a *speedier loss of strength and a greater mortality occurred, almost invariably after each general bleeding, as the result of the impoverishment of the blood.*

Since that time venesection has fallen completely into discredit in St. Petersburg, and has not been again resumed. If we compare with this the experience of other authors—that

of C. Braun,[1] who in 20,000 puerperæ had never seen an indication for bleeding;—that of Retzius, Faye, Elsaesser, Pippingskoeld,[2] and Pfeufer-Kerchensteiner,[3] who have all borne witness to its uselessness in severe puerperal affections and exposed its dangers—if I also add that in those cases of puerperal peritonitis, in which I resorted to venesection during 1859 and 1860 (*vide*, for example, No. 29), not a single favorable result was observed—we are driven to the conclusion that in the diseases of puerperal women this treatment is not only unnecessary but often absolutely injurious.[4]

It is not so with *local abstractions of blood*. These, it is true, will seldom ward off an impending exudation, but they do alleviate pain, diminish the stasis in greatly distended capillaries, and assist in freeing the circulation by relieving passive congestions. They will, likewise, always be useful in the treatment of several of the circumscribed inflammations. I know that they are wholly discarded by many—as, for example, Breisky[5]—but the most recent researches concerning inflammation and suppuration, by Cohnheim, make the application of local blood-letting, near the inflamed part, appear to be excellent, as an antiphlogistic measure, since it serves to keep down the tension, and to accelerate the circulation. The question still confronts us, however, whether venesection from the puerperal uterus itself should be *frequently* resorted to—or only with great caution, as practised by Aran, Hugenberger,[6] Kaufmann, Snow Beck, and others. I am decidedly opposed to this direct abstraction of blood, and for the following reasons: in the first place, it is certain that a very great loss of blood takes place in this way, for during the first period of childbed the uterine vessels are very much enlarged. Cases have occurred—as, for example, those published by Hecker and Mikschik—in which, from slight lesions of

[1] Lehrbuch, p. 980. [2] Monatsschrift für Geburtskunde, xv. p. 304.

[3] Monatsschrift, xiii. p. 391.

[4] In the morbis puerperii even Boerhaave recommended "venesectio haud facile, nec nisi urgente summa necessitate adhiberi potest." Aphorismen, 1332.

[5] Breisky, in his criticism of the 1st edition of this work. Prager Vierteljahrsschrift, 95 Band. Liter. Anzeiger, p. 4.

[6] Hugenberger, loc. cit. pp. 56–60.

the vessels in the neighbourhood of the cervix uteri, women have very quickly bled to death. It is moreover extremely difficult to arrest the flow of blood from the lips of the os after the leeches have fallen off; in many instances success is very doubtful, for the bleeding point is very hard to find through the speculum, and the danger of serious secondary hemorrhage is to be apprehended. It remains to be mentioned, that the crawling of leeches into the uterus, which has often happened with women who were not pregnant,[1] giving rise to unpleasant symptoms, may much more easily take place in the puerperal uterus, so that the leeches should, at any rate, be applied singly, and each held by a thread passed through its posterior extremity. It is, furthermore, certain that the uterus is greatly relaxed by any considerable local abstraction of blood, and will thus be predisposed to deficient involution, secondary hemorrhages, and, as a result of these, to flexions. We can obtain the results of these direct bleedings in other ways, and with equal surety—to wit, by the application of leeches to the abdomen and by the ice-bag. Since the epigastric artery sends to the uterus a branch, which, after accompanying the round ligament, finally anastomoses with the uterine artery, *when we empty the vascular region of the inferior epigastric artery, we indirectly abstract blood from the uterus also.* The ice-bag is, however, of much more importance. When this is laid over the uterus, so as to fit round it like a hood, only separated by the thin abdominal walls, it not only alleviates the pain quite as surely as blood-letting—relieves the hyperemia—notably reduces the temperature of the inflamed organ—and diminishes the spasmodic tension—but, over and above these, it has the additional advantage of favoring the involution, by improving the circulation, and preserving the normal contractile power of the uterus. According to my belief, local venesection from the abdomen, in connection with cold water compresses, is alone sufficient for the lighter affections, and direct blood-letting from the uterus is never needed; for serious cases the ice-bladder not only answers the same purpose, but has decided advantages over the latter. The dis-

[1] F. Weber (Lemberg), Wiener Med. Wochenschrift, xi. 43, xii. 2; Schmidt's Jahrbücher, cxiii. p. 316.

agreeable pressure of the ice bag can be relieved by attaching it to a cord stretched above the patient's bed, so that the former rests lightly, but by its whole surface, in contact with the abdominal walls. The ice-bags of rubber are far preferable to pigs' bladders, as the latter often leak and become offensive. I have never seen the abdominal walls frozen, even after a week's uninterrupted use of ice.

The following is of no less interest than the antiphlogistic, viz.:—

2. The treatment of puerperal uterine affections by injections into the uterus. The different opinions about this remedy, at the present time, and its constantly decreasing use among puerperal women call for an exhaustive discussion of its alleged dangers.

According to the historical researches of Cohnstein,[1] even Hippocrates and Galen were familiar with uterine injections, and employed them especially for metrorrhagia, but likewise to wash out retained portions of the placenta. For this purpose, water, vegetable juices, and subsequently spirits of wine, vinegar, red wine, etc., were used. Injections were early used in the uterine affections of non-pregnant women, and often with good results; but, in our own times, at the beginning of the year 1840, it happened repeatedly that women died suddenly of peritonitis soon after such injections. Lisfranc, therefore, discarded all irritating and astringent uterine injections, except in cases of catarrh that threatened to be fatal. Hourmann published a case, in which, while injecting an infusion of walnut leaves, with the first movements of the piston the patient uttered a loud scream, soon had a chill, and fell seriously ill with peritonitis, from which she had a protracted convalescence. The same accident occurred in two patients of Bretonneau. Hereupon Vidal de Cassis, Astros, and Petit instituted experiments upon 9 female subjects; they began with forced injections, using a syringe designed for injection into the arteries, to the canula of which they bound the os uteri—and the fluid passed into the uterine vessels and into the tubes. With moderate injections the liquid neither pene-

[1] Cohnstein, Beiträge zur Behandlung der Chronischen Metritis. Berlin, pp. 71–92.

trated to the peritoneum, nor even entered the tubes, but always flowed back between the cervix and the canula. The last injections therefore seemed perfectly free from risk. Since that time opinions have, notwithstanding, remained greatly at variance as to the dangers and applicability of this remedy, for mishaps have repeatedly followed its use. Thus Oldham[1] relates, that he has produced violent pains by the injection of ʒj of tepid water through an elastic catheter, and that—after these were allayed, and a second attempt was made, serious inflammatory action and peritonitis set in. Again, Retzius[2] says, that, after having for a long time prescribed these uterine injections in obstinate cases of uterine blenorrhea and amenorrhea, invariably without harm, in the year 1850 he had diffuse peritonitis three minutes after injecting a solution of 10 grains of nitrate of silver to the ounce of water, though the patient ultimately recovered. Pédelaborde[3] likewise had a case of severe peritonitis after the injection of an infusion of walnut leaves, as did Gubian also. In 5 out of 6 women, who had received injections of a weak solution of nitrate of silver for uterine catarrh, Becquerel met with serious affections, and 3 of them were only saved by the most active antiphlogistic measures. Noegerrath,[4] in 3 out of 4 cases of similar injections, saw violent peritonitis ensue—one woman died; with the use of tincture of iodine alone the reaction was slight. Metritis, peritonitis, and colicky pains, in consequence of these injections, are reported also by Ashwell, Hennig, Germann, Sigmund,[5] and others.

On the other hand, some authors have urgently recommended the injections in question. Strohl[6] has employed them in 29 cases of uterine catarrh among prostitutes, and in 25 of these he effected a cure within 14 days. He made the injections daily without once meeting with any untoward results, em-

[1] Oldham, Schmidt's Jahrbücher, lx. p. 189.

[2] Retzius, Neue Zeitschrift, Bd. xxi. p. 392.

[3] Pédelaborde, Schmidt's Jahrbücher, lxx. 61. Hourmann, Schmidt's Jahrbücher, 30, 41, from Bull. de Therapie, t. 19, p. 60.

[4] Noegerrath, Monatsschrift für Geburtskunde, Bd. xix. p. 316.

[5] E. H. Klemm, ueber die Gefahren der Uterininjection. Inaug.-Dissert. Leipzig, 1863, pp. 16–18 and 27.

[6] Strohl, Gaz. Médicale de Strassbourg, Bd. viii. No. 10, Oct. 20, 1848.

ploying lead-water, a solution of iodide of iron, and once sulphate of zinc. In acute and subacute inflammations of the uterus, however, he forbade their employment. Scanzoni[1] also has repeatedly introduced them without observing serious consequences, such as the so-called uterine colics. Savage,[2] Eulenberg,[3] Fürst,[4] Gruenewaldt, Snow Beck, Marion Sims, and others have had good success with this treatment in diseases of the unimpregnated uterus.

In 1863 the experiments above referred to were repeated by E. H. Klemm, who again demonstrated that the fluids invariably flowed back through the cervix uteri when no ligature was applied, and *never passed through the tubes*, whether introduced into the cavity of the uterus by means of a long water pipe (about 60 inches long) or by a small syringe, and regardless of the amount of force which the operator chose to apply. Klemm found that the blue ink injected had penetrated into the venous system of the uterus and of the broad ligaments in 3 cases only, and in these the os uteri was very narrow, and the force brought to bear very considerable ; he thus corroborated the experience of Astros and Petit, and gave an ocular demonstration of the manner in which metritis and peritonitis develop so rapidly after such operations.

In puerperal women, intra-uterine injections were first and most frequently administered for floodings. Even Galen (who used aqua and succus plantaginis) and others employed them for this purpose. Guillon[5] in 1825 tried a decoction of oak-bark for metrorrhagia with good effect ; later Bonnet,[6] in 1850 made "*emollient*" injections into the cavity of the uterus in a woman affected with "puerperal fever ;" the result was, however, unfavorable, for the woman died on the 5th day after delivery. Kiwisch and several others have used cold injections for metrorrhagia ; in a number of their cases, at all events, metritis is supposed to have resulted. Dupierris,[7] on the other hand,

[1] Scanzoni, Lehrbuch der Frauenkrankheiten. Wien, 1859, pp. 38, 39.
[2] Savage, Lancet, 1857, ii. 23d December.
[3] Eulenberg, Preuss. Vereinszeitung, N. F. v. 48, 1861.
[4] Fürst, Monatsschrift für Geb. xxvi. 1–2.
[5] Froriep's Notizen. Bd. xxiii. p. 45.
[6] Bonnet, Schmidt's Jahrbücher, lxv. 332.
[7] Dupierris, Gaz. des Hôpitaux 1857, No. 37, p. 145.

claims such success with iodine injections (1 part tincture of iodine to 2 parts water), that a single one sufficed in every case to arrest the most violent of floodings, nor has he ever observed any deleterious effects. He has also treated unusually persistent and abundant lochiæ with this remedy. Noegerrath[1] reports rapid cures of hemorrhage after abortion by the use of iodine injections. But by far the most numerous injections of this kind have been made by O. von Gruenewaldt.[2] Thus during an epidemic of puerperal fever, 160 lying-in women were treated by him with injections of a solution of chloride of lime (ʒ½ to 3 pints of water), as a prophylactic, the moment they showed any ominous elevation of temperature within the first 24 hours post-partum. The number of severe cases was thereby diminished, and, as the injections proved perfectly harmless, they were subsequently given to every puerpera 2–3 hours after delivery.

In view of the above observations, a more extensive use of these injections with puerperal women than heretofore seemed to me not only safe but urgently demanded in the severer forms of disease; I have, therefore, during the past 4 years resorted to them for every variety of puerperal disease—generally in the presence of one or more students, and often in the presence of several of my colleagues; I must confess to having experienced a certain degree of timidity and anxiety at first. The complications, for which I have chiefly used them, have been endometrits, whether catarrhal or diphtheritic —particularly when caused by retention of pieces of the membranes—and hemorrhages, especially if secondary. The fluids were—a solution of sulphate of copper (2–5 : 200 grms.)—a solution of tannin (2–5 : 200 grms)—a solution of carbolate of soda (5 : 100)—liquor ferri sesquichloridi and water in equal parts, or only 20 drops to 15 grms. water—and a solution of hypermanganate of potash (10 : 200 grms.) of which only 10–15 drops were added to each injection. These were at first introduced with Braun's syringe; after bringing the vaginal portion into the speculum, the point of the instrument was pushed up ½ to ¾ of an inch into the uterus, and the syringe then cautiously emptied; I subsequently dispensed with the specu-

[1] Loc. cit. [2] Petersburger Med. Zeitschrift, v. 1. 1863.

lum. Great care was naturally taken that no air-bubble remained in the tube of the syringe, and that the injections should not be made too quickly. As Braun's syringe held only about 15 drops, I ordered a precisely similar one of 3–4 times that calibre. Of all the lying-in women, with whom these were used, but one, in Dec. 1868, declared that several hours after the injection, she had felt pains like those of labor; none of the others experienced any sensation. The temperature was repeatedly taken immediately after the injection, and compared with that taken just before; nothing abnormal could be detected. Floodings, due to deficient involution of the uterus, were in one instance fully arrested in a few days by 3–4 injections. In one woman, who had been suffering for 6 weeks with metrorrhagia consequent upon abortion, a cure was effected by only 3 injections on successive days. This treatment was especially successful for very foul lochiæ from retained portions of the membranes, two cases of which are hereafter reported in the proper chapter. In short, the success was throughout satisfactory. With the women in the establishment, the injections were at first made chiefly after the 12th day of childbed, but subsequently even in the first days. The contents of 2–3 syringes, according to circumstances, were injected once or twice a day.

The previously mentioned unfavorable results of this treatment can only be explained by its mode of execution, for the fluid was generally driven into the uterus by those authors through an elastic catheter. Thus there was no way of preventing the forcible introduction of air into the puerperal uterus, and, after the explanations and proofs, which Olshausen[1] has adduced, it can no longer be denied, that its presence there may be injurious or even fatal. Besides, with that method of injection, the force cannot be measured, so as to guard against all possibility of the occasional propulsion of fluid into the gaping uterine veins, or through the tubes into the peritoneal cavity. The procedure recommended by Cohnstein for chronic metritis is clearly contraindicated during the first week of childbed, because, by the suction of the

[1] Monatsschrift für Geburtskunde, Bd. xxiv. p. 350.

syringe within the uterus, serious hemorrhages from the site of the placental attachment might be thus induced.

As the escape of the injected fluid is far easier with women in childbed than with others, owing to the relaxed condition of the cervix uteri—as, moreover, the forcible introduction of these fluids into the uterine veins is not to be feared in a slow injection with the above-named syringe—and as the results are decidedly favorable, I believe I can recommend this treatment with a clear conscience, provided attention be paid to the following points.

1st. Braun's syringe, or a similar larger one, is best adapted to these injections. 2d. They should be made with tepid fluids, and not too quickly. 3d. The syringe should be free from air-bubbles. 4th. The solution should not be too concentrated—from $_1{}^1{}_0$ to $_1{}^5{}_0$ grm. of tannin, sulphate of copper, or hypermanganate of potash to 50 grms. of water is sufficient. Liquor ferri sesquichloridi and water in equal parts may be injected for severe hemorrhages. No greater strength of nitrate of silver should be employed in solution than for injection into the bladder: 0.05–0.125 to 50 grms. water. 5th. A small quantity should be first tried. 6th. The injections should be intrusted neither to the nurses nor the midwives, but should always be administered by the physician.

Note.—O. von Gruenewaldt, in a recent paper upon puerperal septicemia and ichorrhemia (*Petersburger Med. Zeitschrift*, xv. Heft 9, 1858), has, for the second time, expressed the belief that, since the septic poison may form in the blood, which escapes during delivery and the puerperal period, before it has changed to the true lochial secretion, prophylactic injections into the uterus are not only justifiable but are strongly indicated, directly delivery is completed, and these should be continued so long as the formation of sepsin in the lochia is conceivable. This gentleman, however, writes me that he has, since then, arrived at the conviction that, in spite of the greatest foresight, these injections have been attended with sad results in many instances, and that their preservative power is very questionable. He, therefore, finds himself obliged to assign narrower limits to their application than formerly, and now includes among the indications, besides retained portions of the membranes and placenta, diseases of the uterus, etc., the following—the repeated recurrence of puerperal affections in a lying-in establishment in rapid succession. However much I recommend injections, I have never as yet employed them with other than diseased women, and never as a preventive measure with healthy lying-in women, nor can I unhesitatingly assent to this prophylactic application, until their protective power is no longer in question.

SECTION I.

PUERPERAL AFFECTIONS OF THE EXTERNAL AND INTERNAL GENITAL ORGANS.

CHAPTER I.

GENITAL LESIONS OF LYING-IN WOMEN.

I. Lesions of the Pubes and Vaginal Orifice.

Ruptures of the Perineum: Rupturæ Perinæi.

Anatomical Condition.—The layer of soft tissues between the posterior extremity of the vulva and the anus, consisting of skin, subcutaneous cellular tissue, fasciæ, and muscles (bulbo-cavernosus, sphincter ani, transversi perinæi), which is called the perineum, is generally 1–1½ inch long, but is not infrequently distended by the fœtus during delivery to 6–8 inches; the length is then so considerable that the whole child may be driven through the perineum without rupture of the fourchette or the sphincter ani. These lesions are divided into superficial (or broad) and deep; or, according to their extent, into ruptures of the 1st, 2d, or 3d degree. In superficial ruptures, only the integument of the perineum, with the superficial perineal fascia, is lacerated; in the deeper ruptures, the inferior part of the posterior vaginal wall, the perineal muscles, the few fibres of the constrictor vaginæ that pass into the sphincter ani, the superficial and deep transverse muscles, and also the deep perineal fascia, are severed. Besides these, in perineal ruptures of the 3d degree, the external sphincter ani, the mucous membrane of the rectum, and a considerable portion of the posterior vaginal wall, are torn through. Ruptures of the 2d degree do not implicate the sphincter ani. The laceration generally follows the median line of the perineum,

beginning at the posterior commissure of the vulva. Sometimes the lesion first appears in the middle of the perineum; the external skin with its deeper layers may then be earliest divided, or the rent may originate in the posterior vaginal wall, and extend to the deeper perineal muscles, involving finally the superficial integument. These are called *central ruptures*, if the anus and the posterior commissure of the vulva remain intact. The edges of the wound are either sharp or ragged. Central ruptures may assume the form of a T, X, +, Y, V, or of a circle. The width of the integumental bridge, which is preserved at the posterior commissure, seldom exceeds ⅓ inch (Dudon). In rarer instances, the perineum tears obliquely to one side; the lesion may then extend to the broad portion of the bulbo-cavernosus muscle, which is inserted into the transverse septum of the perineum. Ruptures in the raphé and both lips of the vulva simultaneously are much more rare (D'Outrepont).

Symptoms.—Perineal rupture itself is generally preceded by a sensation of injury—a cutting, burning pain; this attains its greatest intensity at the moment of the child's passage through the vulva, so that even such women as are usually quiet during labor often cry out suddenly, when the laceration is extensive, and express a fear that they may have been "ruptured." When the wound is deep, hemorrhage often ensues from its surface. This is seldom arterial, but generally venous and of little moment, owing to the direction of the rent and to the lateral course of the common pudendal artery. In slight fissures the pain usually subsides in a few hours. In deep ruptures of the second degree, on the other hand, the pain persists for a longer period, when any movement is made, such as that involved in turning in bed, sitting up, and especially urinating. Women often have a feeling as though "everything would drop out of them." If the edges are not united by stitches, they often swell up with œdema, the integument is reddened and painful upon pressure, several spots in the wound become discolored, small extravasations of blood take place into the tissues forming the edges of the laceration; these spots sometimes become gangrenous and slough away. Great tumefaction of coexisting hemorrhoids

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often aggravates the sufferings of the patient. A serious hemorrhage occurs occasionally from the wound after four or five days. I have seen retention of urine in 9 per cent. of my cases, whether œdema of the perineum were present or not. In central ruptures the child may be delivered entirely through the fissure. In the year 1838 Velpeau was able to collect 30 such cases, while Capuron was contesting the possibility of its occurrence. Duparcque (*loc. cit.*, p. 407–417) discovered many reports of these "perineal deliveries," but, while admitting their possibility, he asserted that not a single instance had at that time (1838) been so authenticated as to be above question. Since then, indubitable cases of this kind have been described by Busch, F. H. G. Birnbaum, Simpson, Leopold and Grenser, B. Brown, Coën, Lamb, Nusser, Stoltz, Dudon, Buot, and others. Douglass, on one occasion, even saw the soft parts torn asunder by the child's head, not in the median line of the perineum, but from the posterior end of the left labium to the tuberosity of the ischium. After such lesions the posterior commissure of the vulva may be subsequently destroyed by ulceration, and thus rupture of the second degree result. In other cases the whole extent of the perineal wound may heal spontaneously, or a perineal fistula remain (Simpson, Marter, Halmagrand, Stoltz), through which the vaginal secretions and menses may escape, and even the uterus at times protrude.

If ruptures of the perineum are left to themselves, they heal, as a rule, almost entirely by second intention, in two and a half to five weeks. In my experience the average time has been three and a half weeks, provided no puerperal ulcers have developed from them. If the lesion is not very extensive—consequently in ruptures of the first and second grades—it often happens that no reaction ensues and the temperature remains perfectly normal. A traumatic fever generally sets in, however, soon after the laceration takes place, lasting from two to seven days. The fever frequently begins with chills occurring immediately after delivery, seldom with a true rigor, and usually reaches its height on the evening of the second to the fourth day, when the temperature may have risen to 104° F., though it remains for the most part under 102.2° F. I have already reported such curves (*Monatsschrift*, xxii. p. 352), and

Schroeder has recently done the same. If the edges of the wound become œdematous, or puerperal ulcers form upon them, the fever lasts longer, the recovery is more tedious, and the deficiency in the perineum is greater. The perineum is then much shortened after cicatrization, being often reduced to a very narrow bridge, the vaginal orifice becoming longer and considerably wider in its posterior part. Prolapse of the uterus, rectocele, and even procidentia may occur, in such cases, from the shortening of the posterior wall of the vagina. Permanent enlargement of the vulva is produced by the cicatricial contractions, the vaginal mucous membrane being drawn down toward the back and side by the shrinking of the suppurating surfaces, whereas the integument of the perineum, being attached to the sphincter ani, is drawn forward. In this way the vaginal wall may be shortened by more than an inch, as was once seen by Roser. If the laceration has extended through the sphincter, it occasionally happens that women are unable to retain the intestinal gases, and in some instances, even the feces, at least when suffering from diarrhœa (Mayo), and their condition may thus become positively intolerable. On the other hand, so considerable a contraction of the vagina may ensue from the firm cicatrization of perineal ruptures, that a catheter will scarcely pass through the opening (Krieg). In ruptures of the third degree, a recto-vaginal fistula may persist, after a part of the perineum has united (G. Simon). The *recognition* of perineal ruptures is easy. The perineum should be inspected after delivery. This may be most effectively done with the woman on her side. The upper buttock is then to be drawn away from the perineum, by which procedure the latter is fully exposed. As the perineum is unusually distended toward the end of delivery, even small ruptures will then appear quite large, but, immediately after the child has passed the vulva, they diminish rapidly, as the perineum shrinks. In order to find out the depth of the rupture and the nature of its edges, a finger must be introduced into the rectum and the anterior wall of the latter be passed toward the fissure; in this way the thickness of the vaginal wall, the surface of the wound, and especially the integrity of the parts appertaining to the rectum, may be

thoroughly examined, while the seat of a hemorrhage, if present, may also be most readily recognized.

Etiology.—The causes of a perineal rupture may, in the first place, be peculiar to the woman who is in labor. To this class belong uncommonly severe and tempestuous pains, too violent straining, abnormal narrowness and rigidity of the vulva, and unusual length of the perineum. Diseases of the vagina and vulva, such as chronic œdema, cicatrices, and ulcers, are among the prominent causes; the first of these conditions is generally due to nephritis, twin pregnancy, or hydramnios, and the last is attributable chiefly to excess in venery. B. Schultze mentions abnormal rigidity of the triangular ligament as an additional source of danger. It seems to me probable that this has often been mistaken for narrowness of the pubic arch, at least by such as consider a narrow pubic arch to be one of the most common occurrences (Hugenberger), for, except among osteomalacitic individuals, this deformity is really quite rare. Besides these, too slight an inclination of the pelvis has been adduced as one of the causes (Kiwisch), for the reason that the head is thereby directed more toward the middle of the perineum, and thus a portion of the space under the pubic arch remains unused. The possibility of such an origin must be conceded, though neither in rachitic individuals (in whom the sacrum is flat), nor in osteomalacitic (who have narrow pelvic arches) have I found perineal ruptures more frequent than in others. It is true that osteomalacitic women in labor are chiefly multiparæ, and their genital organs commonly wider and more yielding. In opposition to the views of Lippert and Birnbaum, however, who accept an abnormal curvature of the sacrum as a cause of the accident, it must be stated that the perineum is not subjected to any great strain by this peculiarity of the pelvis, inasmuch as the chief pressure comes rather upon the anterior wall of the pelvis. In addition, ruptures of the perineum occur most frequently in primiparæ, for out of 120 cases 99 were in women with the first child, 17 with the 2d, and 3 with the 3d. Prieter found that 88.4 per cent. were primiparæ and 11.6 per cent. multiparæ in 250 patients. Too great youth or too advanced age of a primipara are mentioned by Tanner as

predisposing to these accidents. I have, likewise, directed my attention to this point, and have found that of 66 primiparæ whose ages were known exactly, only 7 were under 20 years of age. If now the 22d year be adopted as the nearest average age for the first birth, these figures do not indicate any predisposition on the part of youthful (17 to 20 years old) primiparæ. On the other hand, certainly 14, and therefore $\frac{1}{5}$ of those primiparæ, and in Prieter's cases 30.76 per cent. were *over* 27 *years of age*, and 7 of these were more than 30 years old, so that *advanced age seems, at all events, to predispose primiparæ to this lesion.*

The causes may besides lie in the child. The accident may then be attributable to excessive development and unusual hardness or incompressibility of its head. Hecker denies this, basing his opinion upon the statistics of 42 ruptures. I possess notes of 120 lacerations of the perineum, taken from the records of the Rostock Lying-in Establishment; in 31 of these the circumference of the child's head was greater than usual, that is to say, it measured more than $13\frac{1}{2}$ inches, and the child weighed over $7\frac{1}{2}$ pounds. On the other hand, the more recent measurements of Prieter have shown that in 65 per cent. of the children, who were the causes of this injury, the circumference of the head was below the average; the posterior transverse diameter, however, was greater than the average in 69 per cent. of the cases; on which account, he is disposed to include a head of this shape among the causative factors. The size of the child is, naturally, not the only cause, but the character of the soft parts of the mother is equally important; an injury should, therefore, never be narrowly imputed to a single source. It is furthermore said that a faulty passage of the child's head, as in face presentations and the so-called "anterior occipital" presentation, predispose to ruptures of the perineum. Both statements can be but relatively correct. In my own records, 1st occipital presentations occurred 69 times, 2d occipital 35 times, 3d and 4th occipital twice, and face presentations but once; the relative frequence of the various presentations was therefore the ordinary one, not one of them being more common than is usual; this fact is also corroborated by Preiter in his cases. There is really

no reason why the external genital organs should be exposed to greater danger in face presentations, since the greatest circumference of the head, which in these cases has to pass through the external genitals, is not greater than it is in ordinary occipital presentations. On the other hand, the fronto-occipital circumference, which issues in the 3d and 4th head presentations, is greater than that which issues in the two presentations just mentioned; the probability of a perineal rupture is also enhanced by the fact that the occiput is pressing upon the perineum for a longer time, owing to the slower emergence of the forehead beneath the pubic arch. Central ruptures, therefore, sometimes occur in these presentations (Leopold). I have not found Hecker's experience—that ruptures of the perineum are more frequent with boys than with girls—corroborated by my observations, for in the 120 cases adduced there were 64 girls and 53 boys. Adding Hecker's and Preiter's aggregates to these figures, we have 212 boys to 197 girls, which corresponds pretty nearly to the general proportion of male to female births.

Finally, the cause of the injury is not infrequently attributable to the *midwife* or *accoucheur*. Although I cannot assent to the opinion expressed by Ch. Clay and others, that the customary support of the perineum is the source of many of the ruptures now-a-days, but am convinced that a rational manner of supporting the perineum has prevented many a rupture, yet it is certain that the midwife is often at fault, through injudicious, awkward, or ill-timed support, or the neglect of this measure. The obstetrician too may inflict the very worst injuries by the use of instruments, especially by the too rapid extraction of the head from the external genital organs, whereby, on the one hand, time is not allowed the perineum to develop its elasticity, and on the other hand, fissures may be produced by the blades of the forceps. This is equally true of head as of breech presentations. Lesions of the perineum have been observed (by E. Martin) from the slipping of the forceps, the cephalotribe, or the hook, and from the forcible introduction of the hand. Of 32 deep perineal ruptures, which were sent to Baker Brown for operation, 13 (!) had arisen from instrumental interference during delivery. Ac-

cording to Preiter's estimates, ruptures of the perineum occurred in 15.8 per cent. of the forceps operations in Munich. Twenty-one obstetrical operations (forceps 18, extraction 3 times) had been performed in my 120 patients. Summing up all the perineal ruptures that have come under my observation, including those not exceeding half an inch in length, they do not amount to 10 per cent. of all deliveries; among these, however, were but *five of the 3d grade.* In 7190 deliveries Preiter found 3.47 per cent. exclusive of the very small ones. The percental rate adopted by Hugenberger (1 per cent.) is, at all events, too low, the lighter cases have probably been overlooked. Snow Beck's average, according to which 75 ruptures occurred in 112 primiparæ, is much too high; all the fissures of the mucous membrane at the vaginal entrance must have been included.

Rupture of the perineum generally begins during the passage of the head, and is still further enlarged by the shoulders, though occasionally the tissues do not tear at all till the passage of the latter. C. O. Weber has maintained that most ruptures arise from the posterior vaginal wall being forced down by the child's head, and squeezed to a certain extent over the posterior commissure; when the latter gives way, the rent commonly extends into the vagina on both sides in the shape of a V; this statement may be true in some instances, but certainly is not so in most, as can be proved by the touch or inspection.

Prognosis.—If the perineum was in good condition before the accident, and the edges are carefully brought together, almost complete union by first intention will be secured in 65 per cent. of the patients. The result is generally favorable in those cases also, where, owing to the diseased condition of the edges of the wound, the healing has been by granulation. I have delivered very many women who had met with quite extensive ruptures at the first birth, yet had conceived in spite of the gaping vulva. The successful union of a perineal rupture after the first birth is in no way a hindrance to later deliveries; such women easily give birth again, and often without rupture. Œdema of the edges, and puerperal ulcers of a graver character, occurred in 11.5 per cent. of my cases; two of the women died in childbed of septicemia. It is self-

evident that perineal ruptures create a predisposition upon the part of women to severer maladies, especially during epidemics, inasmuch as they are thereby more exposed to infection. This is also proved by Hecker's experience, who saw 22 women fall sick out of 32 who had met with ruptures; according to a subsequent report from Munich, only 24 per cent. of these women were affected while in childbed (Preiter). The prognosis in perineal ruptures, on the other hand, is certainly better than in deeper-seated lesions, because they can easily be cleansed and thoroughly disinfected. A partial inversion of the posterior vaginal wall often results after such rents as do not heal per primam intentionem; this is by no means an invariable source of annoyance. Prolapse of the uterus is rare after rupture of the perineum, and even when present is often attributable to another cause. I have had many a patient with prolapsus uteri, but not one in whom this condition had resulted from a perineal rupture, that I had seen take place; I, therefore, deem the anxiety of some authors, lest a fall of the womb should occur, even after slight fissures, as exaggerated. In my experience the prognosis of ruptures in general, and even of central ones, is good. There are plenty of instances where both kinds have healed throughout spontaneously (Behm, Lamb, Priestley, Nusser, Schmidt and Müller, and others). It is only unfavorable in cases where the sphincter ani is severed, where an unhealthy state of the wound exists, and where first intention fails; the condition of such women may ultimately become quite as unendurable as those afflicted with vesico-vaginal fistulæ.

Treatment.—We are here concerned only with ruptures already existing, and not with their prevention, which falls rather to the practice of obstetrics, and will, therefore, be considered among the procedures for supporting the perineum. My results accord with the experience of most writers, that immediate union of the torn edges is very essential. I have not been so fortunate as Holt, who obtained complete union in every instance, but half of the ruptures occurring in my practice, that were brought together by sutures, healed fully, while fully a third of the others healed to a great extent. I insert the suture with the woman upon her side. The upper buttock is

raised by an assistant, the edges of the wound carefully cleansed, discolored parts are removed with the scissors, and several sutures introduced, their number varying with the length and depth of the tear; these are knotted as soon as all are in place. The sutures are inserted 3–4 lines from the edge, and made to pass as deeply as possible; the more securely the suture holds, the speedier is the union, and the more thoroughly is the wound protected from the lochial secretion. In superficial ruptures, simple perineal sutures are sufficient, but with a deeper rent, it is well to insert sutures into the mucous membrane also in the shape of the letter L, and when the rectum is torn, a distinct suture must be carried through that organ (Simon).

The sutures are removed after 3–6 days, during which interval the perineum must always be carefully cleansed. When there is any œdema, the stitches need not be removed until they begin to cut through the edges, but compresses with lead-water should be applied at once. I allow injections of chamomile tea or a decoction of linseed to be made three times a day, when the vagina has been previously diseased, or if endometritis is present. I advocate, moreover, the use of sutures even when colpitis or slight œdema of the perineum has existed during labor, having repeatedly seen ruptures heal by first intention in spite of these complications. Under these circumstances, however, I would not apply the sutures as early as the 3d or 4th day, as Brown does, and much less use stitches, when gangrene is already present; "the sooner the better" holds here as elsewhere. If granulations have already sprung up, only the most thorough denudation of the whole wound will give a chance of healing, and that operation is quite a serious one. The administration of opium, to prevent action of the bowels, for eight or ten days after the operation, is unnecessary; the same result is attained by enemata regularly every day; Reybard's suggestion, to introduce a finger into the rectum to allow the fluids and gases to escape, is surely superfluous. Simon's latest experience is favorable to a purgative treatment (ol. ricini ℥ij, or calomel with jalap) after operations for ruptured perineum. Constant use of the catheter is also needless, this course being only called for when passage of the urine is

not readily effected in the abdominal decubitus. The Englishmen, Parker and Brown, recommend the subcutaneous division of the sphincter on either side of the coccyx, in deep tears which involve this muscle. If the rectal and vaginal mucous membrane are deeply ruptured, the lacerations must be closed by two very deep quill sutures before the perineal stitches are inserted ; in such lesions, the wound must be closed most carefully, with the woman upon the table, rather than in bed, and in the position for lithotomy, efficient assistance and good illumination having been insured (Simon). After a deep rupture, the knees should be bound together, and the woman kept chiefly on her side. A strict observance of one position is far from being always requisite, as was shown by Bernhard Schultze ; yet the importance of its occasional enforcement is not to be overlooked. The same may be said of this rule as of vaginal injections, which Holt and others never omit, and B. Schultze never employs—the medium course, with a special regard to individual cases, is, to my mind, the correct one.

The experience of different observers with serres-fines is very contradictory ; while 27 out of 35 cases were healed by Hoogeweg, and 12 out of 82 in St. Petersburg, Grenser has never seen any result from their employment. The records of the Rostock Institution show that they have been applied 36 times in perineal ruptures of the first and second grade, and that in 17 of these cases more or less complete union by first intention was obtained. In my experience they have inflicted pain for a longer period than the sutures, and cut through quite as rapidly ; small ulcers likewise often form on the spots where they press. For the deeper rents they are never suitable. The like is true of the collodion dressing advocated by Grenser. It can be applied in addition to the suture, as has been done in St. Petersburg ; it then relieves or averts the œdema of the edges, but soon becomes detached, loose particles arrest the flow of the lochia, which thus causes excoriation of the skin; finally the removal of the dressing is often quite painful.

The chief result of an immediate approximation of the edges is the healing of the wound in 2–7 days, whereas union by suppuration always lasts longer, and is attended with more discomfort; the former method is, therefore, desirable in pri-

vate practice, but in a clinic is very essential in order to escape the severer affections of the perineum.

The *art* of causing old ruptures and cicatrices of the perineum, and especially fistulous passages, to unite subsequently, as Simon justly remarks, consists only in a thorough denudation of the surfaces, and a careful application of the sutures. The stitches must hold well and approximate the edges evenly throughout their whole length. Quill or hare-lip sutures are serviceable in keeping the edges of the wound in apposition, and in diminishing the tension. Neugebauer's adjusting screw suture is very troublesome, and Reybard's method is still more complicated and objectionable. The interrupted sutures may be inserted between the others in order to secure perfect adjustment of the edges. Silk thread is at least quite as good for sutures as iron or silver wire; the number of cases, by which Hecker has tried to demonstrate the advantages of iron wire, is too small to have any weight.

Simon has recently recommended a special method of uniting old perineal ruptures (*loc. cit.*, p. 259, 264), which he calls the triangular; here the rectal and vaginal sutures are inserted deeply, whereas the perineal are made quite superficial.

If union is not established by means of sutures, tepid vaginal injections must be given three times a day, the greatest cleanliness enjoined, the woman kept on her back for a long time, all violent straining of the abdominal walls forbidden, and the healing stimulated by frequent cauterization with a solution of nitrate of silver (20 grains to the ounce), or by touching the surfaces lightly with the solid stick. Easy dejections must be secured by cold water enemata. The treatment of the puerperal ulcers, that develop from ruptures of the perineum, will be discussed under the former heading.

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Other Injuries of the External Genitals and Vaginal Orifice.

Complete laceration of all the tissues is not confined to the perineum, but also occurs in other parts of the vulva, though much less frequently. Transverse fissures of one or even both nymphæ, by which they are divided into several flaps, are occasionally observed, and I have frequently noticed a perforation of one of them. (See table on the condition of the genital organs in puerperal women, No. 20, Pasenow.) Deep lateral ruptures, severing the nympha and external labium transversely, without involving the perineum, also occur. More or less deep fissures of the mucous membrane in the vestibulum, and especially on the inner surface of the labia minora, are far more common. They vary in extent, exhibit jagged edges, and are often met with in considerable numbers. A favorite site is near or just above the meatus, where they give rise to intense burning on passage of the urine, and may produce retention by the tumefaction of the surrounding tissues.

They are easily converted into bleeding ulcerations, which are ordinarily accompanied by œdema of the nymphæ, since it is almost impossible to prevent their being moistened with urine. They render catheterization a very painful process. In 286 lying-in women Schroeder found 7 primiparæ with bleeding fissures near the clitoris, and 36 in all between this organ and the urethra. By laceration of vessels these fissures may occasion considerable losses of blood. These hemorrhages are not entirely venous, as Klaproth concludes from 4 cases, for upon five occasions I distinctly recognized arterial blood; Schroeder once saw 3 arteries spurting at the same moment. As the seat of these hemorrhages is not readily discovered, women often become quite anemic before the bleeding is arrested. Fissures of the mucous membrane, as a rule, close spontaneously after the flow of blood is stopped. Interrupted sutures are generally employed in transverse ruptures or perforations of the nymphæ or external labia. The treatment of these hemorrhages is given in Chapter III.

II. Lesions of the Middle Portion of the Vagina.

We divide the lesions of the vagina into such as affect the middle portion, and such as have their seat in the fundus. The latter are best included with the lesions of the neck of the uterus, for the causes, symptoms, and prognosis are much the same in both. Under the former we distinguish two groups—vaginal lesions not communicating with neighbouring organs, and those that open into the adjacent cavities, vaginal fistulæ. The division is made on practical grounds, for the symptoms and significance of the two classes are essentially different.

Lesions of the Vagina, not communicating with the Neighbouring Organs. Rupturæ et Contusiones Vaginæ.

These lesions occur on all sides of the vagina; they consist either in rents of the mucous and muscular coats, so that the perivaginal cellular tissue is laid bare, or they extend merely through the mucous membrane. The entire destruction of the vaginal wall by pressure must here be included. The direction

of these rents is generally longitudinal, even though they attain the length of 4 inches (Braun). Their edges are sharp as though cut, or rough with shreds of tissue; in the latter case, extravasations of blood are often found in the vicinity. The form of the lesions that are due to contusions, is mostly round; they are as large as beans or walnuts, and often present sharply-cut edges. They correspond in shape to the sloughs caused in a child's scalp by pressure in cases of narrow pelvis, and are generally situated in the middle portions of the vagina, posteriorly as well as at the neck of the bladder, and in the lower segment of the posterior wall. Small fissures occur in the anterior vaginal wall.

The *symptoms* of the above-described lesions are often singularly slight; those immediately following the accident are commonly unimportant. Quite extensive hemorrhages may follow the severer ruptures. Those who are afflicted are conscious of no pain; they complain, at the most, of a constant desire to micturate, and of a burning sensation during the act. Vomiting is rare, and peritonitis only to be dreaded in lesions located in the upper part of the posterior vaginal wall. As a result of these, I have often met with very obstinate retention of urine of 10–14 days' duration. If the posterior wall is the site of the lesion, the lochia may penetrate and produce inflammation of the wound and of the pelvic cellular tissue, with suppuration and decomposition. The pus may perforate the rectum or vagina, or gravitate toward the perineum. The last is rare, and was never seen by Kiwisch; I have observed it once, and therefore append the case. Œdema of the side of the vulva, corresponding to the site of the wound, sometimes appears several days before the perforation of these perivaginal abscesses. If inflammation and ulceration of the edges set in, there is generally great œdema of the vagina, and a foul, purulent lochia. Defecation is at times painful. In the cases I have seen, considerable fever of a remittent type has invariably been present; union by first intention without traumatic fever is yet possible, for rapid cicatrization has been repeatedly observed (by C. Braun and Ruhfus), even with the more extensive rents. The issue of these lesions may accordingly be complete spontaneous cicatrization, or ulceration with

perivaginal abscesses and perforation of the latter into the adjacent organs, or, finally, death from repeated hemorrhages, or from sloughing of the surrounding parts.

Diagnosis.—The smaller vaginal lesions, especially such as owe their origin to the forceps, are easily overlooked, owing to the absence of subjective symptoms; the longer fissures are often discovered by mere chance. Œdema of the vulva on one side, if not attributable to puerperal ulcerations, is an important indication of fissure. A digital examination should here be made, by which means the wound is readily felt, and its length, depth, and the character of the edges accurately determined. The introduction of the speculum is dangerous, because the parts already adherent are again torn asunder by the dilatation of the vagina. At the most, only the half-specula used in operations for vaginal fistulæ, Sims's metal blades, or Simon's fenestrated specula, should be cautiously employed. On the other hand, examination with the finger in the rectum, or with the catheter in the bladder, in order to ascertain exactly how far the rupture or contusion extends into these organs, is indispensable. The conversion of these lesions into ulcerations can readily be determined by the temperature, the irritation of the adjacent parts, and by the more severe subjective symptoms that supervene.

Etiology.—The lesions described occur: First, in cases of narrow, unyielding vaginal canals in old primiparæ and in such as have suffered for a long time from severe inflammatory catarrh of the vagina, especially when the passage of the head is rapid; a rare instance of this description I will insert among the cases of recto-vaginal fistulæ. Secondly, in stenoses of the vagina, the result partly of cicatrization, and partly of constriction produced by neoplasms and congenital stenoses, especially of the vagina (Stein, Doherty). Thirdly, after sloughing of the vagina from firm impaction of the child's head. Fourthly, after use of the forceps. Sharp incisions are made in the anterior and posterior walls on one or both sides with the edges of the blades, either from too great elevation of the handles, or when a transverse position is corrected by rotating with the forceps; they are usually produced by one edge of the blade, and generally by the one lying at the

outset most to the front; for instance, in the first head presentation, posteriorly and to the right side of the vagina (*vide* case appended). These incisions are 1–4 ctm. long and 5–7 mm. deep, have sharp edges, and, if bilateral, their distance apart corresponds to that of the blades. If rupture of the perineum is caused by the forceps during extraction, other lesions may, nevertheless, coexist, even though not clearly distinguishable from the former. Von Franque found that spontaneous ruptures of the vagina were quite as common as those consequent upon operations. The lesions produced by the first three of the above causes and by the occasional projections from the bony pelvis, are rare, their relative frequence not amounting to more than one per cent. of all the causes. Those attributable to the use of the forceps are certainly more common than is stated in statistics (compare with this statement the extremely interesting case reported by L. Mayer and H. Strassmann). This last form I have seen three times. Fifthly, bony splinters from the child's skull, after perforation with the trepan, may lacerate the vagina; many lesions of this nature are caused by the use of the hook.

Prognosis.—In small fissures and contusions of the vagina the prognosis is generally good; they soon heal without any evil consequences. Even fissures many inches long sometimes heal rapidly without a suture or the least reaction (Schnakenberg). Inflammation, however, often attacks the edges of the wound, and from the resulting ulcerations vesical or rectal fistulæ sometimes develop; yet without these complications the subsequent condition often gives rise to a persistent fever and great exhaustion in childbed. Fistulous passages sometimes result from the imperfect healing of such wounds; these greatly exhaust the sufferer by the profuse suppuration. The capacity of the pelvis is restricted by these inflammations and hypertrophies, whereby the course of the subsequent births is rendered dangerous to mother and child (Mayer and Strassmann). This may arise from extensive cicatricial contractions of the vagina due to ulceration of the fissure after diphtheria or sloughing.

Treatment.—With small fissures, ulceration must be prevented by scrupulous cleanliness; for this purpose tepid (80°F.)

vaginal injections of chamomile tea, a decoction of linseed, antiseptic fluids, or even simple water, are to be prescribed. Towards the end of childbed hip-baths may be taken. Should ulceration set in, direct applications must be made to the ulcerating surfaces, in addition to the injections, to which latter astringents must be added, such as a decoction of oak bark (a teaspoonful of decoction gr. xx–℥j in each injection). Pledgets of charpie soaked in spts. of camphor are to be applied to the ulcers three times a day after the employment of the injections. A daily evacuation of the bowels must be insured by enemata, and, if there is retention of urine, the catheter must be used to prevent laceration of the ulcers by the distension of the bladder or rectum. This treatment may be applied likewise to contusions of the vagina. If, on the other hand, extensive fissures exist, and the vagina is sound, it is well to bring the edges of the wound together at once with interrupted sutures, provided the tear is recognized early. Sims' speculum is to be used in this operation, while the position for lithotomy is maintained. Subsequent injections are only needed, as in ruptures of the perineum, when offensive lochia must be washed away. With high fever and imperfect action of the enemata, neutral salts and digitalis may be administered internally and followed up by castor oil or small doses of calomel.

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RECORD OF CASES.

No. 1. *6th child, 1st occipital presentation. Extraction of the child with forceps, during which an incision was made in the wall of the vagina by the posterior edge of the right blade. In childbed; paravaginal abscess with discharge of pus through the perineum on the 9th day. Remittent fever. Recovery in* 4 *weeks.*

Caroline Dobbertin, 38 years old, was admitted on March 29, 1864. 6th pregnancy. Three of her children had been born dead.

The 6th labor began on June 11, 1864, at 4 A. M. Temp. 99.4° F. Distension of abdomen was considerable. Fœtal heart sounds on left side of abdomen, limbs on right side; head was directed to the left at first. The left lateral posture was consequently enjoined.

7 A. M., temp. 99.5°. 8.30 A. M., temp. 99.7°. 10.30 A. M., rupture of membranes; head engaged; temp. 99.7°. 11.30 A. M., anterior lip of os was much swollen. 12 M., temp. 99.7°; pulse 85; fœtal heart sounds 132. Pulv. Doveri, gr. v, for extremely violent pains. Temp. 99.9°; pulse 92.

12.45 P. M., os obliterated except the swollen anterior lip, which was retracted over the head.

1.30 P. M., temp. 99.9°; pulse 100; heart sounds fell from 132 to 106 beats at 1.45 P. M., became notably weaker; meconium in the escaping waters. Interference was, therefore, called for. On application of the forceps the sagittal suture was still in the right oblique diameter of the pelvis. Rotation of the head about the perpendicular axis slowly took place. The child was born just before 2 o'clock, and was greatly asphyxiated. Venesection from the umbilical cord and inflation of air resuscitated him. There was quite a severe hemorrhage just after removal of the after-birth, which was successfully treated with cold water injections. The boy weighed 8½ pounds; circumference of head 14 inches. 6.30 P. M., vaginal temp. 100.8° F.

Childbed.—June 12, A. M., temp. 102.7°. The very full bladder was emptied with the catheter; violent after-pains; moderate hemorrhage; perineum intact. P. M., temp. 103.3°. At midday spontaneous micturition, warm water compresses to abdomen. The child, which had not taken the breast, died of convulsions.

June 13, A. M., temp. 102.2°. On searching for the cause of the œdema of the right labium, a small fissure, ¾ inch long and ⅛ inch deep, was found on the right side of the posterior vaginal wall about 2 inches from the entrance of the vagina. P. M., temp. 104°; pulse 132.

June 14. Greater œdema of the right labium major. The whole perineum, especially on the right side about the promontory of the right ischium, was swollen, red, very painful to the touch, and œdematous.

A. M., temp. 102.6°. P. M. 104.4°. Vaginal injections were ordered and compresses wet with lead-water and laudanum (1:30 aq. plumbi) on the external genitals.

June 15, A. M., temp. 101.1°. P. M. 103.5°.

June 16, A. M., temp. 101.8°. P. M. 105.4°. Quite an amount of purulent discharge from the vagina.

June 17. Distinct fluctuation in the middle of the inflamed tissues. Continue lead-water compresses. A. M., temp. 101.8°. P. M. 106.5°.

June 18, A. M., temp. 102.7°. P. M. 105.3°. Pain in perineum only felt by patient when on her back.

June 19, A. M., temp. 102.7°; pulse 104. P. M., temp. 104.4°; pulse 102.

June 20. During the night an abscess broke to the right of the middle of the perineum and discharged considerable pus. A sound could be introduced through the small opening, beside the right vaginal wall, about 5 inches deep, into the abscess, yet no communication could be discovered between the cavity of the abscess and the vaginal ulcer, although the infiltration of the vaginal wall and of the perivaginal cellular tissue extended as high as this lesion of the vagina.

A. M., temp. 98.7° } Involution of the uterus, in the mean
P. M., " 103.3° } time, is proceeding normally.

June 21, A. M., pulse 108; temp. 103.3°. P. M., pulse 112; temp. 103.8°.

June 22, A. M., pulse 112; temp. 99.7°. P. M., pulse 104; temp. 104.2°.

June 23, A. M., pulse 92; temp. 100.2°. P. M., pulse 112; temp. 104.4°.

June 24, A. M., pulse 90; temp. 100.8°. P. M., pulse 112; temp. 105.3°.

June 25, A. M., pulse 70; temp. 100°. P. M., pulse 96; temp. 100°.

June 26, A. M., temp. 99.7°. P. M., temp. 100°.

Vaginal injections of chamomile tea, enemata, and warm water compresses on the abdomen.

On July 1st, the fistulous abscess appeared to be almost closed. Patient now took a hip bath with decoction of oak bark every evening.

On July 12th, the abscess opening was healed; a little proud flesh on the cicatrix, which was removed by cauterization with solid nitrate of silver.

The cicatrix in the vagina was so small that it could scarcely be found, the vaginal wall being no longer swollen. Patient was therefore discharged cured.

Lesions of the Vagina communicating with the Neighbouring Organs.

Urinary Fistulæ of the Vagina.

By urinary fistulæ of the vagina are meant those lesions which effect an opening from any point of the vagina into the urinary passages, so that the urine escapes into the vagina. To this group, therefore, belong the urethro-, vesico-, and uretero-vaginal fistulæ. Together with these I shall also discuss utero-vesical and uretero-uterine fistulæ, in order to avoid repetitions.

Anatomical Condition.—Urethro-vaginal fistulæ are round or transverse openings into or below the sphincter vesicæ, rarely exceeding the size of a pea or bean. They are found alone or associated with vesico-vaginal fistulæ. Their edges are pale or red, and in general sharply cut. *Vesico-vaginal fistulæ* may of course be much larger, and vary in size from a pin's head to the complete absence of the posterior wall of the bladder. The shape of these fistulæ is square or round; less frequently they assume the form of long fissures, and occasionally they are half-moon shaped or quite irregular apertures. They are, as a rule, simple openings, and not long passages. Their edges are at the outset jagged, swollen, very red, and bleed readily on being touched. When completely cicatrized, however, they are quite smooth, hard, and often sharp as though cut with a punch. Their seat is most frequently in the base of the bladder just above the end of the urethra. They are usually located in the median line, more rarely to one side. They are less commonly found in the anterior cul-de-sac of the vagina, in front of the anterior lip of the os, or perhaps a little to one side.

At times several large distinct vesical fistulæ coexist, divided by broad or narrow bridges of tissue. These last adhere to the anterior vaginal wall, so that one fistula often results from two. As a rule the vesical and vaginal orifices of the fistulæ are about equally large, though the former is often smaller

than the latter. The reverse may, however, exist, so that the fistula looks funnel-shaped from the bladder. When the loss of substance in the posterior wall of the bladder is great, an inversion of this organ through the opening often results, and the capacity of the bladder is considerably decreased.

The *uretero-vaginal fistulæ* are smaller and lie higher than the vesico-vaginal; they are either round or oval, and are located in the vaginal cul-de-sac, on one side or the other of the cervix. *Utero-vesical* or *utero-vesico-vaginal fistulæ* are still rarer than the above. They form either round holes with sharply cut edges, or irregular openings. Their size sometimes corresponds precisely with the contusions that are found upon a child's head that has been driven through a contracted pelvis; a similar lesion then often coexists on the posterior wall of the bladder. (Stoltz.) Finally, *uretero-uterine fistulæ* may occur. These are generally long passages, which open like a funnel toward the inner surface of the uterus; their ends are covered with hemorrhagic extravasations, and in the uterus are surrounded by very red ulcerations of the mucous membrane. The ureter is then attached to the uterus by perimetric exudations, and often dilated above the point of communication.

Symptoms.—When urinary fistulæ suddenly form in the vagina, the most serious and prominent indication of this event is the involuntary escape of urine. Their development is, however, generally slow, and the trickling of urine is preceded by constant desire to micturate, pain during the process, retention of urine, abdominal pains, and symptoms of peritonitis. The vagina is at first swollen, painful, and very sensitive to the touch, especially in a circumscribed spot; sloughing ensues, and with the detachment of the slough the involuntary escape of urine suddenly takes place, commonly in the very first week. "Still, as happens with many processes in an organism capable of so numerous variations, cases occur where the passages develop insidiously with the complete absence of all the above symptoms, and, at a time when it is thought by both the woman and her medical attendant that all danger is passed, the former is suddenly overwhelmed with misfortune, and the latter with alarm and terror." (W. A. Freund.) The

trickling of urine varies according to the seat and size of the fistulæ; the smaller the size and the higher the location the longer can the patient hold her urine. With very small fistulæ she sometimes voids it chiefly through the urethra. With large fistulæ the urine dribbles or gushes out according to the activity of the renal secretion. Many can retain their water while recumbent, but lose it quickly in the upright posture. With urethro-vaginal fistulæ the urine escapes through the opening, as a rule, only during the voluntary evacuation; yet when the vagina is greatly contracted by cicatrices it very frequently happens that the urine passes off involuntarily, in consequence of the dragging on the neck of the bladder. With uretero-vaginal fistulæ there is a constant flow of urine into the vagina, but the bladder is occasionally filled and must be evacuated. An alkaline decomposition takes place very rapidly in the urine that flows into the vagina, so that women thus afflicted emit an extremely offensive odor. Any fissures of the mucous membrane that may be present become discolored, have a grayish fatty appearance; the external genitals become swollen and œdematous; an erythema, abscesses, even croupous ulcerations appear on the perineum and the inner surface of the thigh. The vagina below the fistula has often been found encrusted with urinary salts, and at times even with considerable concretions. (Petit, Wendt and Saxtorph, Boeck.) Losses of substance in the lips of the os uteri and in the vagina, stenoses of the vagina, adhesions of the different parts of the latter, broad cicatricial bands, and subsequently displacements of the uterus arise from ulceration.

Severe pain and considerable fever attend the formation of fistulæ due to sloughing of the contused portions of the bladder and vagina; the dead shreds of tissue are found in the discharge. Serious hemorrhages often take place from the edges of the wound or from the velvety red mucous membrane of the bladder; these may arise later from ulcerations of the vagina. Colds and fevers are caused still later by the wetting of the chemise, petticoat, shoes and stockings. Jobert has mentioned constipation as an unusual symptom that might torment the patient, and attributed it to the permanent con-

traction of the rectal tissues induced by the irritation of the urine. (?) W. A. Freund's explanation is certainly more correct, according to which this symptom is connected with an increase in the elimination of urine, which may be presumed to exist with urinary fistulæ from analogy with the augmentation in the secretion of other organs excited by its rapid and uninterrupted discharge. All these causes combine to debilitate the patients; they lose flesh, look pale, grow prematurely old, the fetid odor disseminated rendering them a nuisance to themselves and others. Low-spirited and shunned by mankind, they lead a miserable existence.

It is incorrect, as shown by Esmarch, to assert that a vesico-vaginal fistula always produces sterility. I am acquainted with two women who have both suffered from large vesico-vaginal fistulæ, and yet have subsequently given birth to children. (*Vide* Case No. 2.)

With small fistulæ, the discomforts enumerated are all much more insignificant; women can retain a moderate amount of urine, and sometimes, by means of tampons inserted in the vagina, prevent its escape altogether. Death rarely results from vesico-vaginal fistulæ in themselves. Women commonly keep about with their burden for years and even decades, and if not relieved by operation, finally succumb to premature decrepitude or intercurrent affections. The ruin of the constitution depends in part upon the augmented elimination of urine, in part upon the consequences of colds, ulceration of the genitals, and upon the desperate state of the patient's mind.

Diagnosis.—Urethro-vaginal fistulæ are easily recognized by sight, touch, and by introducing a catheter; the same is true of large vesico-vaginal fistulæ. In order, however, to determine precisely the size, shape, location, and the character of the edges, the patient must be brought into the position for lithotomy, with the pelvis considerably elevated. This is called by Simon the dorsal breech position. The posture *à la vache* is at all events suitable for fistulæ that are high up or to one side. Sims' metal specula or Simon's lateral elevator may be used to bring the opening into view. When the fistula is high, the uterus should be drawn down by a hook. A metal

catheter is then introduced into the bladder and an attempt made to feel or see it through the rent, or to pass it through the opening. In obscure cases, the injection of milk will be required, by which means vesico-uterine fistulæ may be diagnosticated. Simpson recommends that these should be made accessible to the finger by the insertion of sponge-tents into the cervix. Uretero-vaginal fistulæ may be with certainty assumed to exist if the patients now and then micturate spontaneously, although the urine is constantly escaping; further, if the milk injected into the bladder does not flow into the vagina, if the seat of the fistula is in the vaginal cul-de-sac; finally, uretero-uterine fistulæ, when the urine issues from the womb, are recognized in the very same way.

Etiology.—Most of the vesico-vaginal fistulæ occurring among women in childbed have their origin in the fall of these portions of the posterior wall of the bladder or anterior wall of the vagina, which have sloughed owing to the great pressure to which they have been subjected during delivery. The opinion expressed by Ch. West in 1858, "that the vast majority of these lesions result from the *too long postponement of instrumental interference*" has been recently corroborated by Simon. A vesico vaginal fistula is not caused by the instruments employed, but by the fact that medical aid arrives too late. Baker Brown's experience confirmed this view. We consequently find this trouble chiefly in cases where there is a disproportion in the size of mother and child, whether it be that the child's head is too large (hydrocephalus) and too hard, or the pelvis too narrow; this is especially true when deficient contractile power of the uterus gives rise to an abnormally long compression of the parts in question. Thus urinary fistulæ have often been caused by a face presentation (*vide* Case No. 2) since a dangerous pressure is readily exercised by the sharp angle of the fœtal jaw, and particularly since a contracted pelvis is often found in face presentations. Hecker claims to have discovered a predisposition to severe contusions also in an unusually high symphysis pubis. Esmarch's assertion that a pendulous abdomen during pregnancy often leads to sloughing of the parts alluded to above, may be refuted by the fact that vesico-vaginal fistulæ would in this

case be of much more frequent occurrence. At all events, Esmarch goes too far when he affirms that a neglect to attend to the pendulous abdomen is the "most frequent" cause. There are a great many fistulæ of this kind whose origin may be traced to the *premature or awkward use of instruments.* Such occur especially in multiparæ, when many fruitless attempts have been made with the forceps, and yet the delivery has at last terminated spontaneously. In these instances, the fistulæ generally originate indirectly as the result of sloughing from pressure, occurring less frequently, though more often observed, from direct rupture of these parts or their perforation with the forceps, with the blade of the cephalotribe, or with the sharp hook; furthermore, by the perforator or by means of the splinters of bone which are made during perforation of the child's head. (Saxtorph and Wendt in Froriep's *Notizen*, Bd. xii. 1826, p. 265.) Puerperal ulcers, especially if gangrenous, and pelvic abscesses often result in vesical fistulæ, as was recorded of a utero-vesical fistula by Simpson. Perforation of the vesical and vaginal walls may also be produced by forcible catheterization when the head is firmly pressed against the symphysis (Dieffenbach). The origin of vesical fistulæ has also been attributed to vesical calculi, long-worn pessaries, and syphilitic ulcers in the urethra (Habit), but these last-named causes will be considered elsewhere.

The occurrence of several vesical fistulæ in one person may be explained, in part, by the mortification of successively contused spots, for instance, from compression of the anterior vaginal wall, first against the upper border of the symphysis, and subsequently against the arch of the pubes, and in part by the simultaneous contusion of many points, for instance, of the posterior wall of the bladder against the upper edge of the symphysis, and of the ureter against the promontory of the sacrum. Upon the separation of the slough from a large contused surface, one or even more bridges may remain behind, since it rarely happens that all the compressed parts have been equally crushed; thus several holes may originate from the compression of one spot.

Plater and Mercatus are said by W. A. Freund to have made the first mention of fistulæ of the bladder in the 17th

century. Vesico-uterine fistulæ were first described by Stoltz in 1828, and subsequently by Harrish, Michaelis, Simpson, and Simon. Uretero-vaginal fistulæ have been observed, so far as I know, but five times, by Alquié, Panas, Simon, and Hegar; finally uretero-uterine fistulæ by Bérard, Puech, and W. A. Freund.

Vesico-vaginal fistulæ occur once in 1000 births. In my own practice I have had but two cases. Hugenberger met with only 3 in 94 cases of contracted pelvis out of 8036 deliveries. Ryan observed 10, but Clarke met with only 4 cases in 10,000 deliveries. They are more common in countries where contracted pelves are common, and also where prompt medical attendance cannot be secured. This seems to be peculiarly the case in America, as has been pointed out by Freund, and also in Russian Poland, whence many women afflicted with fistulæ seek Germany to procure deliverance from their torments.

Prognosis.—Urinary fistula must always be regarded as a severe affliction, owing to the many annoying symptoms attending the trouble and the impairment of strength entailed, while the moral effect upon the patient is equally unfavorable. A spontaneous cure has been several times reported, for example, by Peu, Ryan, Blundell, and recently by Schupp, yet these are rare exceptions. My father saw a woman with a narrow pelvis and a face presentation of the child, who subsequently had a vesico-vaginal fistula, that healed spontaneously after the next delivery (perhaps in consequence of a new contusion). The prognosis is in general better with the smaller, lower located fistulæ than with the higher and larger; in the latter class, however, we have gradually arrived at brilliant results in modern times. Urethro-vaginal fistulæ are favorable and easy to remedy when they are uncomplicated; very unfavorable, on the other hand, are the uretero-vaginal fistulæ, because of their high seat and the proximity of the peritoneum. The operations for the relief of fistulæ have been brought to such perfection in our day that a cure has been effected in 85 per cent. of the cases. G. Simon, up to the autumn of 1868, had treated with complete success 104 out of 118 fistulæ, reduced 5 others to small dimensions, 2 patients being discharged as

incurable, and 6 cases terminating fatally. Several of the patients have since borne children without rupture of the cicatrix (*vide* Holst, *l. c.*). Wilms has cured 12 cases; Spiegelberg 7 out of 10 women, Baker Brown 43 out of 55 (by 1–3 or more operations), 2 died and 5 were not cured. The results of Jobert de Lamballe, who cured 37 out of 72 patients with 17 deaths and relieved 15, are less favorable but still good. The results of the Americans Sims, Hayward, and Bozemann are also very satisfactory, but not quite so good as Simon's. The experience of this last author is very interesting and important, as showing that a half inch of healthy vesical and urethral wall is all that is necessary to enable the surgeon to relieve the incontinence of urine. This point is made clear by the investigations of Uffelmann (*vide* Simon, *l. c.*), which show that the female urethra possesses, in addition to the mucous membrane and the organic circular fibres, a layer of striated muscular tissue, which overlies the organic layer, and consists of internal transverse and external longitudinal fibres. The transverse fibres, forming the external voluntary sphincter, encompass the anterior half of the urethra, including the orifice.

In the cases which have terminated fatally after operation the cause of death has generally been septicæmia, owing to suppuration of the cellular tissue between the bladder, uterus, and rectum with or without a subsequent peritonitis. Conception is occasionally rendered impossible by cicatrization after the operation, for instance, in case the posterior lip of the os should unite with the lower edge of the fistula, or when the complete obliteration of the vagina has been necessary. After such operations, as well as after extreme stenoses of the vagina, satisfactory cohabitation is at times impossible. Women very soon after their recovery lead a new life, and often gain strength and spirits so amazingly that they are scarcely recognizable. Catarrh of the bladder sometimes follows complete obliteration of the vagina, owing to the flow of the menstrual blood through the urethra; such mishaps are easily corrected, and, like other unfortunate results, are so insignificant in comparison with the blessings conferred by the operation, that they need not be taken into account.

Treatment.—In the early stage of childbed, when as yet no thought of surgical interference can be entertained, inflammations of the vagina, bladder, and uterus, if present, must be allayed, the most scrupulous cleanliness be effected by regular evacuation of the bladder, and if the fistula is small, by the aid of mucilaginous injections (decoction of linseed) into the vagina, and by hip-baths. As soon as the lochia has diminished, the ulcerations may be stimulated by astringent injections of alum, tannin, zinc, or a decoction of bark, and cicatrization of the edges of the wound thus promoted. The appropriate time for the operation depends upon the physical condition of the sufferers. The operation has occasionally been performed with success within the first six weeks in spite of extensive inflammation (Abegg, Keiler, and others), but as a rule it must be postponed to a later period. Simon does not think that the menstrual period need be shunned. West advises waiting 3 months after delivery, because the tendency to inflammation of the adjacent organs is then less. The methods which have, of late years, been employed to bring about union of the edges are as follows:—

1. *Cauterization*, either with the *actual cautery*, with *nitrate of silver*, exceptionally with *creasote* (Emmert), tincture of cantharides, or the galvanic cautery (Habit, Simon, and others). After the rectum has been evacuated, the edges of the fistula are pressed down by a staff introduced into the bladder, and cauterized thoroughly for eight or ten seconds; a catheter is left in the bladder to carry off the urine; if union does not take place, the cauterization is not repeated until the slough has fallen off—the eighth day at the earliest. Occasionally one thorough cauterization is sufficient (Abegg), even with large fistulæ, when they are transverse and the edges not too far apart. Under ordinary circumstances the cautery is only suitable for small fistulæ and such as remain after a larger one has been operated upon, although even then Simon prefers to operate anew. Minturn cauterized in the most extraordinary way, first with the hot iron, then removed the slough and united the edges by means of needles and corks.

2. *Sutures.*—By these the most and best results have been won. The chief steps in the operation are: deep and extensive

scarification of the edges, and then their most careful approximation; both are feasible only when the whole fistula is in plain view. To effect this the patient is brought into the position for lithotomy, the pelvis being elevated. The fistulous opening is disclosed by depressing the posterior wall of the vagina with Sims' speculum, and pulling apart the lateral walls with Simon's levers, while they are drawn down by tenacula inserted into the vaginal walls and the lips of the os. The edges of the wound are then scarified, either throughout their entire thickness, or, according to others, only through the thickness of the vagina after this has been freed from the edges of the fistula (Hayward). Instead of the broad (up to 2 ctms.) and flat scarification of the vaginal mucous membrane, Simon practices a more perpendicular excision of the edges, only 1–1½ ctm. broad, which not only extends through the vaginal mucous membrane but up to and even through the mucous membrane of the bladder. There is as yet no unanimity as to the best material for sutures, for Wilms, Baker Brown, and the Americans prefer silver wire, while Simon adheres to silk sutures with the best results. Jobert de Lamballe's plan—*methode autoplastique par glissement*—by which the tension of the edges is relieved by longitudinal incisions in the vagina, has often been employed by its author with success, but has been supplanted in Germany by G. Simon's sutures for the relief of tension. These last are designed to hold the edges of large fistulæ together in order to prevent the sutures, that close the wound, from tearing out; they are inserted from without inwards about ½–1½ ctm. from each edge, whereas the common sutures are introduced under the mucous membrane of the bladder from within outwards. A still greater difference of opinion exists as to whether the mucous membrane of the bladder should be included in the sutures or not; Simon favors this step in many instances; Wilms is opposed to it. Rose asserts that the thread holes, which Simon repeatedly found, were made in this way. Heppner has also observed such fistulæ, of many months' duration, result from the thread holes. Simon, however, insists that these fistulæ are entirely due to the thickness and roughness of the thread; he maintains that

there is no difference between fine silk sutures and well-twisted wire, with respect to the intensity of the inflammation and suppuration subsequently induced. All small clots must be most carefully removed by cold water injections before the edges are approximated; the wounds are closed by tying the thread or twisting the wire, after which the ends are cut off short. Baker Brown makes use of quill sutures, as does Churchill; Heiberg has adopted serres-fines. The most universal method, at present employed, consists in knotting the ends of the sutures or wires. Marion Sims, Baker Brown, Habit, and Wilms insert a rubber catheter into the bladder and allow it to remain. Simon introduces the catheter once, evacuates the urine, makes a cold water injection to satisfy himself that the wound is well united, then withdraws the catheter to pass it subsequently three or four times a day if needed. Its permanent retention is unnecessary, according to Simon's more recent experiences. Many patients are unable to tolerate the presence of this instrument. Simon allows the sutures to remain 4–7 days before removing them, Baker Brown 9–10 days, Jobert, and also Wilms, even 2–3 weeks. Baker Brown removes them with the patient in the knee-elbow posture. Up to that time they maintain the dorsal, lateral, or semi-abdominal decubitus, and constipation is insured by the administration of a liquid diet: bouillon, milk, the yolk of eggs, and doses of morphine. The removal of the sutures is very tedious; if the threads do not come out readily, Simon advises cutting off the knots and leaving the sutures to be withdrawn later.

With uretero-vaginal fistulæ a cure must be sought by cauterizing with nitrate of silver, although the operation is difficult and risky from the proximity of the peritoneum. They are therefore more troublesome than more extensive vesical fistulæ, and Simon's proposal, to establish a large vesico-vaginal fistula behind the urethra and then to obliterate the vagina transversely external to it, is at any rate less dangerous than this cauterization.

The vesico-uterine fistulæ have been rapidly and repeatedly cured by Simon and others by thoroughly denuding the lips of the os uteri, and carefully uniting them by means of 7–10 sutures. The menses then flow off through the urethra.

In cases where the deficiency of the bladder and vagina is very great, and all attempts to unite the edges of the fistulæ directly by sutures are unavailing, the transverse obliteration of the vagina is an admirable and sure remedy. In this operation, the residue of the vesico-vaginal wall is united transversely with the denuded posterior vaginal wall, about 2–3 ctms. above the meatus of the urethra, and the posterior wall of the vagina is made the posterior wall of the reservoir for the urine. After extensive denudation (2–3 ctms.), 6–7 sutures are inserted through the bladder, entirely or in part through the recto-vaginal wall, and most carefully drawn together. This operation is more certain and less dangerous than episiorrhaphy, and is still applicable where nothing but the urethra remains.

The very brilliant results obtained in modern times by the operations just described have rendered all the other methods almost completely obsolete. This is especially true of the implantation into the fistulous opening of a flap from the vagina or from the external genitals (Jobert, Dieffenbach, and others); likewise of the employment of instruments to hold the edges of the fistula in apposition (Dupuytren, Laugier, Heiberg, and others); and finally of episiorrhaphy. In conclusion, I would refer the reader to Simon's different publications and writings on this subject, and also to the surgical treatises, in which a more precise description of the former methods may be found, and especially to the excellent article by W. A. Freund in *Betschler's Beiträgen zur Gynäkologie*, Heft 1, pp. 33–112.

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RECORD OF CASES.

No. 2. Contracted pelvis. Three spontaneously terminated deliveries; in the 4th, 2d face presentation; forceps because of perilous condition of the child; involuntary escape of urine many days after; large vesico-utero-vaginal fistula; cure after 5 years' duration (compare Simon, l. c., sub d. p. 178).

Frau Caroline Keller in Kurzesiefen near Gummersbach, 28 years old, small, blonde, poorly nourished in her youth, had been afflicted with various maladies, and had to perform severe tasks as a child. Before the appearance of the menses in the 19th year, she seems to have been very chlorotic for some time. The catamenia have always been scanty, recurring every 3–4 weeks, otherwise without discomfort.

In her 23d year, after a normal pregnancy and a duration of pains for 24 hours, she gave birth to a *live girl*, passed 4 weeks in bed, and nursed her child for a year. Her menses did not set in when lactation was discontinued, as she had again conceived.

The *second* pregnancy also ran its course normally, the child descended in a head presentation at the birth, and was born alive after a 7 hours' labor. She again suckled it for a year, and was perfectly well during the time; 2½ years later, for the 3d time, she gave birth after 10 hours of labor to a boy, and in 1859, she was pregnant for the 4th time. In this pregnancy she felt languid and exhausted, but improved in health toward the end. At the full term, on Aug. 24, 1859, at 2 o'clock at night, the pains set in; at 3 o'clock the liquor amnii escaped, and soon after the midwife arrived. *She repeatedly attempted to introduce a silver catheter into the bladder, because the woman complained of the pressure of the urine, but failed.* As she made out a face presentation, she sought my aid, and I arrived at 8.30 P. M. My efforts to introduce an elastic catheter into

the bladder were also ineffectual; the fœtus was so firmly impacted in the pelvis in the 2d face presentation, that the catheter could not be pushed up between it and the symphysis. On the left cheek, which was presenting, considerable tumefaction could be felt. I, therefore, applied the forceps, and with 1–2 tractions delivered a very large dead boy. The placenta was easily removed; no considerable hemorrhage occurred.

Three or four days later, the woman sent me word that she could not hold her urine, and, when I saw her again upon the 5th day, I could easily feel a vesico-vaginal fistula half an inch long, from which the urine continually flowed. The edges were rough, as though torn, and very tender. No more blood escaped. Particular attention having been paid to matters of cleanliness, the patient improved somewhat, and wore at first a sponge, and afterward urineaux; but these caused her so much discomfort that she soon gave them up.

In August, 1860, one year later, the patient gave birth for *the 5th time* with artificial help, my father being obliged to make use of the forceps. In the year 1862, she was delivered of a very small, imperfectly developed, child in a foot presentation, and finally, in April, 1863, she bore a child for the *7th and last time* after quite a natural course of pregnancy; the child was again small, and died four weeks after.

The pelvis was in high degree contracted, the distance between the spines amounted to 8″, the cristæ 10½″, the external conjugate 6½″, the diagonal 3″ 6‴–8‴, the left oblique diameter 7½″, the right 7″ 8‴. The conjugate of the plane of the entrance to the pelvis was estimated at 3″.

In the summer of 1864, soon after my removal hither, my father persuaded Mrs. K. to be operated upon here by my colleague Prof. G. Simon. In June, 1864, we found the lesion to be a superficial "*vesico-utero-vaginal fistula*," situated just before the anterior lip of the os, of which a portion was also destroyed; 2½ ctms. in length, and 3½ ctms. in breadth. My colleague Prof. Simon cured the woman at a single operation, by a very skilfully performed bow-shaped union of the posterior lip of the os uteri with the inferior edge of the fistula.

I saw the same woman again in the autumn of 1864. She had become so strong, active and cheerful, that the former sufferer was not to be recognized. Her menses were discharged regularly through the vagina.

No. 3. *Rachitic contraction of the pelvis, third pregnancy, perforation, cephalotripsy; sloughing of the vesico-vaginal wall, a vesico-vaginal fistula formed on the 7th day.*

A. G. Weberfrau, 26 years of age, in her third pregnancy, was healthy up to her 17th year, suffered for many years after

the appearance of the menses from chlorosis; in her 22d year she had an attack of pneumonia, in her 24th an abortion, and in the 25th brought into the world a dead child at full time. The 3d pregnancy began in the middle of February, 1862, and the pains upon Nov. 22, 1862, at 5.30 o'clock in the morning. 2d head presentation. The dolores præparantes were unusually painful; the dilatation of the os uteri very much protracted after the premature discharge of the waters. With a high position of the head and increasing exhaustion of the woman, an obstetrician, who was called in, attempted version and brought one foot into the vagina; the rotation of the child, however, failed in spite of all his efforts. On the 24th of November, 1862, 3.45 A. M., I arrived. The condition of the woman (very rapid pulse, high temperature, extreme anxiety, uterus very tender, nausea, etc.) made a rapid delivery imperative. I perforated through the greater fontanelle, which lay toward the left side, syringed out the skull several times with tepid water, applied the cephalotriptor repeatedly, and compressed the bones of the skull from every direction. In spite of that the extraction was difficult; I had to pull stoutly for a long time with the head in the 1st position; I found several times that the anterior edge of the blade of the instrument pressed too firmly upon the anterior wall of the pelvis, whereupon the direction of the traction was at once altered. At length the extraction of a large child, weighing about 8 pounds, was effected. The placenta soon followed; the hemorrhage was moderate. In the first days of childbed the patient was pretty well except so far as retention and pain upon catheterization were concerned, yet the discharge was very offensive. On the 6th–7th day a piece of the vagina almost as large as a thaler came away suddenly with the most abominable stench, and at once involuntary escape of urine ensued. The fistula was in the anterior cul-de-sac of the vagina. In spite of this the woman gradually recovered her strength, and I have repeatedly examined her since. As a big piece of the posterior wall of the bladder remained and the seat of the fistula was high, the patient was able to retain her urine for some time, yet when a large quantity of urine was voided, it escaped in greater quantities. Her habits were extremely neat, however, so that no excoriations or ulcers formed; her condition at a period of six months after the delivery was perfectly good, despite the size of the fistula, through which the forefinger could be introduced into the bladder; for this reason it was not possible to bring her to submit to an operation for the fistula.

Fecal Fistulæ.

Anatomical Condition.—The communications of the vagina with the rectum, through which fecal masses and gases pass into the vagina, are found in the lower portion of the vagina as well as in the vaginal *cul-de-sac.* The former are the so-called *recto-vaginal* fistulæ, the others are either openings which lead into the sigmoid flexure, which is forced down, or into the small intestine.

The latter are for the most part smaller apertures, like the uretero-vaginal fistulæ, or short passages. The recto-vaginal fistulæ exhibit many varieties of simple holes from the size of a bean to that of a thaler, or narrow, shorter or longer, oblique, tortuous, even branching fistulous canals. The larger are generally rather long, more rarely round, and often associated with ruptures of the perineum. The rectum gives way, as a rule, in those places where it is directly connected with the vagina by close cellular tissue; the sphincter ani remains intact and forms a narrow bridge between the vaginal and perineal ruptures. Occasionally these fistulæ are small at first, but they often become larger from the passage of fecal masses, and fistulous canals form running parallel to the rectum toward the perineum. Their edges are sharp and smooth, or rough, according to their mode of origin; the smooth fistulæ gradually become hard, after a while, and callous from cicatrization; the orifice then appears as a firm ring, which is reddened or in isolated spots excoriated. Very rarely openings occur in the inner surface of the uterus, which communicate with the intestine, and through which the contents of the intestine pass into the genital passage. (Simpson's, Scharlau's, and Demarquay's cases.)

The *symptoms* in recto-vaginal fistulæ are commonly less ominous than in vesico-vaginal fistulæ. If the fistulæ are small, they give passage to gases; if large, fluid and even solid fecal masses escape per vaginam. Upon the mucous membrane of the latter ulcerated spots then form; the genitals may swell, become painful, and the lochia fetid. In severe lesions these appearances are developed at an early stage. If the communication takes its origin in an abscess or in a

sloughing of the vagina, pain, fever, an ichorous discharge, tenesmus, the swelling of hemorrhoids precede those symptoms, and the patient does not, till afterwards, perceive the involuntary escape of flatus and feces. In time the condition of such sufferers becomes just as unendurable as if they were afflicted with vesical fistulæ, but they do not lose so much flesh, and by a strict attention to diet, the avoidance of flatulent and laxative articles, and by scrupulous cleanliness, they can greatly diminish their sufferings. It is otherwise, however, with the higher and especially with the intestino-vaginal fistulæ. These commence with the symptoms of peritonitis or acute stricture of the rectum; in exceptional cases only slight abdominal pains are felt, and, after they have persisted for a while, perforation results and semi-fluid, inodorous, yellowish masses, at times more fecal in character, escape for several hours after each meal. The intestinal and vaginal inflammation commonly attending this lesion still continues. Sloughing shreds of tissue appear for a long time in the acrid, offensive, ichorous purulent discharges; half digested masses escape through the openings, and severe pain is occasioned by the corrosive nature of the secretion. The discharge from the anus sometimes ceases entirely. Women lose their appetites, their strength, show derangements of digestion, especially after indulging in food of a flatulent character, suffer from evening fever, and finally die from exhaustion, if seasonable relief be not afforded, or from peritonitis after operation.

The *recognition* of fecal fistulæ, located in the lower portion of the vagina, is not difficult. The patient is very soon aware of the escape of flatus through the vagina. If, to begin with, the posterior vaginal wall has been carefully explored with the finger, and the opening felt, the introduction of one finger into the rectum, and the passage of a sound from the vagina into the rectum, is sufficient for the recognition of the fistula. If, however, the fistulous opening is too small to allow this procedure, injections of milk should be made into the rectum, and the vagina exposed to view with a half speculum or lateral spatula to decide whether and where the fluid finds its way through. These injections serve to diagnosticate recto-vaginal from intestino-vaginal fistulæ, since in the latter the milk

does not flow off per vaginam, even though feces and flatus escape by this route. Intestino-uterine fistulæ can only be assumed when it has been proved to a certainty that the vagina is nowhere injured, and that the secretion flowing from the os uteri contains feculent matters or the unmistakable débris of food. These cases are exceedingly rare, yet Simpson's advice to dilate the cervix uteri by sponge-tents and laminaria, in order to explore the inner surface of the uterus as far as possible with the finger, and recognize the presence of an aperture, is a valuable one. Demarquay felt, in the case reported by him, at the junction of the neck with the body of the uterus, an opening through which a metallic sound readily passed so as to be felt through the abdominal walls.

Etiology.—Fistulæ between the small intestine and vagina were discovered by Roux and by Casamayor after rupture of the vagina with prolapse of a convolution of the small intestine in a state of slough. Intestino-uterine fistulæ originate in the same way after rupture of the uterus and strangulation of an intestinal convolution (M. Keever). Simpson observed a utero-intestinal fistula after a puerperal pelvic abscess, Demarquay after a difficult embryotomy. Scharlau found in the fundus uteri, at the autopsy of a woman who had died of "*putrescentia uteri*" (*Mschrft.* xxvii. p. 9), the aperture of a perforation, as large as a florin, surrounded by thin, jagged, discolored edges, and a small opening corresponding to it in the wall of the rectum which was adherent; at the place spoken of, the muscles were entirely destroyed by a process of sloughing proceeding from the inner surface of the uterus. Recto-vaginal fistulæ occur much more frequently, in part spontaneously, from the *direct* rupture of narrow unyielding vaginal canals, or from wounds with instruments (hooks, the edges of the forceps, cephalotribe) and in part, *indirectly*, from ulcers and abscesses which, starting in the vagina, perforate the rectum; these occur very rarely after incarceration and sloughing of the sigmoid flexure. They are sometimes found after recurrent peritonitis, and after suppuration of an extra-uterine ovum (Baker Brown).

The *prognosis* is unfavorable in intestino-vaginal and utero-vaginal fistulæ. Roux made an attempt to free the convolu-

tion of the small intestine from the vagina by laparotomy, and to obliterate the fistula by intussusception, but the operation failed utterly, and the woman died. The recto-vaginal fistulæ are far more favorable, spontaneous cure having been much oftener observed than in vesical fistulæ; for instance: Kiwisch, Ruysch, Fichet, de Flechy, Capuron, Deschamps, Busch, met with it many times; I too have seen one case (*v.* No. 4). Recto-vaginal fistulæ, that have obstinately resisted many attempts at cure, have sometimes healed spontaneously. Philippe's case is remarkable in this connection. When the loss of substance is very great, a cure is certainly most difficult, if not impossible; on the other hand, with the smaller ones it is simpler, speedier, and surer than with urinary fistulæ. Finally, fecal fistulæ, that have healed, may recur at a subsequent delivery. (Case of Baker Brown's.)

Treatment.—If vaginal ulcers and abscesses occur after delivery, they must be carefully cleansed; the excretions must be early evacuated, and wounds be incited to a speedy closure by granulation through the introduction of wads of charpie saturated with wine of champhor; by this means the formation of fecal fistulæ may be prevented. The fecal masses are first to be softened by repeated enemata, then fully extracted, and defecation suspended for several days, by the aid of opium. If the lesion is perfectly fresh and large, it should be at once closed with the interrupted suture (silk or wire), so that the denuded and smoothly cut edges of the wound are retained in apposition throughout their whole thickness; scrupulous cleanliness is to be insisted upon. The suture may be introduced *from the vagina*, or, as I have seen successfully proformed by Prof. Simon, *from the rectum*. Simon considers this method of closure indicated in all fistulæ of the recto-vaginal wall, and in transverse and longitudinal fistulæ in the middle portion, if access through the vagina is difficult owing to contraction. In the after-treatment quietude of the bowels is to be secured, the sutures are to be left 6–8 days, and only liquid nourishment administered. If defecation cannot be hindered, the discharge of the feces must be facilitated by castor oil and enemata. In small recto-vaginal fistulæ that do not heal spontaneously, cauterization with nitrate of silver or the

actual cautery, has had the most admirable results; this should be repeated every 8–14 days. Cicatrization may be promoted by astringent injections into the vagina; Velpeau cured a fistula of this kind in 14 days by injections of red wine. With small deep-seated fistulæ, which resist cauterization, incision through them into the sphincter ani, and if the residue of the perineum is narrow, even division of the perineal bridge is essential to recovery. Simpson cured an ileo-uterine fistula by cauterization with nitrate of silver after dilatation of the os uteri. Demarquay discharged his patient with an India-rubber apparatus for catching the masses that escaped from the uterus.

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RECORD OF CASES.

No. 4. Rigidity of the vagina; a recto-vaginal fistula occurring spontaneously during delivery, and healing in 14 *days without operation.*

J. M., a large, strong primipara, aged 28 years, who had in former years been repeatedly under treatment for *obstinate catarrh of the vagina*, was delivered at the normal termination of pregnancy. The os uteri was very rigid; the liquor amnii had been discharged at the commencement of the labor; the head only passed the os uteri very gradually in the 1st occipital presentation. In the 2d period it advanced quite as slowly, and, from the slight overlapping of the bones, and the small tumor, notwithstanding the long duration of the delivery, it could be recognized as being large and hard. After the 2d period had lasted about 3 hours, the occiput began to press upon the perineum. The rectum opened, its anterior wall was driven down, and, immediately after a pain, a laceration of the mucous membrane about the size of a pea made its

appearance, became larger with the next succeeding pain, and finally resulted in a *complete perforation of the recto-vaginal wall.* With the second subsequent pain this became almost as large as a thaler; the child's hair was visible, and the next moment the head passed through the vulva simultaneously with the formation of a large perineal rupture, which nevertheless only extended to the sphincter ani. The child, born alive, weighed 8 pounds, was very strong, and the biparietal diameter measured $3\frac{3}{8}$ inches. Immediately after delivery the index finger could be readily inserted through the vaginal rupture into the rectum, and then brought out of the anus. The perineal rupture was closed by 4 sutures and healed almost completely. Constipation was induced by laudanum. The woman nursed her child; the lochia was not offensive, she did not notice any escape of flatus, and when on the 5th day an enema and castor oil were given, defecation took place through the natural channel. She was discharged in 14 days. *The recto-vaginal fistula had healed spontaneously per primam intentionem without sutures.*

Lesions of the Vaginal Cul-de-sac and of the Uterus.

We cannot undertake to discuss at length all the ruptures of the uterus and of the vaginal cul-de-sac, for these are principally lesions complicating delivery, and are, therefore, more appropriately considered in connection with the affections incident to childbirth, since the severer accidents of the kind generally terminate speedily in death, so that there can scarcely be a question of treatment in childbed. There is, however, a class of lesions in these parts which are of frequent occurrence, and more rarely have a fatal termination; to such belong, primarily, the *deep fissures of the os uteri*, and many perforations of the cervix uteri by attrition, which are not very uncommon, yet are easily overlooked or are obscured by the symptoms of peritonitis. The lesions of the uterus may be practically divided according as they are produced by perforation, by attrition, and by rupture. *Perforations* are more or less round losses of substance, their edges ragged or smooth, at times looking as though cut out with a punch. They vary from the size of a pin's head to a circumference of one and a half inches; they are mostly located in the posterior uterine or vaginal walls, exceptionally in the anterior, and correspond generally to the promontory of the sacrum. They result from

the separation of sloughs caused by pressure, or from ulcers which perforate the vaginal or uterine wall from within, as well as the peritoneum.

Lesions due to *attrition* are, on the other hand, chiefly transverse fissures on the inner surface of the cervix uteri, or at the point where the vagina is inserted into the uterus; their size is very varied, from $\frac{1}{8}$ inch to a circular division of the vaginal cul-de-sac or of the uterine tissues, corresponding in its circumference to the whole pelvic brim. The peritoneum is frequently intact, even though the muscular wall of the uterus is already completely penetrated by the friction. These wounds occur generally in the posterior wall of the uterus and vagina.

Finally, by *ruptures* we designate lesions that have a sudden origin, that commence in the vaginal cul-de-sac, os uteri, or cervix, less frequently in other parts of the uterus, and may or may not be accompanied by laceration of the peritoneum. The edges of the fissure are generally ragged and swollen, as though infiltrated with blood; sometimes, in fissures of the os uteri for instance, they are often quite sharp. The direction of the fissures generally corresponds to the long axis of the organ; less frequently it is oblique, from the os uteri through the cervix into the vaginal cul-de-sac, or even through the base of the broad ligament of the uterus. The deep fissures of the os uteri often have their seat upon the left or right commissure of the lips of the os. Many of these different lesions may occur simultaneously; the longitudinal and transverse fissures, as well as the wounds due to rupture and to attrition (Lehmann, *l. c.* p. 436), may be found together. The parts adjoining the wounds have been shown, in many instances, to be thin, and to be very soft and wanting in tone in comparison with the other portions of the vagina and uterus. It is, however, often hard to determine whether the textural change always precedes the fissure, or whether it is the result of the prolonged pressure immediately before its formation. With reference to the possible occurrence of rents of the first kind, a condition described by Klob is worthy of attention. In longitudinal fissures of the uterine body he has many times noticed that the subperitoneal cortical layers (1–2″ thick) were fatty as the result of an antecedent perimetritis, and assumes

that this cortical layer, which during pregnancy proves a firm incontractile tissue, has its origin in the proliferation of connective tissue, that occurs in perimetritis, and which has extended to the subserous and peripheral connective tissue of the uterus. In other cases (Scharlau, Senfft) a more extensive fatty metamorphosis of the muscles of the uterus could be demonstrated.

The lesions in the posterior cul-de-sac of the vagina may involve the peritoneum and may even make an opening into Douglas' pouch. Lesions in the anterior vaginal cul-de-sac open into the subperitoneal connective tissue lying between the cervix and bladder.

Symptoms.—Only those symptoms concern us here which appear after delivery has been terminated. Let us then turn first to the symptoms produced by lesions of the laquear vaginæ and by deep fissures of the os uteri. These are often very insignificant;[1] for pain is seldom present, and is only sure to be present when the peritoneum or bladder is involved in the lesions. More or less serious hemorrhages from these wounds are more frequently met with, especially if the placenta is attached rather low, or over the internal os uteri; many a woman has bled to death from such fissures. Extensive hæmatomata of the vagina and external genitals have been found with these lesions (Kiwisch, *l. c.* p. 305). In two cases of partial rupture Hecker felt the anterior vaginal wall forced down by an elastic tumor, which he demonstrated, in one instance, at the autopsy to be an *hæmatocele anteuterina extraperitonealis.* Under the influence of the lochia, ulcers, attended with inflammation and swelling of the contiguous parts of the os uteri and vaginal cul-de-sac, develop from these fissures and contused spots. This inflammation may spread to the periuterine and perivaginal connective tissue and speedily bring on extensive pelvic effusions. If, however, the fissure is con-

[1] How trivial the symptoms frequently are, even after the severer lesions of the os uteri, is demonstrated by the case, recently reported by Herbert Barker, in which *the lower segment of the uterus was squeezed off* (1½″ broad!); for 4 days only retention of urine, no pain, moderate distension of the abdomen, and on the 6th day metrorrhagia, occurred; the patient recovered completely in 12 days.

tiguous to the peritoneum, very severe pains, distension of the abdomen, chills and fever suddenly set in, after previously good health, and in a few hours a serious peritoneal effusion takes place. The fever rises with extraordinary rapidity, and is, at the outset, of the continued type, but with a favorable result soon becomes remittent in the morning (*vide* Case No. 6). Obstinate retention of urine frequently attends lesions of the vaginal cul-de-sac and of the anterior lip of the os uteri. The resulting ulcers may also be covered with diphtheritic membranes, and by their extensive destruction of tissues penetrate the bladder or ureter, and thus produce urinary fistulæ. They often heal after destroying a part of the os uteri, and after drawing down the vaginal portion into the *cul-de-sac* by the formation of strong cicatricial bands ; thus arise stenoses of the vagina and os uteri, or even complete atresiæ (*vide* Credé, *Mschrft.* xv. 291). Such cicatrices subsequently cause excentric pains, prevent coitus and conception, besides entailing a multitude of evil consequences.

In all lesions of the vaginal cul-de-sac and uterus, the general collapse commonly present at the outset, with cold extremities, a small and extremely rapid pulse (which has of late been signalized by Hecker as a very important symptom in euphoria), is followed by syncope, vomiting, distension of the abdomen, and very speedily by a diffuse peritonitis. This train of symptoms is only exceptionally absent, and cases have occurred, in which the penetration of the uterus by attrition was unexpectedly discovered at the autopsy (Olshausen). Severe metrorrhagiæ certainly occur, but they do not so often come under our notice, because the blood is frequently effused into the peritoneal cavity. Peritonitis is sometimes first set up by these hemorrhagic effusions, suppuration and rapid death being the ultimate result. If a considerable opening has been made into the peritoneum, intestinal convolutions at times fall through the wounds into the uterus or vagina. These may be constricted and mortify, forming in this manner recto-vaginal and uterine fistulæ, as has been already stated. Even in former times, recoveries from penetrating ruptures of the uterus were observed by Stein, Eiselt, Collins, Bluff, Praël, Braun, Halder, and recently by Castelly, Ordinaire, Praessart, Bayne,

Crichton, Cox, Whinery, and others. My father possesses the specimen of a vaginal and uterine rupture which had healed; the rupture was in an osteomalacitic woman, had extended through the posterior lip and vaginal cul-de-sac as far as the middle of the uterine body, and had left a fine linear cicatrix. It follows from these and other cases (Hartmann, Kettler, A. Davis, Hartt), that even the larger rents may fully heal by first intention.

Diagnosis.—The deep fissures in the os uteri are not always easy to recognize, since immediately after delivery, the cervix uteri, as a rule, hangs loosely down from beneath the contracted internal os uteri. Thus I have repeatedly seen even experienced individuals fail to feel such fissures. The examination with the speculum is difficult, because the flow of blood prevents a clear observation of the os; yet, immediately after delivery, they may often be successfully made out with the finger. After some days, when the external os is more closed, and the portio vaginalis is somewhat involuted, the lesion of the os may be still more perceptible to the touch; the same is true of those in the vaginal cul-de-sac. The more extensive lesions of the uterus are generally discovered during labor, and if this is not the case, they are quite easily diagnosticated afterwards from the collapse, or by insertion of the hand into the vagina, or several fingers into the rectum.

Kiwisch several times found a diffuse emphysema of the uterus through infiltration of air into the sub-peritoneal cavity after such lesions. He considers the former an important point in the diagnosis. In October, 1866, I felt for the first time such an emphysema, where there had been perforation of the uterus by attrition. If symptoms of intestinal incarceration occur in a recognized rupture of the uterus, the half or whole hand must be inserted as soon as possible, in order to examine the fissure, and, in case of need, to undertake reposition of the portions incarcerated.

Etiology.—Lesions extending far into the vaginal cul-de-sac occur spontaneously when these parts are rigid, more rarely, where there is abnormal size and hardness of the child's head; they may also develop from the extension of incisions that have been made in the os uteri. They occur, however, quite

as frequently in obstetrical operations, under the following circumstances: during a too rapid introduction of the hand into the, as yet imperfectly dilated, os uteri (in versions, extraction of a foot, placental operations); 2d, upon too speedy and forcible extraction of the after-coming head, with or without forceps; 3d, upon the premature application of the forceps with an imperfectly dilated os: the edges of the blades then cut the lips of the os in different places as they slide off; this mode of occurrence I have frequently seen, and have published one such case (*Berliner Klinische Wochenschr.*, 1864, No. 9); 4th, they have also sometimes been caused by splinters of bone, after perforation of the head with a trepan, where the latter was not properly protected by the hand of the obstetrician.

The remaining lesions of the uterus may be divided as regards their origin into spontaneous and traumatic. They occur spontaneously. 1st. As penetrations of the uterus by attrition, most frequently with narrow pelves and a large hard head. A pendulous abdomen, hydrocephalus, with face presentations of the child (cases reported by Martin, Hartman, and Hugenberger), favor the occurrence of these accidents in narrow pelves. Among these mishaps, may be classed the annular amputations of the whole cervix uteri (Herbert Barker). 2d. Instances of perforation by pelvic exostoses are on record, although very rare (Castelly, Kilian). 3d. Actual ruptures occur when the cervix uteri is rendered unyielding by firm cicatrices. They are observed, also, during pregnancy from the distension of such cicatrices in the uterus as might result, for instance, from Cæsarean section, or again with an abnormal development of the uterus, such as an unusually thin cervix where the body of the organ has an exaggerated or even normal thickness (case reported by Braun); finally, with a uterus unicornis bilocularis. On the other hand, I do not believe abnormally violent contractions of the uterus, in the absence of other lesions, capable of producing the so-called ruptures; they may have power to enlarge fissures already existing, by forcing a part of the ovum deeper into the cleft, and at length driving it quite through into the abdominal cavity; a diseased state of the

vagina and uterus, or contusion and especially attrition of these parts during delivery, will have usually preceded the event. The cortical layer of the uterus, after having undergone fatty degeneration, as described by Klob, may of course give way and tear, it the fœtal parts are passed forcibly against it, or in case of excessive distension of the uterus. Trask asserts, in his compilation of 300 cases, that most of them were due to a morbid condition of the uterus. (?) In sixty odd cases contraction of the pelvis existed; in many the child was hydrocephalic. Of 129 women, 88 were between the ages of 30 and 45 years. Multiparæ, especially those who had had very many children, manifested a much greater tendency to these lesions than primiparæ. Von Franque alleges that of 26 women with ruptures of the uterus, 21 multiparæ and only 1 primipara recovered.

Traumatic lesions of the uterus have been found after all obstetrical operations. The frequency of this accident is computed by Hugenberger as 6 in 8036; according to Braun, it is 8 in 24,132; Churchill, 85 in 113,138; Von Franque (in Nassau) 114 in 367,708. I myself have seen deep fissures of the os 8 times, penetration of the uterus by attrition 3 times, and actual rupture of the organ twice. The preceding figures, taken together, make it appear that rupture of the uterus occurs in about every 2280 deliveries.

Prognosis.—In deep lesions of the os and of the vaginal cul-de-sac, peritonitis is to be dreaded; if this disease, however, does not set in early, the prognosis is, on the whole, favorable. If ulcers form from the fissures, and are succeeded by parametritis, the prognosis is still better than with peritonitis, though the convalescence may be protracted and deep cicatrices remain in the vagina. Retention of urine is an unfavorable complication, and yields very tardily to treatment. The calculation of Ritter, that twenty-four per cent. of such patients recover, is assuredly too favorable. As a rule, death supervenes early, either during or soon after delivery. If death does not result from internal hemorrhage, it is early or late ushered in by the rapid supervention of peritonitis. Recovery has unquestionably been seen after extensive peritonitic effusions with perforation of the pus externally or into

the vagina (Crighton); it has been observed also by Trossat and Chéreau, even after rupture and prolapse of the intestines, and by Roux and Casamayor, after gangrene of the incarcerated portions of the intestines. These cases are, however, rare exceptions—miracula naturæ—which should hardly be allowed to improve the extremely ominous prognosis. The rupture of the cicatrix of Cæsarean section, when the seat of the placenta is not too near, is, on the whole, the most favorable of these lesions, for many a woman has been saved by laparotomy, after escape of the child into the abdominal cavity (Reild, Bayne, Hartt, Winckel, Sen.).

Treatment.—As soon as it is definitely determined that fissures exist in the os or vaginal *cul-de-sac*, injections of tepid water must be made regularly three or four times a day for the purpose of preventing the formation of ulcers at the wounded places. Cold or warm compresses should at the same time be laid upon the abdomen in order to excite the uterus to contraction, and to avert congestion of the peritoneum. As soon, however, as severe and especially lancinating pains set in, and the abdomen is distended, ice-bags should be at once substituted and retained uninterruptedly upon the part of the abdominal wall which overlies the uterus, until they become disagreeable to the patient, or until the pains no longer recur after they have been removed. Evacuation of the bowels is likewise insured by enemata, or, if this is not effectual, by small doses of calomel (0.03–0.05 grm. three or four times a day); when satisfactory dejections have taken place, a strong dose of laudanum (gtt. xv–xx) may be prescribed, with the view of moderating peristaltic action as much as possible for the first few days. If there is high fever, digitalis (1¼–5 grms. in aq. 180 grms.) may be administered internally with or without nitrate of potash, until the pulse begins to be retarded, when emulsions or saline mixtures should be substituted and continued as long as the fever persists. If there is retention of urine, the catheter must be used at least three times a day. If the lochia is offensive, antiseptic injections (with tar or chlorine water, a solution of the hypermanganate of potash or carbolate of soda) are to be made, in place of the lotions previously mentioned. When large ulcers have formed in the vaginal

cul-de-sac, or from the fissures in the os, cauterization with nitrate of silver either solid or in solution (gr. viij–xx in aq.–℥j) is advisable every two or three days. The treatment of hemorrhages from these fissures will be discussed in the chapter on the hemorrhages of lying-in women.

The treatment above recommended applies equally to the wounds of the uterus—due to attrition and rupture—which simply occupy a higher site; it should, however, be borne in mind, that the portions of intestine or omentum, which may have protruded through the rents, must be replaced. The ice-bag does away entirely with the necessity of considerable local extractions of blood, and if in spite of the ice the pains are very grievous, the hypodermic injection of morphine is more advisable. If a tendency to the recurrence of a prolapse exists after the reposition of protruding convolutions of the intestine, the vagina may be tamponned, as was done by Praessart and Hartmann. The most important measure in all these lesions is the enjoinment of absolute mental and physical repose, upon which alone the result in many cases depends.

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RECORD OF CASES.

No. 5. Pelvis contracted by rachitis, prolapse of the umbilical cord, perforation, cephalotripsy, deep fissures in the os uteri, incipient peritonitis, recovery.

Mrs. K., 25 years of age, had suffered when a child, from rachitis. Her first pregnancy ran its course naturally. She was delivered by means of perforation and cephalotripsy after the umbilical cord, which had prolapsed, was pulseless because the lips of the os uteri, instead of becoming thinner and dilating, grew more and more œdematous. While exerting traction upon the head, the cephalotribe slipped off several times, and only after repeated compression could the head be pulled through the small pelvis. The child weighed over 6 pounds. Immediately after delivery I discovered a deep fissure in the right commissure of the lips of the os uteri, which extended into the vaginal cul-de-sac. The hemorrhage, after removal of the placenta, was but moderate. On the following morning at 8 o'clock (11 hours after delivery), the abdomen was distended, and somewhat tender on pressure. At 10 o'clock, a severe rigor, sharp burning pain, particularly in the right hypogastric region, distension of the abdomen, nausea, distress, anguish, a knitting of the brow, and high fever set in. Several ice-bags were laid at once upon the abdomen, and injections of a decoction of linseed made into the vagina; a solution of acetate of potash (gr. viij) was administered. The ice-bags were applied continuously for nearly 8 days, because the pains recurred the moment an attempt was made to discontinue them. After their removal on the 8th day, the patient remained well, manifesting only a slight elevation of temperature every evening. Six days later, quite an eruption of sudamina (miliaria rubra) broke out, but soon disappeared. On the 19th day of childbed she was discharged with a deep and still sensitive cicatrix in the vaginal cul-de-sac.

No. 6. A deep fissure in the os uteri, occurring after an attempt to apply the forceps; threatening peritonitis; remittent fever; recovery.

Mrs. F., a large woman, 33 years of age, with a wide pelvis, in the 3d pregnancy, was admitted into the University Lying-in Establishment on October 29, 1862, after an accoucheur outside had made many vain attempts to apply forceps; one-half hour after her arrival she gave birth spontaneously to a dead girl weighing 9 pounds. The placenta was extracted without difficulty, and then there appeared a considerable fissure in the left side of the os. At 8 A. M. the vaginal temperature was 102.2° F., with a pulse of 76. The woman was very much

exhausted. At 6.30 P. M., pulse 76; temp. 100.2°. The uterus was very tender on the left side; the after-pains were severe and the hemorrhage considerable; the urine was passed voluntarily.

Oct. 30.	8	A. M.	P. 96.	T. 101.2° F.	}	Very little sleep,
" "	6½	P. M.	P. 112.	T. 104.	}	short chill; no

dulness, but great abdominal pain and distension. Compresses of ice-water, vaginal injections, nitrate of silver internally.

Oct. 31.	8	A. M.	P. 88.	T. 102.4° F.	}	Few after-pains,
" "	6¼	P. M.	P. 100.	T. 104.2.	}	otherwise cessa-
Nov. 1.	8½	A. M.	P. 76.	T. 103.8.	}	tion of pains; no
" "	6	P. M.	P. 84.	T. 103.	}	chill; ol. ric.
"	2	8 A. M.	P. 88.	T. 100.8° F.	}	Condition steadily and decidedly improving.
" "	5⅜	P. M.	P. 84.	T. 104.	}	
"	3.	8¼ A. M.	P. 80.	T. 101.4.	}	
" "	6	P. M.	P. 96.	T. 103.2.	}	
"	4.	8 A. M.	P. 80.	T. 101.2° F.	}	Very profuse lochia alba; no discomfort of any kind.
" "	5¾	P. M.	P. 88.	T. 102.4	}	
"	5.	8¼ A. M.	P. 82.	T. 100.6° F.		
" "	5¾	P. M.	P. 96.	T. 102.8		
"	6.	8 A. M.	P. 76.	T. 100.8° F.	}	Burning sensation
" "	6	P. M.	P. 84.	T. 102.6	}	on passing urine;

regular dejections; fundus uteri still rises the width of four fingers above the symphysis.

Nov. 7.	7¾	A. M.	P. 84.	T. 101.4° F.		
" "	6¼	P. M.	P. 88.	T. 103.4.		
"	8.	7¾ A. M.	P. 80.	T. 99.8° F.	}	The patient left her bed.

There was no more hemorrhage. She convalesced rapidly, and left the institution several days after with a cicatrix perceptible in the left side of the vaginal *cul-de-sac*.

No. 7. A universally contracted pelvis. Forceps, owing to the precarious condition of the mother and child. A sloughing rent in the cervix due to pressure. The woman died of diffuse peritonitis and septicemia seventy hours post partum.

Ottilie M., aged 27 years, 4 ft. 11 in. high, well formed, in robust health, of rather a brilliant complexion, had menstruated since her 16th year, previous to which she had been chlorotic for 2 years. In 1857, after 3 days' confinement, she was quite easily delivered by means of the forceps of a 5¾ pound boy, who was at first asphyxiated, but soon revived. The childbed ran a normal course. She became pregnant for the second time early in November, 1859; felt the first move-

ments of the fœtus in April, 1860, and toward the end of her pregnancy suffered so much severe pain deep down in her abdomen that she could only walk while bending over. The measurement of the pelvis was as follows: The distance of the ant. sup. spinous processes of the ilia was 7¾″; that of the crests 10″; the external conjugate 6½″; the diagonal conjugate 3¾″. On the 12th of August, 1860, at 3.30 A. M. the labor commenced; at 8.15 A. M. the membranes ruptured, and the head, which was in the second occipital position, was driven down into the small pelvis, during which the left parietal bone was forced over the right, and the occipital bone under these two. Excruciating pains gradually drove the head through the entrance to the pelvis; the pulse sank, however, to 56 beats; the mother screamed fearfully; the fetal heart sounds decreased in frequency; vomiting of watery fluids set in; the uterus was extremely tender. The head was fixed in the direct diameter, but was brought down by two slight tractions; the child, male, weighing 7¼ pounds, and measuring 20 inches, was asphyxiated when born, and could not be revived. (The autopsy on the following day showed considerable extravasation of blood between the convolutions of the brain, especially on the left side. There was one large hemorrhagic effusion at the base of the brain between the dura mater and the skull. There was separation of the squamous and glenoidal portions of the occipital bone. Several hemorrhagic extravasations on the corpora striata. In the bronchi were mucus and meconium. The lungs were collapsed.) The placenta was readily removed; the uterus remained very tender, but finally contracted; a little blood escaped. There was a chill on the first day of childbed and some abdominal pain; the flow of blood was trifling. Twenty-four hours later (Aug. 13), the abdomen was enormously distended; dyspnœa was great, vomiting incessant, and the lochia very offensive. The pulse rose from 104 to 134. Leeches, cracked ice, acids, and morphine afforded but little relief. On Aug. 14th, a vaginal examination showed the os uteri to be gaping, covered with irregular masses; the os could hardly be distinguished from the vaginal cul-de-sac; the posterior vaginal wall was very tender. In the evening, jaundice appeared. Pulse 160. Extremities cool.

On August 15, euphoria. Pulse no longer perceptible at the extremities; abdomen enormously distended. Discharge from the uterus offensive and fetid. At 9 A. M. she died.

At the autopsy, made on August 16th, a considerable peritoneal effusion was found; fibrino-purulent deposit on all the abdominal organs, and a thin serous fluid in the peritoneal cavity. In the right lateral wall of the uterus, at the junction of the body and neck, was seen from the outside a round

opening, as large as a walnut, with black, sloughing, very friable borders, which led into a gangrenous cavity communicating with the uterus. The inner surface of the cervix, on the right side (corresponding to the occiput of the child), was almost fully severed transversely by attrition, and completely perforated at one spot as large as a walnut, the edges of which were infiltrated with ichorous fluid. The lymphatics and veins were intact. There were fresh adhesions between the posterior wall of the uterus and the rectum. The thoracic organs were sound. The measurement of the pelvis gave the following dimensions: distance of the spines $7\frac{3}{4}''$; conjugata vera $3''\ 4'''$; diagonal conjugate $3''\ 11'''$; transverse diameter of the entrance to the pelvis $4''\ 4'''$; height of the symphysis $2''$, etc. The vagina was intact, except for several fissures of the mucous membrane, which had a sort of yellowish coat.

I have seen with my father one case of rupture of the uterus in the cicatrix resulting from Cæsarean section. He described it in Monatsschrift, Bd. xxii. p. 249, under No. xiii. The woman recovered, though I was not able to study the course of the childbed.

CHAPTER II.

DISPLACEMENTS OF THE VAGINA AND UTERUS.

All known alterations in the position and form of the uterus and vagina may, of course, be found in childbed. Very many of them occur chiefly as a consequence of child-bearing, and, of these, none are more frequently connected with the termination of delivery and the commencement of childbed, in comparison with other sources of origin, than depression and inversion of the uterus. This is, therefore, to be regarded as the chief affection of childbed, whereas the remainder will be discussed only so far as, by their occurrence during this period, they exert a pernicious influence upon the involution of the genitals and the general condition of the lying-in woman.

I. The Versions and Flexions of the Uterus.—Versiones et Flexiones Uteri Puerperalis.

In anteversion and anteflexion of the uterus, its body rests upon the anterior vaginal *cul-de-sac*, and is, in the latter case, more or less bent upon the cervix uteri. For this reason, the anterior lip is then more hyperemic, enlarged, and covered with chronic erosions, than the posterior, and more so than occurs in cases of anteversion.

The vaginal portion is generally pushed backwards, and points towards the sacrum when the os uteri is inclined forwards. The anteflexed uterus commonly feels more flabby, retains the imprint of the finger, and upon compression a considerable amount of retained lochia often flows from the os uteri (lochiometra). Its anterior wall is, at times, more arched than the posterior. Retroversion and retroflexion of the puerperal uterus are much more rare; in the former condition the fundus is directed toward the posterior wall of the pelvis, whereas the os points directly forwards toward the symphysis, or somewhat below it; the anterior wall of the uterus is con-

sequently almost converted into the superior, and the posterior lip of the os into the inferior; the latter appears considerably longer than the anterior, which is retracted into the vaginal cul-de-sac. By retroflexion, on the other hand, the vaginal portion is driven forwards, but the os is directed forwards and downwards, its lips are everted, the posterior often more so than the anterior. Here also the wall of the uterus, which is felt through the posterior *cul-de-sac* of the vagina, is generally thicker than the anterior. In very rare cases, the fundus may be forced down behind the posterior vaginal wall; it has even occurred in several instances that an acutely retroflexed puerperal uterus has protruded from the external genitals through a rupture in the vagina.

The *symptoms* produced by these displacements and flexions of the uterus are often of but slight importance, since they frequently give rise to no trouble whatsoever during childbed. This applies especially to anteversions, and depends partly upon the fact that the causes of the displacement and its accidental complications are often attended by more grievous symptoms than that deviation itself. This circumstance is in part explained by the fact, that the extreme grades of these displacements rarely take place during the early weeks of childbed, and that most of the so-called anomalous situations are not permanent but disappear as involution of the organ advances. Most of the remaining deviations of position increase gradually the longer they exist, and are then usually the source of those catarrhs, erosions, hemorrhages, neuralgias, etc., which may be the cause of so much distress. Since, however, derangements of circulation in the great venous plexus of the pelvis, as well as venous congestions of the uterus, and especially of the placental site, must necessarily accompany displacements and flexions, it follows that hemorrhages from the uterus in the later days of childbed are frequently met with as their chief result. These are generally slight, but increase on violent exertion; they are obstinate, often recur, and with intermissions may persist even for weeks. Slight chills, headaches, moderate abdominal pain, and sometimes frequent micturition are their attendants. Metrorrhagiæ are common both to versions and flexions. They retard the involution of

the uterus, exhaust the patient, and in that way augment the displacement of the uterus. Retention of the lochia, called lochiometra, is often present with flexions. When the enlarged uterus is firmly impacted in the small pelvis, pressure upon the bladder and rectum is seldom absent, with their accompanying retention of urine and constipation; to these may be added severe pain during defecation and a sensation as though the rectum had not been fully emptied. In greater degrees of retroversion and retroflexion with prolapse of the vaginal wall, there is descent of a pouch of the rectum, whereas the meatus urinarius appears to be drawn up into the vagina (E. Martin). Owing to the absence of suffering at the outset, displacements in childbed often fail to attract the attention of the physician, until they have been in existence for many months.

Diagnosis.—By means of the vaginal examination with one or two fingers, combined with palpation through the abdominal walls, an exact determination of the positions and form of the uterus may be made during the first two or three weeks of childbed; this may be effected with such ease and certainty that, generally speaking, there is no need of the sound. The use of this instrument during the first fourteen days is usually harmful, since more or less hemorrhage is apt to follow, no matter how carefully it has been introduced. In the more difficult cases, especially if complicated by an effusion near the uterus, the double examination per rectum and through the abdominal wall may effectually take the place of the sound. While steadying the fundus from above, care must be taken to avoid pressing it down too forcibly, since at such a time an anteflexion may be readily produced by this means, although the displacement disappears again on removal of the pressure.

Etiology.—Kiwisch does not include the above-mentioned displacements and flexions in his account of the diseases of lying-in women, giving only a description of inversion. Berndt calls them pronation and supination, and considers the former to be very dangerous judging from the two instances reported by Möller and Carus; he designates a complete pronatio uteri post partum as of the rarest occurrence. He believes that supination is scarcely ever found in the early period of childbed, having been observed only by Brünning-

hausen (*Siebold's Journal*, iii. 59) four weeks after delivery. The displacements in question are by no means rare. Among the last two hundred women who were subjected to one or more careful examinations before their discharge, generally on the 10th or 11th day, there were 62 (31 per cent.) with anteflexion, 28 (14 per cent.) with anteversion, 13 (6½ per cent.) with retroversion, and 4 (2 per cent.) with retroflexion. Schroeder found, in 214 examinations of the uterus in childbed, that this organ was somewhat, but not greatly, anteflexed 29 times, lying at least at a right angle with the vagina; more or less flexed 119 times; bent at a sharp angle 35 times; very greatly anteverted once, and 4 times retroverted or flexed. In view of these results it is very remarkable that E. Martin, as late as July, 1863, should have seen but 55 cases of recent anteversion and flexions in almost 4000 lying-in women, likewise only 49 recent retroversions or flexions (16 in the 2d and 10 in the 3d week). From this discrepancy it must be assumed that this author has only described the *permanent* irregularities in position and form of this character. Whereas anteflexion and anteversion are often very pronounced as early as the 9th and 10th day, or even earlier, marked retroversion is extremely uncommon at this time. Yet a case has been recently reported in detail, with illustration, by Hardey (see below) in which complete retroversion was felt on the 3d day after a miscarriage at the 8th month of pregnancy. Hardey attributed the cause to great prolapse of the posterior vaginal wall. He expressly states that this is the only case he has seen during an extensive obstetrical practice of 40 years, and that he has not found its parallel in literature. The earliest period of childbed, in which I have found a distinct retroversion, was on the 14th and 16th days; slight retroversion, at times, somewhat earlier. Retroversion and retroflexion are much more common at a later period. I know of two cases where the diagnosis was verified by the sound, in which the retroflexion was demonstrated as early as the 19th and 20th day of childbed. It is rare before the 14th day, because the body of the uterus is so large that it cannot be forced backwards into the hollow of the sacrum unless great force be applied; and inasmuch as the force is usually applied from behind and above, the displacement must

then generally be forwards. Sometimes the puerperal uterus is found to be unusually movable; in one case of this description I found retroversion in the morning, anteflexion on the evening of the same day, on the following day retroflexion, and so on repeatedly during the first three to five weeks.

The causes of the displacements above alluded to are, primarily, *too great and too early use of the abdominal muscles*, for which reason the sudden production of these conditions is found chiefly on or about the 10th day, when the patient leaves her bed. Another cause is *relaxation of the uterus* from hemorrhage, or inflammation of its walls, which makes it yield more readily to pressure from above, behind, or before. Effusions in the vicinity of the uterus must be mentioned, which in part displace the organ directly, force it to one side, and most often antevert it, but may also give rise subsequently to flexion by contraction, either immediately or in consequence of a shortening of the round and broad ligaments. In one such instance, where on the 18th day I diagnosticated anteflexion together with a parametric effusion, I discovered, 10 weeks later, after complete convalescence, that the anteflexion still existed. A flexion of the uterus is also said to be produced by *imperfect involution of the placental site* owing to its being more voluminous, and the whole wall being heavier. As the sole and direct cause it will seldom be able to produce dislocation; but the hemorrhages occurring as a result of this condition, and giving rise to a relaxation of the whole uterus, may contribute to the formation of this affection. Finally, it is worthy of note that out of 49 displacements of the uterus, only 14 were in primiparæ; of these 5 were anteversion, 4 anteflexion, and 5 retroversion. Martin remarks, that of his 55 lying-in women who were afflicted with anteversion, 25 had indulged in coitus within 6 weeks post partum (!) He attributes retroversions and retroflexions to a protracted maintenance of the dorsal decubitus as a causal agency.

Prognosis.—As most anomalies of this kind gradually disappear without treatment, the prognosis is in general good. Persistent retention of the lochia may, however, lead to the absorption of putrid matter into the blood (*vide* Case No. 15).

In permanent displacements, the chances of complete recovery are better, the earlier the affection is recognized, especially in the cases induced by too great straining of the abdominal walls. The prognosis is much less favorable when the displacement is due to an effusion. Although hemorrhages in these affections rarely threaten life, they nevertheless reduce the patient, and render the complaint chronic.

Treatment.—When a version or flexion of the puerperal uterus has been recognized, if considerable, it must be at once corrected; with anteversion or anteflexion this is effected in the dorsal decubitus by means of two or three fingers of the right hand, by which the fundus is pushed up, and at the same time, or subsequently, the vaginal portion drawn forwards. The patient is directed to lie on her side, so that the pressure of the intestines is taken off the fundus uteri. With retroversion or retroflexion recourse may be had to the knee-elbow posture, as is done by Hardey, though the reposition may be executed in the lateral decubitus, which should then be insisted upon during the following days; or else the half-abdominal position should be maintained. Reposition is in general easy, the uterus often springing back in place quite suddenly. After this act the tendency to new displacements must be met by preventing relaxation of the organ and promoting its involution. During the first eight or ten days of childbed, tepid astringent injections, such as a decoction of oak-bark, tannic acid (grms. 1.25 daily in solution), alum (same strength), are to be made into the vagina, and ergot (0.3 grm. in powder four times a day) administered internally, combined, in case of anemic individuals, with iron or quinine. Hemorrhage is likewise successfully controlled by the same means; should the flowing persist, nevertheless, the cold douche (15 minutes a day), or injection into the uterus itself may be employed after the tenth day. Easy defecation should also be procured. Patients must keep their beds for a longer time than usual. Plugging of the vagina with wads of cotton-wool, that have been soaked in a solution of alum or tannin (grms. 2 in 60), are advisable, especially when relaxation of the vagina and a tendency to displacements are likewise present. The use of the uterine sound to replace a flexed

fundus, is not admissible before the end of the third or fourth week, since up to this period, and often later, the placental site forms a projection almost as large as a thaler, in which the point of the sound may easily wound the larger vessels. The introduction of intra-uterine pessaries or stems of hard rubber, is not allowable prior to the 6th week. All exertion is to be avoided for a long time.

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II. Descent and Prolapse of the Uterus in Lying-in Women. Descensus et Prolapsus Uteri Puerperalis.

By descent of the uterus, we understand a decrease in its elevation, as a result of which the vaginal portion stands lower than the plane of the narrowest transverse diameter of the pelvis, that is to say, below the line joining the spines of the ischia. Incomplete prolapse is the term applied to the position of the uterus when the os is visible between the external genitals, or even protruding from them. The prolapse only becomes complete when the fundus uteri has also issued from the vulva. The vagina generally projects, wholly or in part, with the uterus, either in the form of an inversion of the anterior, of the posterior wall, or finally as a circular invagination of itself. It is well known that frequent deliveries produce a greater predisposition to the formation of these uterine displacements. They are, however, rarely developed during the early weeks after delivery. Roberton has reported 25 cases, in twelve of which prolapse occurred in the first 14 days; 13 were primiparæ, 12 were multiparæ; in all it appeared after childbed, and was of gradual development. It is only when premature and severe exertion, too early relinquishment of the bed, too heavy lifting, too violent coughing spells, excessive straining at stool, act upon the fundus during childbed, that the uterus can be expelled, the displacement being

sometimes sudden, and at others occupying several hours. For this reason, the affection is much more common among poor women than those who can take proper care of themselves in childbed. It has already been mentioned, when speaking of perineal ruptures, that a shortening of the vagina, as well as invagination of one of the vaginal walls, is likewise capable of giving rise to prolapse of the uterus. Prolapse sometimes takes place suddenly and spontaneously during delivery, or may be produced by ill-advised interference at that time. Instances of this have been collected by V. Hueter, and reported by Mauriceau (of spontaneous origin), Chemin (spontaneous), Ricker and Wagner (during extraction with the forceps).

The *symptoms* that attend acute prolapse of the puerperal uterus may be of very ominous character, and resemble those of intestinal incarceration. There is generally, however, only a sense of weight—a dragging and pressing—and a feeling as though the parts were "falling out of the body;" an increased and often bloody lochia appears, with frequent micturition as well as discomfort and pain during the act; a constant inclination to defecate is likewise experienced, without the power of easily emptying the rectum. The abdomen is often tense and painful; the uterus at times projects further and then again retreats to a higher level.

If the prolapse did not exist before delivery, the complaint admits of a decidedly favorable prognosis, when recognized and treated early. The prognosis is, moreover, favorable, if there are no extensive ruptures of the perineum, to produce shortening of the posterior vaginal wall; it is still better when cystocele and rectocele are not simultaneously present. A radical cure may be often effected under these conditions by a suitable treatment during childbed. It should be mentioned, that a pre-existing prolapse has occasionally been cured by a closure of the vagina due to the healing of puerperal ulcers, and that the fundus has at times been held in a normal position by the adhesions that have formed between it and the neighboring organs, the result of perimetritis and peritonitis.

The *treatment* consists in prescribing absolute repose and a maintenance of the horizontal posture. Busch effected a perfect cure in one instance by this means alone. In the majority of cases, however, it is not well to restrict the treatment to these measures, but the relaxation of the uterine ligaments and supports, that always accompanies prolapse, should at the same time be met by the use of astringents and tonics. Alum tampons, introduced regularly every evening and removed every morning, are of chief service. Fifteen to sixty grains to the ounce of water is the solution in which the charpie or cotton-wool should be soaked. This treatment may be commenced on the sixth or eighth day, without any fear of harm from the presence of the lochia, as maintained by Roberton and others; on the contrary, the involution of the uterus will be promoted. It is evident that care must be exercised to see that the bladder and rectum are emptied regularly. The woman should keep her bed uninterruptedly for three to four weeks, and only leave it under rigid supervision. Local abstraction of blood should only be resorted to, and laxative salts be prescribed, when very inflammatory symptoms have appeared. If there is still a sensation of dragging on leaving the bed, the woman must remain in the recumbent posture for a while longer, or if this be not submitted to, a rubber ring should be inserted. The subsequent treatment of chronic uterine prolapse cannot properly be considered at this place.

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III. Depression and Inversion of the Uterus.—Depressio et Inversio Uteri Puerperalis.

Anatomical Condition.—If a depression of any part of the uterine surface takes place, with a corresponding projection of

this point into the cavity of the organ, the condition is designated as *depression of the uterus*. From this condition is developed the incomplete version by an increase in the circumference of the protruding part, until the organ is inverted as far as the internal, or even the external, os. In this case, the tubes are drawn down by their uterine extremities, until one or both are contained within the pouch formed in the peritoneum. Sometimes an ovary, as well as a portion of the omentum or an intestinal convolution, is imbedded in the cavity. If the whole uterine body issue from the os externum, and the cervix is invaginated even up to or including the external os, the inversion is then complete. Prolapse of the whole organ is often associated with this condition—inversio uteri cum prolapsu.

If the invagination is of old date, adhesions may have formed between the opposed walls of the peritoneal pouch, and have completely obliterated the cavity, owing to the irritation of the peritoneum and the great hyperemia of the incarcerated parts; sometimes, however, exudations do not take place, and the tubes remain quite movable; it even seems as though this were of frequent occurrence, for, comparatively speaking, many such cases have been reported of late years, in which even after many years' existence the inversion has been successfully reduced, which would hardly be possible with any firm adhesions. In consequence of the hyperemia and swelling, erosions and ulcers form on the inverted body of the uterus, which give rise to adhesions between that organ and the cervix or top of the vagina; when there is a coexistent prolapse, the mucous membrane becomes of a horn-like consistency, often observable in the inverted vagina. In the speculum, the inverted portion looks dark and velvety, and frequently presents a striking contrast to the pale appearance of the vagina and os, due to the hemorrhages. In old inversions, the fundus has been found to have atrophied. If the free ends of the tube and the ovaries are not included in the inversion, they are at first commonly very hyperemic and œdematous, being spotted here and there with hemorrhagic extravasations. The seat of the depression is usually near the placental site in the fundus.

Symptoms.—When inversion of the uterus takes place suddenly or immediately after delivery, women often utter a loud cry of anguish, have nausea and vomiting, syncope, cold face and extremities, and become, even without great hemorrhage, so weak that they can scarcely speak. If the placenta is still adherent to the inverted part, the amount of flooding depends upon the extent of its detached surface. If it is adherent throughout its circumference, hemorrhage may be entirely absent; as a rule, however, the loss of blood is often considerable and dangerous to life. An inclination to strain is experienced at the same time, and patients perceive plainly that a tumor is protruding from the genitals. The pulse becomes small, very rapid, often scarcely perceptible; respiration is often labored, the abdomen distended and tender to the touch; urgent desire to empty the bladder and rectum, intense colicky pains, and at times retention of urine, combine to torture the sufferer. In the first stage of inversion reduction often takes place spontaneously; this is even possible when the inversion is complete. If the formation is more protracted, women at the outset complain of severe after-pains, have profuse hemorrhages, as well as pains in the back, hips, and thighs. The hemorrhages are continuous, or recur after short intervals; they are notably increased by any exertion, and soon render the patient anemic. If the condition becomes permanent, the inverted portion of the uterus, as a rule, gradually undergoes involution, so that from a tumor as large as a child's head it is gradually reduced to the size of a pear. Crosse, for instance, found the length of the inverted body on the fourth day post partum to be $5\frac{1}{2}$ inches, the greatest circumference 12 inches; on the sixteenth day, on the other hand, these measures were $3\frac{1}{2}$ and $8\frac{1}{2}$ inches respectively. The tubes and ovaries during this process may become freer, but their condition is chiefly dependent upon the alterations and adhesions that may have taken place in the peritoneal pouch formed by the inversion. Menorrhagia, leucorrhea, ulcerations, and exhaustion are the common symptoms presented by women who are suffering from chronic inversion. In rare instances, however, the incarcerated uterus becomes gangrenous in many places, owing to the irritation of its inner surface,

and its being constantly wet and excoriated by urine; the woman may die of this gangrene, unless prompt assistance is rendered. Clemensen has met with one case in which the patient recovered after the inverted part had sloughed and been cast off. The fatal result, however, ensues much more commonly from the weakening effect of hemorrhages, as well as the exhaustion which accompanies violent tension of the peritoneum and the other dislocated organs. Even after successful reduction, the preceding traction may be the source of peritonitis and profuse hemorrhages. The small, thready, often imperceptible pulse, the collapse, syncope which may occur without loss of blood, the restlessness, distress, and finally the early death, without any noticeable lesions of the genital organs, render it probable that the vaso-motor nerves of the veins, or of the heart itself, are paralyzed by the irritation, and especially the compression of the sympathetic fibres of the uterus and of the tubes, either acting in a reflex way directly from the spinal column, or indirectly through the vaso-motor centre in the medulla oblongata. To determine these points, however, further clinical studies about the conditions of the heart-sounds, the pulse, the temperature, and the sensitiveness of those affected with inversion of the uterus, are required. A peculiarly marked instance of this mode of death has been reported by Merriman from the practice of Dr. Edward Smyth. After the pulse had been almost imperceptible for some time, the patient died 16 hours after delivery, without having emitted a single cry, without having had syncope, delirium, or profuse flow of blood. Quite similar cases have been recently published by Costial and Möller (*Monatsschrift für Geburtskunde*, xxvii. 411). Among the sources of death in 54 cases, taken from the recent literature, I have found peritonitis mentioned three times (once after the application of a ligature); exhaustion twice (death after 9 days and 4 weeks respectively); septicemia once; anemia twice; sudden death (without assignable cause) four times. The assumption of Olshausen, that the cases of sudden death from inversion of the uterus are in part caused by the entrance of air, seems to me more improbable than the above hypothesis, for, owing to the invagination, the veins are not only much compressed, but

are flexed at the point of the inversion, so that the transmission of air into the pampiniform or utero-vaginal plexus meets with even greater obstacles than in the non-inverted uterus.

Diagnosis.—When symptoms of so threatening a nature, as those detailed above, appear in a lying-in woman, it is self-evident that an examination of the genitals must be at once instituted; through the abdominal walls we must feel whether or no the fundus uteri has, at any part, a more or less deep depression, surrounded by a raised, resistant, round swelling, resembling the bottom of a bottle (Lazzati); or whether in place of this a cup-shaped hollow exists. On vaginal examination, a round, tender tumor is then felt in the os uteri, or it is found to be already protruding from the vagina and bleeding on the slightest touch. An error is hardly possible if the inverted uterus has prolapsed, and the placenta is still adherent. The diagnosis is more difficult when the condition has existed for a longer period, and the abdominal walls are so distended that palpation is almost futile. In these cases the sound must be employed; when the uterus is inverted, this instrument can only be introduced on all sides to the distance of ½–3 ctms.; aid may sometimes be derived from drawing upon the tumor, for with recent complete inversions the still existing external os then disappears, and again appears when the traction is removed.

The bimanual examination through the rectum and abdominal walls should never be omitted, since it may give us trustworthy indications, even when all other methods have left us in the dark. By its means the absence of the uterine body is recognized, and in place of it a funnel-shaped opening is discovered from above. In this way we can avoid mistaking the condition for a uterine polyp, which has repeatedly occurred even in recent times. Many also lay stress on the tenderness of the tumor when scratched. The color, hyperemia, and bleeding on being touched have, on the other hand, but little value as diagnostic points. Scanzoni has quite recently called special attention to the broad band, formed by the Fallopian tubes, broad ligaments, and vessels, which may be felt above the vaginal *cul-de-sac*. It is, likewise, occasionally possible to re-

cognize, through the speculum, the openings of the tubes, as small points with elevated edges on the inverted body.

Etiology.—It is very unusual for inversion to take place at other times than in childbed; it is moreover rare during this period. There are plenty of such cases reported in the journals for the very reason that they are uncommon. I have had many cases of unmistakable depression of the uterus, but as yet none of complete inversion. Denham found only one instance of acute inversion among 100,000 deliveries in the Dublin Lying-in Hospital. Three agencies may concur to produce this condition: *traction* upon the inner surface of the organ; *pressure* upon the fundus from above; and *disease*, especially that involving relaxation of its muscular fibres. According to Duncan, the uterus must always be paralyzed, or at least in an atonic condition. The inversion generally occurs immediately after expulsion of the child, before or after the removal of the placenta; the following are the well-ascertained causes: First, *traction* upon the placental site by means of the umbilical cord, whether the latter is really too short or is wrapped around the fœtus; or again during efforts to extract the placenta. This was the probable origin of the inversion in fifteen of the above-cited 54 cases. In one of them (Woodson) the woman appears to have been overtaken on her way home, and to have caused the inversion herself, by pulling upon the fœtus when half delivered. Second. *Violent contractions* of the abdominal wall, accompanied by sudden expulsion of the contents of the uterus (partus præcipitatus, vehement squeezing and pressing to expel the after-birth). Third. The condition may be gradually produced in lying-in women by *retarded involution of the placental site*, especially if this part is made to project inwards by adherent clots (placental polyps). Fourth. In cases where all other agencies have been wanting, imperfect contraction of the uterus has been assumed on the ground that during contractions and descent of the organ it might become wedged in the still relaxed cervix.

With all these causes it is presupposed that the cervix offers little or no obstacle, in other words, is relaxed; otherwise the most violent external force could produce but an incomplete inversion. It is equally essential that the uterine cavity should

have a certain width, at least for the sudden formation of the inversion. Inglis believed that an unusually long duration of an occipital presentation was the causal agency in his case, this having the effect of stretching the cervix abnormally, while the pains were so powerful as to force the uterine body into the cervix upon completion of parturition.

Duncan distinguishes a *spontaneous* from an *artificial* inversion, and divides each into active and passive. The *active spontaneous* inversion is supposed to arise from paralysis of the whole or a part of the fundus, especially of the placental site, since this spot, sinking into the cavity of the uterus, is grasped by the contracting walls, drawn down and driven through the cervix. The *passive spontaneous* variety occurs with atony of the whole uterus. The *active artificial* is similar throughout to the active spontaneous inversion, except that the places designated are forced in by pressure from above, or traction from below. Finally, the *passive artificial* form is the one commonly described by authors. The active spontaneous and the passive artificial are the most common varieties. Inversion in general takes place once in 2000 deliveries. It is most frequent in multiparæ, but not unusual in primiparæ. In the above collection of cases, the number of the delivery was noted 33 times, and of these 18 were primiparæ. Finally it is worthy of note that one and the same woman may suffer from inversion after several successive deliveries, as is shown by the cases of Kühlbrand and of Crosse.

Prognosis.—The condition is very grave, and may result fatally within a very short time. Crosse (1847) found that death had occurred in 81 out of 109 cases, and in 72 of these within very few hours after delivery. In the 54 more recent cases, on the other hand, death took place in only 12, or 25.2 per cent. Thus even this lesion appears to have lost somewhat of its terrors with the steady improvement in the practice of midwifery. The prognosis is much better when the trouble is recognized from the first, because reduction is then easy and more certain, and secondary affections are hardly to be feared. Cases have been of late reported by C. Mayer, Gazzam, Borham, Tyler Smith, Brandt, Cowan, Miller, Fougen, White, and others, in which, after immediate reposition, an early recovery

has taken place, in spite of the most threatening antecedent symptoms. The direct danger to life, to be sure, diminishes in proportion to the duration of the displacement, for women bear even severe hemorrhages for decades. The prospect of complete recovery, however, is steadily getting more unlikely, and the number of complications becomes so great in the end, that even the danger of extirpation is preferable. Cases of successful reduction, after many years' duration, have been recently published by Birnbaum (2 years), Noeggerath (20 years), Tyler Smith (12 years), Bockenthal (6 years), White (6 months), Schroeder (2 years), Sims (1 year). Instances have multiplied in the past few years, in which a cure has followed excision of the uterus. West has collected 50 cases of extirpation, of which 36 recovered, 12 died, and in two the operation was not completed. Successful cases of excision have been recently reported by McClintock, Geddings, Sims, Canning, and others. (Vide *Scanzoni's statements*, p. 106.)

Treatment.—Whereas formerly many authors reduced the inverted uterus, together with the placenta, when this was still adherent, leaving the latter to be subsequently detached; quite a number have recently expressed the opinion that the placenta should be first removed, inasmuch as its volume and weight materially interfere with reposition, while the hemorrhages after removal are less profuse, from the circumstance that the vessels are compressed and bent by the inversion of the uterus. A comparison of the results, attained in a great number of carefully reported cases treated on the two different plans, can alone determine their respective merits. Reduction is effected by first pushing the prolapsed uterus into the vagina, then with the whole right hand, well oiled, in the vagina, grasping the fundus uteri and compressing it from all sides, we seek to squeeze it like a sponge, and, while the left hand is resting upon the abdominal walls, above the symphysis pubis, cautiously press the uterine body through the os, so that the parts lying within the external os will be first reduced by the points of the fingers. The body of the uterus sometimes springs back suddenly into position while the pressure is being applied. A new inversion must be guarded against by excit-

ing contraction of the uterus; this may be aroused and hemorrhages prevented by grasping the fundus firmly, by rubbing it, and by the application of intense cold (ice-bags on the abdomen, as well as the use of colpeurynters filled with ice-water); finally, by the internal administration of ergot. If reposition is not accomplished in spite of repeated careful attempts, the colpeurynter should be introduced into the vagina, after the prolapsed uterus has been pushed up. Constant pressure is thus brought to bear upon the fundus, which at times will alone reduce the inversion. (Cases by Bockenthal, Tyler Smith, and Schroeder.) Hamon's case is interesting in this connection, for spontaneous reposition is supposed to have taken place, owing to the very hard fecal matter that distended the rectum. Chloroform is said to be of great service during reduction, when the condition is of long standing. A number of the styptics, to be mentioned hereafter, should be successively tried for the *obstinate hemorrhages.* Some writers claim to have employed a sound having an olive-shaped head, with good results in old cases of inversion. (Smart, Champion, Woodson, and Birnbaum.) In the instances cited, however, the uterus did not spring back during the use of the sound, but while the colpeurynter was lying within the vagina. Extirpation of the inverted organ is only admissible when the symptoms threaten the life of the woman, and when, after protracted efforts, reduction proves absolutely impossible. Marion Sims (*loc. cit.*, p. 104) has recommended that before resorting to this last measure, longitudinal incisions should be made from the external os up to a point beyond the internal os, so as to aid reposition. P. Dubois recommended the ligature, but Borham reports that where this method was employed by him, four cases out of five terminated fatally. The tumor has been repeatedly mistaken for a polyp and removed with the scissors. One death, at least, has occurred after such an operation. (Lee.) The écraseur has been successfully used subsequently to the ligature. (McClintock.) Wilson's, Aran's, and Veit's (*vide* No. 8) cases, to be sure, ended fatally, but Sims's patient survived (*loc. cit.*, p. 100). In 58 cases of amputation of the inverted uterus which Scanzoni found

on record, 23 recovered, as did 16 of those in whom the simple ligature was used, and 2 of 8 in whom the organ was simply cut off; of 27, in whom ligation was first practised and subsequently excision, 22 recovered. In these cases it was shown that the result was most favorable when amputation did not take place at once, but after a certain interval. The most approved method of operation consists in the application of a ligature to the part to be removed, and amputation of the tumor below this point with the scissors or knife the moment symptoms appear indicative of commencing mortification in the ligatured parts. The pain during these operations is usually slight, but drawing the ligature tight is often extremely painful. If reduction be impossible, and at the same time extirpation be not indicated, and the inverted uterus not prolapsed, the latter must be retained within the vagina by the use of a hysterophor, and the treatment be directed entirely to the symptoms. The practice which Emmet has recently advocated—the sewing together of the cervix beneath the fundus, so that constant pressure should be applied to the latter, whereby reduction is finally rendered possible—is certainly impracticable for very many cases, and, where it can be employed, is most probably not so serviceable as the colpeurynter, because it does not exert pressure upon the inverted part from all sides, and is not devoid of risk.

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RECORD OF CASES.

No. 8. Complete inversion of the uterus. Removal of the uterine body with the écraseur. Death on the fourth day.

M. G., the wife of a magistrate, had always enjoyed good health. She had had three easy deliveries, the last having been 7 months before. The three deliveries had been very rapid, and the placentæ expelled immediately after the child. She was well during the first 3 days, except for severe after-pains. On the 4th day, while she was being supported by another woman at the side of her bed which was being made over, she suddenly felt the most intense pains, and a sensation as though something had escaped from her abdomen. The physician, who was summoned, found inversion of the uterus. It was remarkable that the patient at first had no hemorrhages; these did not set in till the 16th week, but were then so profuse as to render her anemic in a very short time. On her admission to the Rostock Lying-in Establishment, a tumor, as large as a fist, was discovered in her vagina; it was very tender on the right side, and bled readily on being touched. The opening of the right tube could be felt, as could the external os. The diagnosis was simple. As all attempts at reduction were in vain, and the hemorrhages became steadily more severe, and as the patient did not improve after many weeks' stay in the Institution, but rather grew worse, the uterus was amputated by Veit by means of the écraseur; the patient died on the 3d–4th day.

The specimen may be found in our collection. The uterine body, which was removed, has a length of 7, and a circumference of 15 ctms. The thickness of the wall was $\frac{1}{3}$ inch. The peritoneal pouch, which is free from adhesions, contains the uterine ends of the tubes; the ovaries and the free ends of the tubes lie in the portions of the broad ligament by the side

of the wound. The vagina is quite large and perfectly normal; the external os is fissured transversely, and is so patulous that two fingers can be readily introduced. The amputation had taken place precisely at the line dividing the body from the neck. No traces of inflammation could be discovered, either in Douglas' pouch, or in the vicinity of the ovaries and tubes.

CHAPTER III.

HEMORRHAGES FROM THE GENITAL ORGANS OF WOMEN IN CHILDBED.

These are divided into hemorrhages from the external genitals, from the vagina, and from the uterus; two varieties are recognized—the so-called external, in which the blood is discharged externally; and the internal, in which it is poured out either into the tissues or into the cavities of the genital organs, and does not find a free exit.

I. External Hemorrhages. Hæmorrhagiæ Externæ.

Seat and Causes.—Hemorrhages from the external genitals arise mostly from wounds, such as ruptures of the perineum, or of the mucous membrane just beneath the clitoris and beside the orifice of the urethra. They are quite rare; for instance, I have had but 9 cases of hemorrhage, from fissures of the mucous membrane, in 2000 deliveries; they were all arterial. Klaproth, on the other hand, has repeatedly seen profuse venous hemorrhages from these fissures. Severe venous hemorrhages occur only in about three per cent. of perineal ruptures, and arterial are much more uncommon; still more exceptional are the losses of blood from lacerated varicose veins in the vulva. The causes of these lesions are attributable to the distension of the vaginal entrance during labor, and have been already fully considered (*vide* page 61). *Bleeding from the vagina* is partly due to rupture of its walls, and is partly produced by torn varicose veins; but it may also originate in pre-existing ulcers. The first occur at any point, the last usually at the upper or lower end of the vagina. Laceration of the veins is so rare, that Sickel found a ruptured varix in the vagina but twice in 12,612 deliveries. Streng, however, met with 6 cases in 2936 deliveries. Hemorrhages from vaginal ruptures, whether communicating with the neighbouring organs or not, have been already discussed. Losses of blood from the

vagina, like those from the vulva, owing to the nature of their causes, generally take place soon, if not immediately, after delivery. In exceptional cases, they do not appear until many days or weeks later (Helfer—3 weeks). They may be secondary to the bursting of a thrombus in the vagina. *Hemorrhages from the uterus* are very much more common. They arise from ruptures of its walls, such as deep fissures in the os, especially when the placenta is low, or *prævia*, and also from rents of the uterine body or cervix; in other instances, hemorrhage takes place from the vessels of the placental site. The last mentioned variety is the most frequent, and may be divided, for practical purposes, into those occurring within the first eight or ten days of childbed, and later ones, which are termed secondary hemorrhages. In 114 cases of flooding in lying-in women, where quite an amount of blood was found to have issued from the uterus, I discovered the following causes:—

1. Imperfect contraction of the uterus,	2 cases	after spasmodic pains during labor.
	7 "	from atony of the uterus.
2. Deficient involution,	18 "	without other complications.
	4 "	with pelvic effusions.
	5 "	with parametritis.
3. Changes in the position and form,	6 "	" anteversion }
	4 "	" anteflexion } of the
	3 "	" retroversion } uterus.
	1 "	" retroflexion }
	1 "	" elevation by an ovarian cyst.
4. Retained portions of the placenta and membranes,	9 "	
5. Endometritis,	4 "	
6. Granulations on the os,	3 "	(an ulcer in one case.)
7. Mechanical exertions,	16 "	when first leaving the bed on the 9th day.
	2 "	with obstinate bronchial catarrh.

8.	Retention of urine,	6 cases
9.	Constipation,	1 "
10.	Occurring during a rigor,	4 "
		96 cases.

In 50 cases, when the time of its occurrence was precisely fixed,

9 were in the first 12 hours after delivery,
3 " " " " 3 days " "
18 " between the 3d and 10th day (the lying-in women generally rise on the 10th day),
26 " after the 10th day.

Nineteen of the patients were pregnant for the first time, 16 for the second, 17 for the third, 3 for the fourth, 5 for the fifth; 31 were multiparæ, consequently rather more than there were primiparæ, as pointed out by Earle. I would here refer to the appended tables showing the condition of the genital organs in 100 lying-in women, of whom 22 had the lochia slightly tinged with blood as late as the 9th–31st days; of these only 6 were primiparæ. Violent physical exertions, combined with dread of the examination, were the sources of the bleeding in many of these cases, since during the first few minutes after introduction of the speculum only a pale, vitreous or muco-purulent discharge appeared, but this was soon followed by blood from the os, obviously the result of the woman's movements in consequence of the manœuvres.

Of the 50 patients who had hemorrhages, only six failed to nurse their children, and one of these had a flooding immediately after delivery; thus only a tenth of the entire number failed to nurse.

As regards the *frequence* of these hemorrhages, they occurred 114 times in 1375 patients, or once in 12; in the early observations they were much more rarely recorded than subsequently; for instance, I found in the first

870 cases 53 = 1 : 16, subdividing these—
150 " 8 = 1 : 17 (1861),
70 " 3 = 1 : 23,
172 " 20 = 1 : 8.6 (1862–63),
114 " 24 = 1 : 5 (1864–65).

The far greater frequence in later years is explained by the fact that the thermometer has been introduced into the vagina of every patient (in Berlin and here) several times a day. Many of them, who have left their beds several days before, assert that they have no flowing, yet the thermometer is withdrawn covered with blood, and examination with the finger and speculum generally discloses the seat of the hemorrhage.

The bleeding is most commonly due to retarded involution of the uterus, as is shown by the above figures. The placental site is then, as a rule, the least involuted; the lumina of the vessels are not yet firmly closed, and, moreover, are not subject to any firm pressure, the result of which is that even slight physical and mental exertions often suffice to increase the passive congestion already present, and to reopen the vessels that are already partially occluded. This deficient involution could be recognized in nearly thirty per cent. of the cases. In most cases, the anterior or posterior wall of the uterus was alone affected; in exceptional instances only was the involution of the whole organ retarded. Hemorrhages of this description generally take place after the eighth day, are of slight degree, unless the exciting cause has been violent, but last for a long time.

Deficient involution of the uterus.—One of the most common causes of hemorrhage, occurring in childbed, and immediately after parturition, consists in irregular contraction of the organ, the result of colicky pains during labor. Thus internal hemorrhages are produced, the internal os being more firmly contracted after delivery than the body or fundus of the uterus. Stricture about the openings of the tubes is another source of hemorrhage. Relaxation, atony of the uterus, on the other hand, such as follows very rapid labors, too great distension owing to twins, or hydramnios, and feeble as well as spasmodic pains during labor, form a more frequent cause. Great losses of blood, exhaustion of the uterus by too long exertion during labor may also induce this condition. As atony of the uterus is equally unfavorable as regards the involution, secondary hemorrhages after the ninth day are not unlikely to follow those occurring just after delivery. The losses of blood arising from atony are generally very profuse;

those from irregular contraction are less so. At times atony is but partial, and is particularly apt to be confined to the seat of the placental attachment.

Changes in the position and shape of the uterus may produce hemorrhages, partly by producing pressure upon the venous plexus of the small pelvis, partly (in the case of the flexions) by direct interference with the venous flow from the uterus, as well as by retardation of involution. In either case the bleeding is from the placental site; its appearance is usually subsequent to the ninth day, since unmistakable displacements are apt to be caused at that time by violent exertions; in rare instances it is observed at an earlier date. It has already been stated, that inversions of the uterus are generally attended by great loss of blood. The bleeding, however, is often slight, inasmuch as the vessels are occluded by the compression of the body of the uterus by the cervix and os. I once found a profuse secondary hemorrhage from the uterus to have been caused on the third day by a recently developed ovarian cyst, which dragged the uterus upwards and impeded its contraction.

Retained fragments of the placenta and membranes are the causes of bleeding in rather less than ten per cent. of the cases, especially during the first eight days; more rarely after this period. Fragments of the placenta interfere with the constriction and normal diminution of the vessels in the placental site. Their decomposition, as well as that of retained fragments of the membranes, may produce disintegration of the clots already formed, and thus reopen the occluded vessels. The decomposition is, however, not due entirely to the presence of placental remains, or the blood therein contained, nor to their attachment to the uterine wall, and the hemorrhagic extravasations in the latter; but is sometimes occasioned by irregular contraction of the uterus, a morbid condition of its inner surface, and affections of other organs. It must be noted that the accumulation of putrescent fluids within the uterus is prevented by the powerful contractions of the organ, while the action of the putrid matters upon the orifices of the vessels is limited, and, at the same time, their absorption is prevented by the compression exerted upon these vessels. If the retained fragments are small, and the contractions violent, the

loss of blood may be insignificant; yet, on the other hand, profuse hemorrhage has been experienced in the case of partial or entire failure of the contractions, even though the pieces of placenta remaining were very small.

Diseases of the inner surface of the uterus and of the os may be classed with the rarer causes. Endometritis may give rise to hemorrhages partly by the congestion which accompanies it; partly (and this is especially true of the diphtheritic form) by erosion of the already occluded vessels in the placental site; in part, secondarily, by the consequent retarded involution of the uterus. Granulations and ulcers of the os are at times the seat of slight hemorrhages if they are exposed to friction against the vaginal wall, at the period when the patient leaves the bed and begins to move about. Mikschik relates a rare instance of fatal hemorrhage from erosion of an artery, the size of a raven's quill, produced by an ulcer as large as a silver dollar.

Too early and violent straining of the abdominal walls very often produces bleeding, especially during the later days of childbed. As many as 16 per cent. of our lying-in women lost blood on the ninth day, or soon after, upon leaving the bed for the first time. Two causes here co-operate, the necessarily severer pressure upon the uterus with its consequent displacement, which must weaken its contractions, and disturb the circulation in the organ; and the venous stasis which must occur in the valveless venæ spermaticæ internæ, when the upright posture is first assumed after a long confinement in bed. A reflux of blood follows, and a venous hemorrhage takes place from the placental site, this being often so profuse that the woman is speedily rendered unconscious. In the very same way an obstinate bronchial catarrh may cause a protracted flow of blood from the uterus.

Retention of urine, and extreme distension of the bladder quite often give rise to secondary hemorrhages, especially in the early hours of childbed. This is effected by the full bladder dragging the uterus from the small pelvis upwards and somewhat to the side, whereby its circulation is impeded, the contraction delayed, and the cervix compressed in the conjugate diameter of the entrance to the pelvis. The discharge of blood

is arrested in the manner last described, and, accumulating within the uterus, produces dilatation. The latter only takes place, as a rule, when the contraction of the uterus has previously been deficient; even though the pains are powerful, yet during the remissions clots may collect in the cavity, which are not expelled by severe after-pains. If the bladder is emptied, the uterus often contracts more forcibly, and forces out the coagula. Under such circumstances external and internal hemorrhage generally coexist. If retention has persisted for several days, giving rise to these hemorrhages, this, combined with their pernicious influence upon the uterine contraction, may result in imperfect involution, and may, moreover, prove an indirect source of secondary hemorrhages in childbed. In an analogous manner, an accumulation of fecal masses within the rectum tends to give rise to metrorrhagia.

Finally, four instances must be mentioned in which uterine hemorrhages occurred during a chill, without any of the above-cited or other causes being discoverable. It was quite certain that no disease of the uterus was present. It seems to me conceivable that, when affections, such as intermittent fever, pleurisy, arthritis, etc., supervene during childbed, a loss of blood should take place from the placental site, owing to congestion of the internal organs, because this spot must present less resistance to the circulatory flow, for at least a month, than do the fully cicatrized segments. This would also explain the retarded involution of the uterus, which so often follows those affections. In addition to the causes above specified, the following have been enumerated by other writers: Relaxation of the vaginal portion, with a flabby condition of the mucous membrane, even though the uterus is well contracted (Von Helly); paralysis of the uterus (Chiari). Louis Chapel made the autopsy of a woman, who died of metrorrhagia with a firmly adherent placenta, where the blood was found to have escaped from the torn umbilical cord. Violent emotions have been adduced by many (McClintock, Kunkler) even in the later stages of childbed. I have only had one case in which such an explanation seemed probable, at least no other cause could be definitely assigned.

Symptoms.—The symptoms, which are evoked in puerperal women by a loss of blood, depend upon its degree, causes, duration, and the constitution of the patient. Strong, full-blooded, healthy individuals bear the loss of a pound and a half of blood without further results. At the most, a lack of red color in the lips, cheeks, and conjunctivæ, and a rather accelerated pulse, are the only changes produced. There is no falling off in the temperature, and even a profuse flooding *may be unattended by any change in this respect* (*vide* Case 9). If the blood gushes out in any quantity, the women notice the flow and experience a sensation of increasing warmth. The symptoms of anemia in all its various degrees manifest themselves in weak individuals, and in such as are exhausted by the protracted efforts accompanying parturition, or by antecedent hemorrhages. These symptoms are coldness and pallor of the face and extremities, nausea, cold sweat, restlessness, distress, anxiety, attempts to turn upon the side in order to breathe more freely, a distressing choking and vomiting, ringing in the ears, muscæ volitantes, loss of consciousness, syncope, and finally, death with or without convulsions. Women bleed to death in this way in a few hours from ruptured varices (Helfer); from vaginal ulcers (Lehmann); after delivery with placenta prævia (Leo, 14 out of 38!); rarely after the disruption of thrombi in the vulva or vagina; and immediately after delivery, when there is atony of the uterus. Formerly this event took place more frequently.

The hemorrhages are not very abundant, when retarded involution, or changes in the position and shape of the uterus, form the causes; on the other hand, they recur often and gradually render the sufferer anemic without the appearance of these grave symptoms. Languor and profuse sweating, loss of appetite, a tendency to constipation, and a temporary swelling of the feet, are, for the most part, the only accompanying signs. Far different are the symptoms attending the retention of placental fragments; these are primarily hemorrhages, occurring early, as a rule, but sometimes even later than the 14th day; with them are associated labor-like pains, uterine colic, sacral and abdominal pains, and frequent micturition. Upon vaginal examination, the cervix and os are found

to be patulous, the vaginal portion obliterated, and the uterus subinvoluted. Here also are manifest signs of extreme anemia, and subsequently of thrombosis and embolism including septicemia, all of which still remain to be discussed.

The *effect of great losses of blood upon the uterus* is always dangerous, inasmuch as the contractions of the organ are thereby impeded, and its walls relaxed, so that the involution is retarded, and a tendency to versions or flexions induced. From both causes slight chronic catarrh of the cervix is apt to ensue; these drawbacks are more probable, the more directly the blood is abstracted from the uterus. The congestion of the breasts is usually less in such cases, and the secretion of milk often insignificant, so that the breasts remain soft.

It is very difficult to make evident the influence of considerable hemorrhages upon the temperature of women in childbed, because complications (wounds, inflammations, ulcers) are so very commonly present. In many instances, however, in which repeated local examinations failed to disclose any affection of the genitals, I have found, for many successive days, great elevation of the temperature (103.1° F.), which, together with the slight general disturbance, subsides gradually (*vide* Case 9). It has seemed to me as though these phenomena set in especially on the diminution of the sweating, which is often so excessive in anemic women; in one case of this kind, I repeatedly saw the fall of temperature follow very great secretion of urine, and the diuresis was subsequently very profuse with a lower range of temperature. Abnormal rapidity of the pulse, accelerated respiration, and notable dilatation of the pupils are adduced by L. Earle as important indications.

One symptom, which is constantly met with in anemic lying-in women, is intense *headaches*, which, however, possess no specific character, but are equally common in other individuals suffering from anemia of the brain. At times, the subjective sensations, experienced in these cases, are described as those of emptiness, heaviness, and beating in the head, or as hemicrania. Rheumatic affections of the cranium are only to be suspected when pressure upon the cervical and occipital nerves is painful, and other rheumatic troubles are at the same time present. The period varies at which these symptoms appear.

Kyll describes the headaches as binding, persistent, and as most severe in the evening and at midnight. The small, rapid pulse then becomes harder and quicker, the heavy eyes brighter, an intolerance of light is occasionally experienced, the carotids throb, the tongue is broad, pale, coated white; great thirst prevails, and so on.

Diagnosis.—Bleeding from a lesion of the mucous membrane beneath the clitoris, from a ruptured varicose vein in the vulva, or from a lacerated perineum, is readily recognized upon examination of the vulva. On separating the nymphæ, the spurting vessel is often brought at once into view; with every flooding, immediately after delivery, the external genital organs should be exposed for examination, just as soon as the accoucheur has assured himself, by grasping the fundus uteri, that uterine contractions are going on. If the various parts of the vulva are free from lesions, and the womb well contracted, hemorrhage may still proceed from the vagina, os, and cervix. We must then seek to discover, with the finger, whether lacerations of the vagina or os exist, from which the blood may issue. If the digital exploration gives us no clear insight, the speculum must be introduced, and every part of the vagina carefully searched; the source of the flow is thus occasionally found, so that styptics may be directly applied. With hemorrhages from the placental site, either the whole uterus is large, flabby, and yielding, or the placental site alone is softer than the rest. The bleeding ceases while the uterus remains contracted, but begins afresh when the contraction intermits, except at the commencement of the after-pains. If retained portions of the placenta and membranes are the causes of the metrorrhagia, the cervix is found patulous; now and then it is even possible to feel the membranes, or pieces of placenta protruding. At other times, the abnormal contents of the uterus may be diagnosticated, as a rule, after successive examinations, by the re-opening of the os, and the re-obliteration of the vaginal portion of the uterus. These floodings sometimes recur profusely at intervals, and then disappear for several days. When overdistension of the bladder has given rise to the hemorrhages, an oval, elastic tumor will be discovered in the median line above the symphysis, and on the right or left side of this some-

what higher, and often above the navel, the fundus uteri, which may be depressed with the hand, and is rendered harder by rubbing the abdomen over it. The position of the fundus above the umbilicus is a very important indication that the uterus is forced out of the pelvis, or distended by abnormal contents. To prevent confounding bleeding from granulations on the os, with secondary hemorrhages induced by displacements and retarded involution, the lips should be everted by pressure against the cervix after the speculum has been inserted, so that it may be seen that the blood issues from the cavity of the uterus. Deficient involution is to be inferred when the fundus can still be felt above the symphysis after the 14th or 16th day of childbed, especially with primiparæ. One lip is then often larger than the other, as is the corresponding wall of the organ. Finally, there are individual cases in which only the inner surface of the uterus can be recognized as the seat of the hemorrhage, but the precise locality, and the causes of the latter, whether lacerations, retained fragments of the placenta, or ulcers—cannot be more exactly determined. A case described by Hecker (*Monatsschrift*, vii. 1, No. 3), in which after death a cicatrix as large as a silver 3-cent-piece was found on the anterior surface of the cervical canal, with a fibrinous clot filling an enormous ectasic vein, may serve as an instance.

Prognosis.—The loss of blood is generally slight in the case of displacements and deficient involution of the uterus; the prognosis then necessarily depends upon the cause of the hemorrhage, being quite favorable in both these alternatives. This is generally true of metrorrhagia due to retention of urine; as soon as the latter is relieved the former ceases; the prognosis is, of course, less favorable when the loss of blood has occurred in women already weakened. Flooding is more dangerous when it is sudden and profuse, than slight and continuous, for these trifling hemorrhages with their steady abstraction of blood are often borne by women in the most inconceivable way. Cases of sudden death from great losses of blood are not so very rare after labors complicated with placenta prævia, from the rupture of varices and from complete atony of the uterus in individuals who are already greatly reduced. The entrance of air into the gaping vessels of the

placental site by the side of the examining hand, as insisted upon by Olshausen, must be adduced as a possible cause of death. The prognosis is worse in case of hemorrhage from retained portions of placenta, owing to the fact that the flowing does not cease until the latter are all removed, and septicemia may result from these retained masses. It has been repeatedly demonstrated, that great losses of blood in childbed predispose to the gravest diseases. That this is the case will be readily appreciated if we but consider the tendency of excessive hemorrhages to relax the uterus, delay involution of the placental site, consequently favor the development of thrombosis by dilatation, and enhance the chances of infection even in the later days of childbed. The danger of exciting inflammation by the frequent introduction of the hand to check the flow is not to be overlooked. Many other causes must invariably be considered at the same time; just as the retention of pieces of the placenta will not always give rise to hemorrhages, so decomposition and septicemia are not the invariable results. The source of the bleeding, its causes, and the antecedent condition of the woman often determine the significance of a loss of blood more than its degree. Hemorrhages from the external genital organs, when promptly recognized, admit of a favorable prognosis; those from the vagina are less favorable, because the bleeding spot is more difficult to find, and is not so readily compressible. Hemorrhages which are due to disease of the inner surface of the uterus are for the most part of little import; the prognosis is dependent upon the predominant morbid condition. Secondary hemorrhages, occurring at a late period, are rather to be dreaded in connection with atony, than with irregular contractions of the uterus, and the amount of blood lost is commonly much greater in the former case.

Treatment.—If arteries have been wounded in the external genital organs, they must be seized with the forceps and tied. With bleeding fissures of the mucous membrane beneath the clitoris, ligature is not always easy, but luckily is not often required; a pledget of cotton as large as a walnut, soaked in vinegar, or in a solution of chloride of iron, suffices to check the flow; it must be firmly pressed against the wound, and

held there during a quarter or half of an hour. If the bleeding is arrested, the patient may be allowed to lie quietly with thighs pressed together; the cotton will come away of itself on the first or second day of childbed. If the compression be not effectual, the bleeding vessel may be transfixed with a needle, it being often impossible to seize it with the forceps. Venous hemorrhages from a lacerated perineum are speedily arrested by irrigation with cold water, and their recurrence best averted by the suture.

Bleeding from varicose veins in the vulva and vagina should be treated by pressure and the direct application of styptics. A wad of cotton with liquor ferri should be firmly pressed against the bleeding spot for some time, and subsequently secured by a T bandage; such a hemorrhage in the vagina is best checked by plugging with cotton-wool. Sometimes continuous (15 to 30 minutes) pressure with the finger, or compression with the wad of cotton, is sufficient to check such bleeding veins. When these agents do not answer the purpose, and the bleeding is not located too high, the spot may be compressed between the fingers in the vagina and rectum simultaneously. If vaginal fissures are the source of the bleeding, cold injections into the vagina, or the application of astringents to the wound and digital compression are indicated; plugging of the vagina is, on the other hand, only advisable in case of small fissures.

Innumerable remedies have from time immemorial been recommended for the various hemorrhages from the uterus, and new ones are suggested every day. Novel methods of treatment are constantly sought by accoucheurs, from a tendency to indulge in the delusive hope of discovering a cure, applicable in all cases. This end can never be attained, since the causes of bleeding are so multifarious. Many extol opium, ipecac, or emetics; others only ergot, ergotine, digitalis, and so forth. Digitalis is especially praised by Dickinson, who asserts that he has generally seen contractions ensue within ten minutes after its administration. (Thirty drops of the tincture is said to have brought on a miscarriage?) Uterine hemorrhages in the early days of childbed may be divided, with reference to treatment, into three groups:—

1. Hemorrhages of the uterus from complete absence of contraction. Contractions must then be excited by every means; internally by the administration of ergot, three grms. every fifteen minutes; locally by rubbing the fundus uteri with the hand. The application of cold compresses to the abdomen is of very little help in flooding, and interferes with efficient compression of the organ. Irrigation with ether, the so-called ether douche, so much recommended by Broadbent, may be tried in the intervals. Cold injections into the vagina, and the removal of coagula, which are felt in the os and cervix, are beneficial. Compression with the hand is, however, preferable to all other measures; the sandbag and the tourniquet (Pretty) are utterly worthless. If atony is the consequence of prostration during labor or other exhaustive conditions, tonics, and especially claret (one to two teaspoonfuls every five to ten minutes) are very useful combined with, or given subsequently to, secale. As ergot in the form of powder is repulsive to many, and produces nausea, a teaspoonful of the infusion (8 in 180 grms.), or the fluid extract of ergot (2 to 4 in 180 grms.) may be given in cinnamon syrup either with or without the addition of acids. Ice-water and cracked ice by the mouth are worth trying, as well as icebags upon the abdomen. If the relaxation of the uterus does not yield to all these remedies, and the loss of blood continues, styptics must be applied to the bleeding inner surface of the organ itself. In this category belongs the introduction of pieces of ice into the uterine cavity, and the injection of astringents. The former practice is recommended by Seyfert, and has been employed by many others with success; it is not, however, necessary to insert so large pieces as to fill the entire cavity as is done by Betz; small pieces about the size of a walnut generally suffice. The importance of injections into the uterus has been thoroughly enough discussed in the introduction. On one occasion, where there was a tremendous flooding that could not be checked, immediately after the removal of a myxoma of the chorion weighing five or six pounds, I resorted to the introduction of a cylindrical wad of cotton-wool, two inches long and one-half inch thick, soaked in thirty grammes of liquor ferri sesquichloridi. The hemorrhage was arrested, and the woman recovered without a

trace of inflammation, and is still alive. This practice I have since followed in many cases (*vide* No. 9) with good results, and can recommend it most emphatically. I generally take equal parts of chloride of iron and water. The liquor may also be injected slowly with Braun's syringe. As simple remedies are often inefficient, resort should only be had to this drug when all others have proved useless, and the danger is imminent. The measure just suggested by me was, as I afterwards learned, successfully employed by Schreier as early as 1854; he made use of a sponge-tent with chloride of iron, likewise with harmless effect. I have had no experience of the injection of iodine (one part in five parts of water) recommended by Dupierris in 1857, and Noeggerath in 1861. Both report that no reaction followed the treatment. Koyen claims to have once stopped a profuse metrorrhagia by introducing a strong solution of ergotin on a tampon pushed into the cervix. Chloride of iron is amply sufficient, and is unquestionably preferable to a solution of nitrate of silver (0.6–1.25 in 30 grammes).

With reference to compression of the abdominal aorta to check the hemorrhages, I agree with the opinions expressed by Spiegelberg as early as 1858, in spite of the recommendation of Braun, Cazeaux, Jacquemier, Chailly-Honoré, Dubois, and notwithstanding the happy results which Fleury ascribes to this method. The pressure can only be applied externally, and above the point of origin of the internal spermatic artery, while compression of the inferior vena cava must be at the same time avoided, and not too much time lost in these attempts. Rubbing the inner surface of the uterus with the hand, for the sake of exciting contractions, is, likewise, to be regarded as a last resort. I have had to rely upon this measure in one case only, where the completely relaxed uterus had sunk as low as the external genitals, and would not contract in spite of every effort. I had here no liquor ferri at hand. The case terminated fatally by the patient's dying of metritis. R. Lee has repeatedly had this experience; he deems this method useless and dangerous, stating that Dewees, in a practice of thirty-five years, did not once find it necessary to introduce his hand into the uterus to check a flooding.

I can fully corroborate the reason for this given by Lee, that

the coagula disappear when proper pressure is made upon the fundus uteri. Machen recommended cold water injections into a beef-bladder which had been put into the uterus. This advice is, however, not to be followed, for the uterus, whose contraction we were seeking to promote, would by this means be again distended. Plugging the uterus with linen, as tried by Blease, is equally worthless. The use of electricity is rarely practicable in private practice, because it takes too much time to send for the instruments. There is, moreover, a dearth of observations as to its value in these emergencies. Plugging the vagina with cotton, or with the colpeurynter filled with ice-water, is insufficient in the most profuse hemorrhages, harmful, and only suitable for certain cases to be cited hereafter. The catheter must be passed in retention of urine and extreme distension of the bladder. It is not well to apply the child at once to the breast after severe metrorrhagiæ, as advocated by Rigby, since this is scarcely practicable without moving the woman, and absolute repose is the first factor in the arrest of hemorrhage. Earle's attempts to set up this irritation artificially, by compressing the breast, or allowing the nurse to grasp the nipples and draw them out, is a useless waste of time when the flow is profuse, and superfluous when it is slight.

2. Ergot and rubbing or kneading the uterus are contra-indicated when the uterus is irregularly contracted, or possibly a stricture is present, and the patient complains of severe after-pains. Here antispasmodics are in order, such as Dover's powder, laudanum, an emetic, or a mustard plaster over the sacrum, after the clots have been taken from the uterus. Enemata with twenty drops of laudanum, an emulsion of bitter almonds with extract of hyoscyamus (gtt. 20), are of great service in most such cases. This is the class of cases, by no means uncommon, which has satisfied so many practitioners that there is no better hemostatic remedy in metrorrhagiæ than opium, and especially laudanum.

3. Finally, when the uterus is firmly contracted, and the external genitals and vagina are not the seat of the bleeding, it must arise from the cervix, and will not be amenable to internal treatment alone. Styptics are then to be employed

locally; cold injections into the vagina, the insertion of wads of cotton-wool, soaked in a solution of chloride of iron, into the cervix, and plugging the vagina with balls of cotton-wool rather than the colpeurynter, because it cannot be so fully and firmly packed with the latter. Manget squeezed the juice of half a lemon into the cervix, and thus stopped the bleeding in one case.

If the hemorrhage has yielded, fresh sheets must be provided, and a perfectly clean napkin applied to the genital organs, so that it can be told at any minute how much blood is escaping. If all internal and external remedies are of no avail, and vomiting sets in, or if the anemia is so great after arrest of the flooding, that death is imminent, transfusion is indicated. The performance and importance of this step are fully set forth in the writings of E. Martin, Landois, Mosler, Uterhart, and others, and the practice has been repeatedly tried with success in England, France, and Germany.

The general condition of a woman must be constantly watched, when she is suffering from more or less profuse losses of blood. She should maintain the recumbent posture, with her head low, the pelvis somewhat raised, so as to avoid cerebral anemia and the stasis of blood in the relaxed uterus due to the inclined course of the internal spermatic veins. If the patient is very anxious and excited, large doses of laudanum often have a surprising effect between the tonics. Broths and wine are given internally, to ward off attacks of syncope, and eau de Cologne or liquor ammoniæ causticæ applied to the nostrils. Pieces of ice may be swallowed to relieve nausea. A fresh and cool temperature of the room must be secured by opening doors and windows, while heavy blankets should be taken off and all movement forbidden.

The treatment of *secondary hemorrhages* in childbed should be directed first of all to the removal of their cause; they are rarely of so formidable a nature as the metrorrhagiæ during the early days, so as to require an immediate resort to hemostatic remedies. The retarded involution of the uterus must be stimulated by the internal administration of ergot, and by the use of astringent injections into the vagina with decoction of oak-bark (15 : 180 grms.), alum (2 grms. in

each injection), tannin, or by vaginal tampons soaked in astringent solutions, and finally, by the regulation of the bowels. Portions of the placenta and membranes, that can be felt, are to be extracted with the fingers, and decomposing fragments should be removed by the injection into the uterus of tepid water with the addition of liquor chlori, hypermanganate of potash, carbolate of soda in solution, or aqua picea, which, at the same time, has the effect of neutralizing the offensive odor from the lochia. Eulenberg recommends in such cases the vaginal douche with water at a temperature of 59°–66° F., by means of which non-adherent intra-uterine bodies will be expelled, and, on the other hand, the os so dilated that firmly attached masses can be readily peeled off with the fingers.

If the hemorrhage was caused by too violent exercise, the patients must keep the recumbent posture for a longer period, take ergot, maintain the lateral decubitus, astringent tampons and vaginal injections, such as the cold douche, being, in the meanwhile, introduced. In these cases, uterine injections act very speedily and favorably. Displacements of the uterus, when present, are to be corrected. Bleeding granulations and ulcers on the os must be stimulated to heal by cauterization with a solution of nitrate of silver (0.6–2 : 30 grms. of water), or with liquor hydrarg. nitrici oxydulati. These applications should be made once a day through the speculum. The fluids mentioned may also be allowed to act upon the cervix. But cauterizing the inner surface of the uterus, when diseased, with the sound coated with nitrate of silver, is to be discarded, because we cannot determine precisely the seat of the affection, and because healthy parts may be thereby deeply cauterized. The careful injection of a solution of tannin or liquor ferri sesquichloridi, by means of Braun's syringe, is especially adapted to severe cases of diphtheritic endometritis; these agents act as styptics, and, at the same time, destroy the diphtheritic membrane. It is well to begin with weak solutions, such as equal parts with water.

The *after-treatment* of lying-in women, who have met with great losses of blood, is very important. Absolute rest is essential, as is the horizontal position with the least possible movement; the urine must be passed while reclining, or, if this

cannot be accomplished, the catheter must be used; even conversation is be avoided, and solicitous friends are to be debarred from entering the room. If the woman is not so anemic as to cause evil results to be apprehended with any movement, and milk appears in the breasts, the child may be applied to the breasts ten or twelve hours after the hemorrhage has been checked. If, however, the anemia is considerable, it is better to wait one or two days, and then make the attempt when the woman has somewhat rallied. A uterus, which has been relaxed by hemorrhages, may be stimulated to contraction by applying the child to the breast. At first, cow's milk should be given in addition to the breast-milk, so that the mother shall not be disturbed too often or too continuously by her offspring. If the woman is suffering from extreme anemia, is very weak, or has a scanty supply of milk, the child should not be given the breast, since it only does injury, exaggerates the nervous irritability, disturbs the night's rest, etc. The bladder must be emptied every 3–4 hours, either voluntarily, or, if that is impossible, with the catheter. The functional activity of the skin should be promoted by warm clothing. Care should be taken to insure a sufficient supply of fresh air, the temperature of the room being maintained at 66° F. In the early days, the infusion of ergot is still to be administered, if the bleeding proceeds from the placental site. The diet should be chiefly liquid, not too hot; milk, bouillon, water-gruel, yolk of eggs, and even small quantities of red wine. A dejection must be procured on the 2d or 3d day by an enema of cold water, and repeated the succeeding days. Early sitting up in bed should be firmly forbidden; after the 4th–5th day the lateral decubitus will occasionally be preferable. But such lying-in women as these must keep their beds longer than others, not rising before the 12th–14th day at the earliest, since secondary hemorrhages, displacements of the uterus, and fainting turns are to be apprehended, and even sudden death may occur when the bed is left too early. If there is œdema of the feet upon standing, the legs must be swathed with flannel bandages. Equal parts of quinine and iron in form of a pill, or tinctura ferri pomati (0.6 grm. 4 times a day) should be given to such individuals to hasten recovery; bitter tonics are serviceable, as

well as strong wine and good beer. Anemic lying-in women must shun all violent efforts for some time, and must remain quietly in bed or on the sofa upon the occasion of the first menstruation, that they may not be again reduced by profuse loss of blood; thus, also, must excessive flow be checked by the administration of the suitable remedies (digitalis, acids, cold enemata, etc.).

The uterine catarrh persisting after hemorrhage must be treated by improving the diet, and the constant local application of astringents.

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RECORDS OF CASES.

No. 9. Precipitate delivery; profuse external and internal hemorrhage checked by the introduction of a plug soaked in chloride of iron into the uterus. Normal childbed.

Frederike Behrens, 34 years old, a rather large blonde in her third pregnancy, drove up before the Institution in a droschke at 8.30 o'clock in the morning, and had hardly been conducted

to a room before the waters came away, and at the same moment the child was expelled from the genitals, while the mother was in the sitting position, so that it was just caught by the midwife. The umbilical cord was jerked forcibly. I arrived a few minutes later. The uterus was greatly relaxed, and as soon as the woman had been hastily undressed and put to bed, I squeezed out a great many blood-clots, which, on being placed in the scales by the student on duty, weighed 1½ lb. During the next three-quarters of an hour at least 5–7 ounces of fluid blood and coagula were expelled, before we succeeded in removing the placenta by means of firm pressure upon the fundus and simultaneously moderate traction upon the cord. The placenta was entire and weighed 1 lb. 5 oz. The child, which was asphyxiated but soon revived, weighed but 5⅓ lbs., and had not reached the full term. Owing to great distension of the bladder with urine, a secondary hemorrhage occurred at 11 A. M., which was arrested by emptying the bladder with the catheter, by pressure upon the fundus, and by ergot internally. Another very abundant flooding took place at 11.15 A. M., whereupon I again pressed out numerous clots whose weight amounted to 1¾ lb. I then passed my hand into the uterus, removed several small prominent parts of the placental site, and inserted into the uterus a large wad of cotton-wool soaked in equal parts of liquor ferri sesquichloridi and water. The hemorrhage ceased; considerable red wine was administered (a tablespoonful every 5–10 minutes); the patient did not vomit, but looked very anemic. The uterus was everywhere very tender, when it contained a great quantity of clots, so that the patient screamed if it was firmly grasped; the pain was, however, completely relieved as soon as the uterus was emptied by pressure. As 3¼ pounds of coagula and fluid blood was carefully weighed, the whole loss of blood must certainly have reached nearly 4 pounds. The patient had a perfectly normal childbed.

II. Internal Hemorrhages of Women in Childbed.

Extravasation of Blood into the Tissues of the Vulva and Vagina. Thrombus sive Hæmatoma Vulvæ et Vaginæ.

Anatomical Conditions.—Hemorrhages into the tissues of the external genital organs are most frequently situated in the labia majora, much less often in the labia minora (hæmatoma labiale), but may also be found in the perineum alone. The blood is generally extravasated into the subcutaneous cellular tissue,

in the perineum between the superficial and median fascia, in the vagina into the submucous tissue, or into the cellular tissue encompassing the vagina; as a rule, the effusion of blood is below the diaphragm of the pelvis; yet there are cases (Cazeaux and Hugenberger), in which it has extended along the vagina up to the periuterine cellular tissue and posterior to the peritoneum up to the kidneys, anteriorly in front of the peritoneum up to the navel, and on the sides as far as the sacrum. It is certainly possible for the tumefaction to extend in every direction when the hæmatoma is large, so that the whole vulva, even the perineum and high up in the vagina, may be distended by an effusion of blood, and the original source be no longer determinable. As thrombi of the vulva, that are at all extensive, always project somewhat into the pelvic outlet, the distinction between hæmatomata within and without the small pelvis, as made by Hugenberger, is not a fortunate one; the division into infra- and supra-fascial is preferable, since the fascia of the pelvis is here taken as the dividing line, and this division is the one commonly accepted. The suprafascial hæmatoma may extend between the peritoneum and pelvic fascia, and, in extreme cases, rise even higher, inasmuch as the fascia presents an obstacle to the extension downwards into the external genitals. If perchance the latter occurs, it is a result of original anomalous adhesions, or else is dependent upon decomposition and perforation of the fascia (Hugenberger). The tumor which is formed by an extravasation of blood varies in size from a hen's egg to a child's head, and the source is usually to be ascribed to laceration of a vessel in the lower part of the vagina, or more rarely of the vulva. There is no question that the wound of an artery, as well as of a vein, may give rise to a hæmatoma, even though the effusion is most commonly of venous origin. If these tumors rupture, or are opened with a bistoury, more or less large clots generally escape besides the dark fluid blood; a large cavity is thus exposed whose walls are thoroughly saturated with blood; the openings of the vessels, from which the hemorrhages took place, may sometimes be discovered (Rau). These hæmatomata are usually unilateral, more rarely bilateral. The points at which the perforation takes place are generally at the junction of the

labia majora and minora (*vide* Case 13). Openings of various sizes are formed at these points, or cracks may appear, an inch long, occurring at times several in succession (Case 13).

Symptoms.—Excruciating pain generally attends extravasation of blood into the tissue of the vulva or vagina, and is more intense in proportion to the distension of the parts. This is often experienced before a tumor presents externally, though it is not commonly long in making its appearance. One side of the vulva swells gradually, its integument becomes bluish and almost transparent, whilst the pain is steadily increasing, attended by severe straining and pressing, which the patient occasionally takes for violent after-pains; as the distension is augmented, bullæ at times form on the vulva, which then becomes gangrenous, yields to the pressure, and bursts, discharging blood and clots; the patient may even bleed to death in a few minutes by this external hemorrhage (Josenhans, Seulen). Indications of grave constitutional disturbance usually precede such a sudden evacuation. Women are restless, nervous, experience nausea, attacks of syncope, their lips and cheeks become pallid, and there is incessant complaint of severe pain. Although the uterus is apparently not relaxed, and though no more than the ordinary amount of blood has escaped, indications of extreme anemia soon become manifest. If the bleeding is arrested spontaneously, or after the administration of appropriate remedies, the tumor, according to its contents and degree of distension, will be either firm, elastic, and non-fluctuating, if it contains many coagula, or distinctly fluctuating if there is much fluid blood within it. If the seat of the thrombus is on one side and rather deep, and if it is not very extensive, the other symptoms may be trivial. Absorption not infrequently takes place, with low fever, the walls of the cavity then become adherent, and the undue prominence of the vulva gradually subsides (No. 10). If the hæmatoma is, however, larger, it presses upon the neighbouring organs above and below; compression of the urethra with retention of urine ensues, also backache and constipation. The tumor may so contract the entrance and passage of the vagina, that hardly more than a finger can be inserted (Haase), and the escape of the lochial secretion may be obstructed. If the distended skin does not

give way during the formation of the tumor, the rupture and evacuation take place on the following days (No. 11); I found that this occurred spontaneously within the first eight days in 23 cases out of 50 reported in modern literature; it happens generally, however, in the first three days; in Hugenberger's 11 cases it took place spontaneously five times. After evacuation a secondary hemorrhage may set in, and the cavity be filled anew (Haase, D'Outrepont, and Dewees). If gangrene of the vulva follows perforation, septicemia may succeed, to which women often succumb (Lubanski, Braun). Fistulous passages have frequently formed, leading from the suppurating cavity to the vagina, through the perineum (D'Outrepont, 2 cases), or into the rectum, which processes reduce the patient by the tedious fever and great suppuration thereby superinduced, while they heal but slowly. The various results are: (1) death by hemorrhage without an antecedent rupture, or subsequently to it; (2) death from suppuration of the sac with subsequent septicemia or septico-pyemia; most commonly after rupture or perforation of the walls; (3) rupture and recovery; (4) rupture and subsequent fistulæ; (5) absorption without rupture, and perfect recovery.

Diagnosis.—The recognition of these effusions of blood are, on the whole, simple. Deneux, to be sure, narrates several instances in which they were mistaken for varicose tumors of the labia majora, with labial hernia or inversion of the vagina, and Dryer describes a case in which he reduced a tumor of the right vulva, as large as a fist, by means of compression (?), but the tumor returned (1826). The cases date, however, from a period when these tumors were but little known. Their rapid development and growth, the bluish color of the overlying integument, the pain, the elastic nature, occasionally even the fluctuation, besides the sudden symptoms of anemia, without hemorrhage within the uterus or externally, can admit of no doubt that we have to do with an effusion of blood into the parenchyma. The distended condition of the parts must be ascertained by digital exploration through the vagina and rectum. It is only in those cases where the physician is present during the formation of the tumor itself, that it can be definitely determined whether the wounded vessel belongs to the

vagina, vulva, or perineum; at a later date, any localization of the lesion is absolutely out of the question, because, when the effusion is considerable, the blood makes a way for itself in every direction; the external and internal labia, the perineum, vagina, and pelvic cellular tissue are successively invaded. It is scarcely possible to decide, before opening the tumor, that arteries have been lacerated, and even after incision the solution of this point is uncertain.

Etiology.—Laceration of the vessels, to which the origin of the hæmatoma is attributable, occurs with rare exceptions during labor; the appearance of the tumor dates, therefore, from the period of labor, or soon after delivery. I found that in 16 cases out of 50 in recent literature, the commencement took place during labor; in 15 immediately after delivery; and in 4 during the first three days of childbed; no later ones were recorded in this collection. The case reported under No. 13 is peculiarly interesting on account of its late development without evident cause. The period of its formation depends greatly upon the kind of lesion. If a vessel is directly torn or burst, the effusion begins at once; it may, however, be diminished by compression of the bleeding point by the child's limbs, and then rapidly increase after delivery. If, on the other hand, only a sloughing of the wall of the vessel has been produced by pressure during labor, the extravasation does not take place till this spot has fallen away. The earlier and the greater the pressure of the contents upon the contused spot, the quicker will it yield. With this sloughing of the vessels from pressure is often associated a corresponding gangrene of the vaginal wall, and a direct effusion of the blood externally would be of more common occurrence, were it not that, upon completion of the delivery, the spots are displaced so as not to overlie each other. Deneux found that extravasations of blood into the vulva and vagina were quite as frequent among multiparæ as among primiparæ. The above 50 cases, of which 12 are recorded as primiparæ, 18 as multiparæ, and in 20 the number of deliveries is not stated, refute the opinion held by Braun and Hugenberger, that the lesion occurs oftener in primiparæ. It is self-evident that greatly developed varicose veins constitute a predisposition to these hemorrhages, for at the dilated spots

the wall of the vessel is often thicker, but the middle coat is, as a rule, atrophied, and the vessel becomes consequently more friable; it is certainly true, however, that very many, in fact most of these effusions take place in women who are not affected with varix. Marked varicose veins are only mentioned six times in the 50 cases. A bursting and direct laceration of the vessels may be produced by excessive straining during the second period of labor (forcible bearing-down, tempestuous pains, precipitate delivery), by rapid distension of the genital organs, and by direct laceration with some sharp object (a blow, fall, etc.). If effusion is caused by violent coughing, as seen in one instance by Meissner, some antecedent affection of the vessels must have been present, or else a contusion been experienced during labor; upon no other hypothesis could a rupture of vessels so situated be brought about by coughing. Contusion of the vessels is produced by instruments (forceps four times, hook once); by a large child when the outlet is narrow; by unfavorable presentation of the head, and protracted pressure upon the soft parts. The origin is, however, most frequently spontaneous; thus, in the above 50 cases operative interference was recorded but seven times. The thrombus occurred twice in case of twins (Schneider, Dewees); once with triplets (Bossi); once in case of a breech presentation. With reference to the position of the child's head in relation to the side in which the thrombus appeared, I could learn nothing positive owing to the general insufficiency of the data. Contracted pelvis is mentioned twice. As to the frequence of hemorrhagic extravasation, this was observed by Bossi but twice in 5660 deliveries, and he states that Scanzoni has only met with one such effusion, which was as large as a hen's egg. In 14,000 labors at the St. Petersburg Lying-in Establishment, Hugenberger saw effusions of blood into the cellular tissue investing the genital organs but eleven times; in two of these cases, the delivery had been completed by means of instruments. In Vienna, eighteen of these cases occurred in 33,241 deliveries. No such thrombus has been entered in the records of 816 patients in the Rostock Establishment. In addition to many extravasations into the vulva and the edges of the perineal ruptures, varying in size from a pigeon's egg to a walnut,

there have come under my observation several cases, reported under Nos. 10, 12, and 13, which give a proportion of about one hæmatoma to 1600 labors. McClintock states in his work on Diseases of Women that he has observed 25 (!) cases of thrombus of the vulva.

Prognosis.—Deneux, who in 1835 published a monograph on these tumors, found a fatal result recorded in 22 (!) out of 60 cases; since that time, the opinion has been widely disseminated that such a hemorrhagic effusion is a very dangerous affection. Four of Hugenberger's 11 patients also succumbed, one after the discharge of a peri-uterine effusion into the peritoneal cavity. As a fact, however, the prognosis is by no means so bad, for in the 50 cases that I have collected, death occurred but 6 times; in 3 the result was not recorded; on the other hand, 40 made perfect recoveries, and twice only did a tumor remain after the hæmatoma was absorbed (Schneider, Drejer); one developed again during a subsequent labor (Schneider), and had to be evacuated. Four recoveries took place by complete absorption without rupture, 20 after spontaneous rupture, and 16 after the evacuation of the cavity by incision. Unfortunately, the duration of convalescence is not often stated precisely, yet there are instances enough in which this was completed in two to three weeks (Drejer, D'Outrepont, Gilmour, Bossi, Burger, Hecker, and the author) even during seasons when, and in localities where, septic puerperal affections were of frequent occurrence (Hecker). Convalescence is much more protracted where there is gangrene of the vulva or where fistulous passages form. Fatal cases have been reported by Cazeaux, Lubanski, Broërs, Seulen, Josenhans, and C. Braun. The cause of death was hemorrhage in 3 instances, bursting of the tumor twice, in one instance (Cazeaux) the effusion of blood extending to the kidneys and navel.

Lubanski and C. Braun attributed death to septicemia, Broërs to typhoid fever (?). Many of those who recovered are reported to have had normal labors subsequently (Hecker, Nusser, Kretzschmar, and the author), and in this case, the cicatrix of the perforation has often been sought in vain. It may be seen from these statements, that the prognosis must be guarded, but is not now so unfavorable as it was thirty years

ago. If the evacuation takes place early, without the supervention of extensive gangrene of the soft parts, or a fresh hemorrhage, the prognosis is on the whole good; but it is unfavorable if the gangrene is considerable, and the losses of blood profuse; 12 per cent. die, and the remainder have a protracted convalescence. The formation of fistulous passages is luckily rare (4 per cent.). The prognosis, after all, is less favorable in cases of extensive subperitoneal extravasations of blood during childbed, than in the equally large effusions into the peritoneal cavity (hæmatocele) of non-puerperal women. This significant fact is partially explained by the numerous sloughing shreds of tissue remaining behind after hemorrhagic effusions in childbed, which greatly favor the development of putrid infection, and is in part attributable to the great hyperemia, and the very great size of the vessels in those organs whereby they take up the poisonous matters much more readily. It is, moreover, certain, that in the lochiæ which flow past these tumors, monads and vibrios (*i. e.* generators of putrefaction) very often exist, which penetrate not only into the blood-sacs that are already open, but possibly into those that are still closed, and may thus give rise to putrefaction (*vide* Case 12). Finally, it must be borne in mind, that, even after the opening of a cavity, which is so irregular, contains so many depressions, and is so traversed by septa, parts could be easily found which, even in spite of the most careful disinfection, had still escaped the action of the antiseptic injections.

The *prophylaxis* of blood extravasation belongs chiefly to midwifery. The application of the forceps, when the presentation of the head is unfavorable or varicose veins are greatly dilated, and even the use of chloroform may sometimes be serviceable in preventing their formation. As a rule, however, the appearance of such tumors is generally a matter of surprise.

Treatment.—In order to prevent the extension of a thrombus, resort must be had to hemostatic remedies, as soon as its existence is recognized. If the vagina is the seat of the bleeding, this organ should be plugged with tampons of cotton-wool, or with a colpeurynter filled with ice-water. Cold compresses, or the ice-bag, may be laid upon the tumor, if it is

situated in the labia; compression against the anterior wall of the pelvis is not advisable. Internally, ice, digitalis, and especially opium, should be administered, the latter to allay the excitement of the woman and assuage her pain. As soon as it can be definitely determined that the tumor has ceased to increase, I restrict myself at once to the use of absorbents. I am not of the opinion of Hugenberger and others, that the tumor should be invariably opened, as soon as it ceases to augment in volume, but believe that the size and the appearance of its surface and surroundings must govern our treatment. It is my opinion, therefore, that there is no indication for incision, when the thrombus is not larger than a fist, when the integument of the vulva is not discolored, or too tense, and when perforation is nowhere imminent. We may then employ ice-compresses, cloths wrung out in warm lead-water and opium (15 grms. tinct. opii to one pound of lead-water), infus. chamomile flor., arnica, hyoscyamus, etc., with the addition of lead-water. Perfect quiet and the recumbent posture must be insured, as well as regular action of the bladder and intestines; sleep must be procured by opiates. Rising and sitting up, and giving the child the breast must be interdicted. Under these circumstances the tumor may rapidly diminish. Commencement of absorption will be recognized by the abatement of the pain, tension, and volume.

If, however, the tumor does not decrease; if the skin grows darker and the pain more intense, an incision must be made. The appropriate time for this procedure must be determined by the character of the surface of the tumor. If this becomes rapidly discolored, if vesicles form, and perforation is imminent, the incision cannot be longer delayed. If the bleeding then persists, the vagina must be plugged, the empty cavity filled with charpie soaked in a solution of tannin, or, better still, in a solution of carbolate of soda (3 per cent.), a compress laid over it, and the dressing secured by a T bandage.

With tumors that are exceptionally large, and do not manifestly diminish on the employment of compression, when absorption cannot be waited for, the removal of the tumor must be sought by means of incision and evacuation of the coagula. But before resorting to this measure it is better to

wait three or four days, if the thrombus does not threaten to burst, or if gangrene does not supervene, for then the bleeding vessel may be completely occluded. That incisions into tumors immediately after their appearance may involve a liability to secondary hemorrhages, in the later days of childbed, is proved by the experiences of Haase, Rau, D'Outrepont, and Dewees; on the other hand, no case of secondary hemorrhage was reported in those 50 cases, when the rupture or incision of the tumor was deferred.

The incision should be made at the most prominent part, on the inner side of the labia majora by preference; it may be extended to ¾ inch with small tumors, and to 2–3 inches with large ones, so that the blood-clot may be readily removed. After evacuation the cavity should be washed out with tepid chamomile tea, hypermanganate of potash, or carbolate of soda in solution. If the discharge is profuse, the cavity may be filled with charpie soaked in a solution of alum or tannin, or antiseptic fluids. This dressing may be secured by compresses and a T bandage, and changed at least twice a day. If gangrenous spots appear in the vicinity of the incision, they must be removed as soon as possible; if the surface of the wound is discolored, and the suppuration scanty, wads of charpie, soaked in decoction of oak bark, tincture of myrrh, or in vinum camphoratum, or smeared with basilicon ointment, must be inserted after the injections.

Finally, the anemia must be treated, and the woman's strength supported by good nutritious diet, and with wine, quinine, or acids, according to circumstances.

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RECORD OF CASES.

No. 10. *Hæmatoma of the vulva and vagina on the right side after extraction, with the forceps, of a head transversely impacted in the* 2*d occipital presentation. Retention of urine. Complete absorption in ten days.*

Mrs. K., 30 years old, primipara, a large strongly built blonde in perfect health. At the normal termination of her pregnancy, at 2 A. M. on March 6, 1862, the labor commenced, and between 6 and 7 o'clock the pains had become very severe and painful. Upon being summoned at 1 P. M. on March 7, because no progress was made in the delivery, I found the abdomen moderately distended, the breech on the right side, the fetal heart-sounds strong, and the head, slightly tumefied, lying transversely in the pelvis, in which position it was said to have been for an hour. The os uteri was no longer to be felt, the membranes had been ruptured; the pelvis was normal. The contractions were quite powerful, not very frequent, but were not properly assisted by the woman, who was quite exhausted by the 35 hours of labor. As ergot effected no improvement, and the position of the head, in spite of the lateral decubitus, remained unaltered, after awhile, I applied the forceps with the woman upon her left side; the introduction of the left blade during the narcosis was easier than that of the right. As the head rotated without difficulty, so that the occiput was beneath the pubic arch, the forceps were unlocked and reapplied more in the transverse diameter of the pelvic outlet. The head was then easily brought down without injury to the perineum. The child was large, weighing $9\frac{1}{3}$ pounds; the diameters of the head were normal. During the passage of the head a little blood had begun to escape, but the bleeding ceased upon pressure, after the placenta had come away. The woman felt perfectly well immediately after delivery; pulse 80. The uterus remained well contracted; toward 3 o'clock I left her. At 5.45 P. M. I was again called, and, on my arrival, was told that $1\frac{1}{2}$ hour after delivery acute pains in the genital organs had all at once set in; that the

woman had then become very restless, noisy, complained of great distress, and had suddenly fallen into a profound syncope accompanied with cold nose, face, and hands. The midwife, who was quickly summoned, found her still much excited and complaining of sharp pain in the right lip of the pudenda, which each moment assumed a larger proportion. On my arrival, her face and extremities were of normal temperature, her face pale, the pain less, but the woman faint; pulse 96–98. The right labium majus was larger than a goose's egg, elastic to the touch, very painful upon pressure, and the skin light bluish. With a finger in the vagina I felt the tumor protruding, and could easily reach the upper end of it behind the right ramus of the pubes. The vaginal wall was also very painful upon pressure, the uterus was well contracted, and there appeared to be but little discharge of blood; the bladder was but partially filled. By continuous observation I soon satisfied myself that the tumor no longer increased in size; I then applied compresses of lead-water with opium, administered laudanum, and recommended perfect repose. During the night following, several attacks of unconsciousness took place, but the pain abated somewhat. On the next morning, I found the bladder much distended, the patient not being able to pass her urine, as the tumor had partly compressed the urethra; a large quantity of urine was drawn off with the catheter; pulse 80; pain slight. On March 9, the swelling had notably decreased in the vagina as well as in the vulva; the woman had several times passed her water spontaneously. On March 11, the tumor had become decidedly smaller. The mother nursed the child, and did not leave the bed until the 12th day, when the tumor had completely disappeared.

In October, 1863, the patient was for the 2d time easily and happily delivered, and upon repeated subsequent examinations no trace of the former hæmatoma was to be found.

No. 11. *Hæmatoma of the right labium after the use of forceps. Spontaneous perforation. Recovery.*

At 10 o'clock in the evening of April 11, 1817, my grandfather, at that time district physician in Berlebung (Westphalia), was summoned to a 28 year old primipara, where in spite of 24 hours of labor the head had made no advance. On arriving, he found the head at the plane of entrance to the pelvis, the left side of the os uteri compressed and tumefied, the pains unusually distressing and ineffectual, and the waters already escaped. The external genitals were somewhat swollen and narrow. Since, notwithstanding a suitable change of the decubitus, the administration of opium, etc., the pains were no better at 1 o'clock at night, but had become still more exeru-

ciating, he applied the forceps, and in a few minutes, by resorting to repeated prying movements, succeeded in delivering the head. The perineum was slightly fissured by this operation. The umbilical cord, which was twice wound about the child, was cut, and the latter, though at first slightly asphyxiated, soon began to cry lustily. The forceps had been applied with the patient upon the table; before she was carried back to bed, her external genitals were again examined, because she complained of a burning pain in these parts. Nothing was discovered, however, besides the small fissure. The placenta was afterwards removed from the vagina. Not much bleeding took place.

Upon the first visit on the morning of April 12th (at the expiration of about 8–10 hours), the woman continued to complain of an unbearable pain in the external genitals, although her general condition was otherwise unimpaired; my grandfather gives the following description of what he saw: "I then appealed for aid to the evidence of my eyes, and was not a little astonished to find the right labium pudendi swollen to the size of a man's fist, black and blue toward the inside, as though it had suffered from great contusion, bleeding, extremely tense and very painful upon the slightest touch; the left labium was by this pressed entirely to the side, the rima had disappeared, and the whole tumor resembled a child's head, black and blue, emerging from the genital parts. Compresses with infusion of hyoscyamus, conium, and chamomile tea were applied, and the pain thus allayed. The whole phenomenon seemed to me to be attributable to a contusion (obscure in its causes and conditions) of the right labium pudendi, apparently containing only effused and coagulated blood," the lochia was moderate, and the condition otherwise fair. On the 13th and 14th, her state was quite good; the secretion of milk normal, and the child nursing. On the night of the 14th–15th of April (on the commencement of the 4th day), the tumor opened and discharged a great quantity of coagula, the distended parts collapsing at once. The aperture, through which the coagula escaped, was over an inch long; the discharge was very offensive on April 17th, and the left labium appeared excoriated. With suitable dressings, the secretion from the cavity improved, and a healthy suppuration gradually set in; on the 31st, the patient had already left her bed; the wound cicatrized slowly, and she made a perfect recovery.

No. 12. *Hæmatoma of the left labium pudendi during pregnancy. Sloughing of the same in childbed. Continued fever. Metroperitonitis. Recovery in four weeks.*

H. S., a blonde, 21 years old, primipara. was perfectly well in the early part of her pregnancy, but had great swelling of

both legs and the vulva in the second half of the tenth month.[1] Examination of the heart revealed insufficiency of the mitral valve. The urine contained a small amount of albumen and casts of fibrine. The œdema of the external genitals became so enormous that the labia lay between the thighs like two children's heads. Eight days before her delivery an effusion of blood, larger than a hen's egg, suddenly took place into the posterior part of the left labium. Numerous punctures had to be made in the labia to allow the serum to escape, and thus prevent their bursting, as they threatened to do. In the mean while the fœtus died, and the delivery soon followed with very high fever (pulse 120, resp. 28, temp. 104.9° F.) and constant chills. Its course was normal and lasted but five hours. The boy weighed scarcely eight pounds, was dead and considerably macerated. Soon after delivery, the labia majora looked gangrenous, and complete mortification of the external genitals soon set in. There was constant fever with irregular remissions (the fastigium was at 12 M. on the third day, pulse 128, resp. 24, temp. 105.8°) and repeated severe chills. On the seventh and eighth days large sloughs were removed from the vulva with the scissors. By an assiduous application of compresses wet in vinum camphoratum, by cleansing the parts with hypermanganate of potash, and, after the sloughing masses had been completely removed, with a decoction of oak bark and tincture of myrrh, the surface of the wound improved very noticeably in fourteen days. Although the case was complicated by a severe metro-peritonitis, the patient almost entirely recovered in four weeks. The external genitals wholly cicatrized, the rima pudendi appeared very gaping at its posterior extremity, the greater portion of the labia majora and minora was destroyed, so that only the upper third of the latter remained.

No. 13. *Hæmatoma labii majoris dextri, without mechanical cause. Spontaneous double perforation soon after an effusion of blood occurring sixty hours after delivery. Recovery.*

Mrs. W., 27 years old, the record of whose first delivery is contained in my Clinical Observations on p. 258, under eclampsia, was delivered of a living child at 11.30 A.M. on March 3d of the present year, after a normal duration of the second pregnancy. The pains had lasted twelve hours in all; the child followed soon upon the discharge of the waters, and the placenta came away shortly after; but, according to the story of the midwife, the discharge of blood was great. On March 5th at 10.30 P. M., about sixty hours after the termination of the birth, without any physical exertion, without straining during defecation, or any assignable cause whatsoever, she was sud-

[1] Lunar month. Transl.

denly attacked with a rapidly augmenting pain and sense of tension in the right labium, so that her husband summoned a physician as speedily as possible. At 12 o'clock at night in his presence the greatly distended labium all at once ruptured, and a stream of blood, together with masses of coagula, gushed from the fissure. I arrived toward 2 o'clock and found the patient very anemic, resisting the tendency to syncope; the pulse feeble (88 beats), the second sound of the heart scarcely audible at the apex and over the great vessels. The abdomen was soft and not tender. The right labium was swollen so as to form a tumor larger than a man's fist, in the middle of which on the line dividing the two labia a wound 3 ctms. long, with its smooth edges standing 1 ctm. apart, was visible; from between the latter protruded a coagulum; the bleeding had ceased. The inner side of the nympha was of a purple color. The tumor extended downwards as far as the perineum, and upwards almost to the border of the mons veneris; it did not reach up into the true pelvis, but was entirely external to this and beneath the right ramus of the pubes. Pressure upon the tumor was hardly felt. The patient, however, complained of a numb feeling in the left leg and of coldness of the feet and hands.

Whereas at the first examination only one opening existed, seven days later I found a second 2–3 ctm. long, into which the finger could easily be introduced at the spot where the nympha had been so tense and purple; the openings communicated with each other; the intervening bridge was 2 ctm. broad, and had a healthy appearance. Besides the ice-bag at the outset, and afterwards fomentations of chamomile locally, as well as injections into the vagina, the anemia was treated internally with a strengthening diet. The reaction was on the whole but slight, and after the second perforation—as to the date of which no more exact information could be obtained—the hæmatoma vanished completely in two and a half weeks, though the two apertures remained.

At eight o'clock on the evening of March 5th the midwife had washed and examined the woman's genitals without seeing any swelling, and the patient at that time was suffering no pain; it may therefore be stated with certainty that the hæmatoma did not occur until after eight o'clock in the evening.

Internal Uterine Hemorrhage. Placental Polyps and Extravasations of Blood into the Parenchyma of the Uterus. Metrorrhagia interna. Hæmatoma uteri.

When, after the expulsion of the child, the contraction of the internal os is normal, whereas that of the uterine body is

deficient, or fails altogether, the blood flowing from the placental site finds no escape externally, but, owing to its coagulation, collects in the cavity of the uterus. By these clots the weakly contracting uterus is still more distended, the bleeding thereof augmented, and the contractile power of the uterus still further enfeebled by the loss of blood. If, on the other hand, the contraction of the body is spontaneous, or caused by external irritation, the coagula are either wholly or in part expelled, the fragments remaining in the cavity for awhile longer, until they finally succumb to the force of the firmer contractions induced by their presence. In some instances the so-called *fibrinous* or *placental polyps* are formed from the clots resulting from these internal hemorrhages, the free polypoid hæmatoma uteri (Virchow). The point of attachment is commonly the placental site, since the blood adheres to the roughened surface and by the process of aggregation forms large coagula out of small clots. Sometimes a fragment of placenta is imbedded in an effusion of blood, whereby the attachment of the latter to the uterine wall is effected. This connection gradually acquires great firmness, and may be drawn out into a pedicle, so that the whole structure, whose surface slowly assumes the form of the uterine cavity under the pressure of that organ, more and more resembles a polyp. This consists principally of an external, smooth, firm, pale layer, under which successive layers of fibrine are arranged like an onion. The presence of remains of the fœtal or maternal placenta, or pieces of the decidua, may be demonstrated in the pedicle or base of the tumor. There is a very beautiful preparation of this kind in our collection; the pedicle of this polyp is formed by a roll of decidua as thick as a little finger, the polyp, however, is as large as a hen's egg; in the decidua at its base numerous openings of the utricular glands may be distinctly recognized. On section, brown layers of fibrine may be seen, and in the centre a small cavity filled with a reddish fluid. The inside is smooth, firm, and paler than the cut surface. These structures do not undergo further change or organization; sooner or later they are expelled, owing to detachment of the pedicle, to gradual disintegration of the clot, or to the increasing force of the uterine contractions. The paren-

chymatous uterine hæmatoma still remains to be distinguished from this free polypoid hæmatoma; it consists of a more or less extensive extravasation of blood in one wall of the uterus, or in a lip of the os. This is also very rare, may attain to the size of a fist (C. Braun, *l. c.*, p. 221, No. 4), and disappear by bursting or absorption.

Symptoms.—If the internal bleeding is considerable, the above-mentioned symptoms of anemia often appear in a very short time. The uterus becomes larger and larger, and is difficult to distinguish, through the abdominal walls, from the other organs, owing to its slight amount of resistance. If contractions recur from time to time, they are as a rule very painful, and are attended by the escape of considerable fluid blood, and the occasional passage of a clot. If the fundus is grasped and compressed, very large coagula are expelled, though at times this may not be observed till one or two days later, whereupon the tenderness is usually much relieved. If the flowing is less serious, the uterus feels hard, is firmly contracted and tender to the touch. If the loss of blood persists, the uterus diminishes in size very slowly, and profuse hemorrhages repeatedly recur in the following days. "The hæmatoma favors the tendency to hemorrhages by constantly distending the organ, and drawing apart the places which have once bled" (Virchow, *l. c.* p. 149). If remains of placental or fibrinous polyps are present, the internal os and the cervix open, from time to time, under the influence of the steadily augmenting labor-like pains; the tumors descend, and a fresh hemorrhage takes place. The contraction then intermits, and the os again closes; this process is repeated several times until finally the polyp is expelled with profuse flooding, or is felt by the physician and removed. Involution of the uterus is under these circumstances generally much retarded, and the discharge after the hemorrhages extremely offensive, very purulent, or consisting chiefly of a brownish serum. Months may elapse and the woman still continue anemic; if such a tumor sloughs, as I once saw happen with favorable result, putrid infection is possible. Hæmatomata in the parenchyma of the uterus may, by pressure upon the bladder, give rise to derangements of that organ, and may, moreover, endanger the woman's life by bursting and suppurating. Besides C.

Braun's case, I know of but one on record (that of Hohl) in which, after the bursting, rapid involution of the anterior lip took place without further complications. Earle cites the two cases of this description reported by Montgomery and Johnston; in the latter death followed the rupture.

The *diagnosis* of internal metrorrhagiæ is not difficult; the excruciating after-pains and the symptoms of anemia soon necessitate an examination of the fundus, when the size and relaxed state of the uterus, as well as the discharge of blood upon pressure, indicate the nature of the hemorrhage. Free hæmatomata are more difficult to recognize; the tardy involution; the repeated hemorrhages; the opening and closing of the os; finally the perception of a tumor in the cervix by the fingers, make sure the diagnosis. That a questionable tumor is fibrinous, and not a true polyp, is ascertained from the fact that pieces may be broken off and their structure subsequently investigated. The microscopic examination reveals between the concentric layers of fibrine, red and white blood corpuscles in nearly equal numbers, the latter undergoing fatty, or, as Wagner once found, colloid metamorphosis. The speculum is indispensable for the recognition of parenchymatous hæmatomata, which may be often mistaken for extreme œdema of the lips of the os; the bluish color then indicates the kind of effusion present; œdema, as a rule, disappears speedily after delivery, whereas the hæmatoma lasts a longer time.

Etiology.—Internal uterine hemorrhages occur in lying-in women, owing to deficiency or entire absence of contraction; in the former alternative, when the internal os alone is sufficiently contracted; in the latter, when the escape of the blood is impeded by a clot located in the cervix, or by compression of this part from without. Thus, it is of very common occurrence with retention of urine during the first twelve hours after delivery; if, at the same time, the uterus is capable of contracting to a certain extent, an external and internal hemorrhage may coexist. As the retention of pieces of placenta is usually associated with deficient contraction of the placental site, whereas the rest of the uterus is well contracted, those fragments are often the cause of internal hemorrhages; the formation of polypoid hæmatomata on the prominent spots is explained above. At autopsies of lying-in women, who have

died in the first two weeks, flat, more or less broad and thick segments, or at times, fragments of the placenta as large as a walnut or hen's egg, are often found adhering to the placental site, even when the principal mass has been expelled by the unaided natural forces. Stadfeldt observed this state of things seven times in seventy autopsies of puerperæ, in only two of which had the placenta been removed by manual efforts. The polypoid hæmatomata are consequently not so very rare. They occur quite as readily after abortions, as after deliveries at full term, since they only require for their formation metrorrhagia, and a dilated uterine cavity. With reference to the seat of the placental fragments, and consequently the spot in which the polypoid hæmatoma develops by preference, it is curious that Stadfeldt discovered them relatively most often upon the anterior uterine walls, whereas Gusserow's investigations have shown that the site of the placenta is quite as often on the posterior as the anterior uterine wall. Attempts have been made to explain this more frequent occurrence on the anterior wall, by supposing that this part was more exposed to traumatic influence, and subsequent inflammation. Many formations of this description are doubtless overlooked, as they are likely to be taken for simple blood clots, and not further examined. Hegar (*loc. cit.*, pp. 86 and 89) has seen such coagula discharged as large as a pigeon's or hen's egg; Leopold's case, in which the tumor was firmly adherent to the internal os on the right side, and was not detected until the tenth day of childbed (two inches long, half an inch thick, a so-called fleshy polyp), belongs unquestionably to this category, as does that of J. Engel.[1] The assertion of Kiwisch, that these may develop

[1] The following citations prove that this form of hæmatoma was known to Kiwisch and Velpeau as such, even though it was designated by no name: Mursinna (*Krankheiten der Schwangeren, Gebärenden, Wöchnerinnen*, etc., II. Auflage, Berlin, 1792. Theil ii. p. 44) says, "since from this place (the inner surface of the uterus) much mucous or viscid, gelatinous fluid is secreted, it may so envelop a blood clot by degrees, that it not only becomes indestructible but more like a fleshy growth. Still further, such a clot may, by its adhesive character, become actually attached to the inner wall of the uterus, and consequently resemble more or less a polypoid growth. It is also my belief that most organized structures, observed after delivery, are formed in this way; and I am also inclined to think that many growths are too soon mistaken for polypoid formations."

after menstruation without an antecedent delivery (which was disputed by Scanzoni), seems to have been demonstrated by a case published by Rokitansky (*Wiener Med. Wochenschrift*, 1866, No. 21). Rokitansky and C. Braun have established the fact, that these structures may form about portions of the ovum, and especially fragments of the placenta.

Prognosis.—The significance of internal hemorrhage depends chiefly upon its degree and causes. That accompanying retention of urine is, on the whole, more favorable than that induced by deficient contraction, and far better than that which results from retained portions of placenta. In the latter case, the prognosis is always doubtful, because, even if the discharge of these fragments may be finally brought about by powerful contraction without further dangerous measures, yet very profuse hemorrhages supervening at a later period may reduce the patient, and thrombosis, embolism, or septicemia be often produced. Profuse metrorrhagiæ are almost always associated with polypoid hæmatomata. The sooner the cause is recognized the better. Apart from the deficient involution of the uterus, the anemia, and the concomitant affections, a favorable prognosis is justified in case of these tumors; they are easy to remove, the operation is almost painless, and the recovery is generally rapid.

Treatment.—Internal hemorrhages, like the external, are to be treated according to their causes, and in general with the remedies mentioned in the preceding chapter. As soon as the presence of a foreign body in the uterus is discovered, its expulsion must be effected by ergotine or strong doses of an infusion of ergot, and, when the bleeding is profuse, by dilating the cervix, at the same time, with a sponge-tent or laminaria. If the tumor is accessible to the trocar, and can be embraced with the finger, so that its pedicle can be reached, the fundus should be steadied from without with the left hand, and pressed downwards as far as possible. The fore and middle fingers of the hand should then be passed up to the pedicle, this grasped, and a careful attempt made to tear it off, which is generally successful. If the tumor is situated too high, or is too firmly attached, the fundus must be held by an assistant, while with two fingers of the left hand the polyp is drawn

down as much as possible, seized with polyp forceps, and the pedicle twisted, so that the tumor can be removed. For after-treatment cool injections into the vagina are to be recommended, and, if the discharge is very offensive, the injections should be introduced into the uterus itself. Water alone, or with the addition of alum, tannin, permanganate of potash, or carbolate of soda, may be used. Ergot should be administered for several days, in order to excite anew the contractions of the uterus; frequent examinations should be made, to see if the os again closes and the vaginal portion reforms. Beau has recommended for cases in which parts of the placenta have been retained, the administration of ruta with iron or sabina (ruta 0.3 grm., sabina 0.12 grm., sacchari 0.6 grm.), but this drug has thus far found but few advocates.

The same procedure is to be followed with parenchymatous hæmatomata of the lips of the os, as with thrombi of the vagina and vulva. If absorption does not take place, an incision through the speculum will be necessary to give exit to the effusion of blood; if the bleeding still persists, the vagina must be plugged with wads of cotton-wool, with the colpeurynter, or with pieces of ice. For after-treatment frequent injections of antiseptic fluids into the vagina are indicated.

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CHAPTER IV.

INFLAMMATION OF THE GENITAL ORGANS IN CHILDBED.

I. Inflammation and Ulceration of the External Genital Organs and Vagina. Ulcera Puerperalia Vulvæ et Vaginæ, Œdema Vulvæ.

Ulceration of the vulva and vagina is one of the most common affections of childbed. Its situation is generally at the posterior portion of the vaginal entrance, whence it spreads laterally and upwards into the vagina; the shape that it assumes in these localities is variable. Ulcerations further occur on the inner surface of the nymphæ as long, narrow, profusely suppurating surfaces, extending up to the base of the clitoris and to the orifice of the urethra. They occasionally encircle the whole vaginal entrance like a wreath. In the vagina they are most frequent at its lower end and in the *cul-de-sac*, more rarely isolated in the middle segment on the anterior or posterior wall. As a rule, these ulcers appear 2–4 days, occasionally as early as 12 hours, after delivery; they are first seen as healthy fissures of the mucous membrane, but soon acquire a yellowish-gray look, their edges become red and tender, while the surface secretes freely. They soon invade the neighbouring tissues, and are attended by œdema of the vulva. This last complication always corresponds to the seat of the ulcers, and is consequently either on the posterior commissure, on one or both of the nymphæ, or may even involve the whole vulva. The other parts of the vulva and vagina are usually swollen, and, when ulcers are present, the papillæ are very prominent and the secretion of the mucous membrane is augmented. The appearance of the ulcers changes rapidly; their surface, which is at first covered with a thin layer of pus, often becomes, in a very short time, grayish-yellow, with here and there rough spots as if eroded, although the membrane cannot be wiped off; the neighbouring tissues then become

harder and more infiltrated, and the œdematous parts very red. Whereas the secretion of the simple ulcers consists chiefly of pus corpuscles, with which blood globules are frequently associated, in the firmly adherent diphtheritic membrane are found many vibrios and that delicate species of algæ which has been termed *leptomitus vaginæ;* the presence of broad bands of mycelium may also be demonstrated. The edges of the ulcers are frequently discolored in spots, brownish-red and gangrenous, at which times the aspect of the suppurating surface is less healthy, and the secretion more offensive. The form of phlegmonous inflammation without laceration of the parts, which results from abscesses and great losses of substance, is much rarer. This will be found to occur (as has been shown in Case No. 1) when ulceration takes place in the higher parts of the vagina, and the pus burrows downwards until it occasionally points in the perineum; this is associated with tumefaction of the external genitals, which may bear a resemblance to phlegmon, but never manifests the pernicious course of true puerperal phlegmons. In October, 1868, I had under treatment two cases of abscess, as large as a hen's egg, in the left labium majus, both with flat puerperal ulcers; one evidently originated in the left Bartholin's gland, and healed in a few days after the pus was discharged, an incision having been made at the point that was thinnest and projected most into the vagina.

The first *symptom* of commencing ulceration in lying-in women is slight pain, especially a burning in the genital organs, on passing water. This is soon associated with tumefaction of the vulva, which is so regular an accompaniment in lying-in establishments that it is found in at least two-thirds of the cases. The flow of urine is thus suspended; the wetting of the suppurating surfaces with urine is increased; and the aspect of the ulcers is worse. When puerperal ulcers exist the lochia is commonly offensive, whether it has been previously fetid from the presence of endometritis, or, as often happens, this penetrating odor has been acquired by a mixture of the lochia with the secretion of the ulcerating surface. More or less high fever generally attends puerperal ulcers that are accompanied with swelling of the external parts; chills at the

outset are rare; the type is remittent, the chief exacerbations falling in the evening. The height of the fever is generally reached on the evening of the third or fourth day. A decided remission takes place toward morning, owing to the night's rest, the greater freedom from movement, and the diminished moistening with urine. This traumatic fever may be regarded during the first two days as of a slightly septicemic character, owing to the absorption of septic matters; it subsequently becomes a simple pyemic fever from the absorption of pyrogenic substances from the surface of the ulcer, since, according to Billroth and Weber's investigation, pus *bonum et laudabile* contains pyrogenic matter. The usual duration of ulcers is 2 to 3 weeks; they cicatrize very slowly, and are retarded in their healing particularly by the woman leaving her bed too early. They are painful on walking and sitting, and occasionally bleed when rubbed. The surrounding œdema generally disappears long before the wounds are completely healed. Constrictions of the vulva are, on the whole, rare from such cicatrices, and, generally speaking, are only observed to follow extensive losses of substance, in consequence of gangrenous or diphtheritic ulcers.

Inspection is indispensable for the recognition of the peculiarities of the ulcers just described. Examination with the finger and speculum is also necessary, and should never be omitted when œdema of the vulva is present, for which no cause can be discovered at the vaginal entrance. This is also true when there is retention of urine. The microscopic examination will generally be needed to recognize the variety of the ulcer. Puerperal ulcers are readily distinguished from syphilitic by their form and course.

Etiology.—A predisposition to ulceration in childbed is traceable to the catarrhal inflammation of the vagina and vulva during pregnancy, and particularly to the virulent discharges and gonorrhea of those parts and of the cervix uteri. For these reasons it is explicable that this variety of ulcers and œdema should be so very common in lying-in establishments, and yet so rare among women of the better classes. In 816 childbeds that are entered upon the books of the institution in Rostock, puerperal ulcers and œdema of the vulva are

recorded fifty-nine times; *i. e.*, one in fourteen; during 1861–1862, on the other hand, I found 52 (!) lying-in women affected with œdema and ulcers at the vaginal orifice among 172 patients in the Berlin University Lying-in Establishment. This more frequent discovery of ulcers is attributable to the fact that I examined the external genitals every time that I introduced the catheter into the vagina. The ulcers are more common in primiparæ than in multiparæ, for in 100 cases I found that 87 were with the first child, only 11 with the second, and 2 with the third. In 100 lying-in women, whose condition was given in the tables appended to the first edition of this book, 53 (!) exhibited lacerations at the vaginal entrance, and in 29 of these there were ulcers of greater or less extent. Since fissures of the mucous membrane occur at nearly every delivery, whereas puerperal ulcers are quite rare, especially in private practice, it follows that the normal lochia is not as a rule capable of converting such a fissure into an ulcerating surface. If, however, with the lochia there are mingled decomposing tissues (fragments of placenta and membranes), suppurating masses from the cervix, or pieces of diphtheritic membrane from the uterus or vaginal *cul-de-sac*, an ulcer is, in the majority of instances, produced. Whether it is the pus corpuscles, or the vibrios contained in the decomposing fragments, which bring about this change, is not yet ascertained, yet this self-infection has been proved to be of common enough occurrence. Puerperal ulcers may, moreover, develop from ruptured thrombi of the vulva and vagina; there is then generally a large foul collection of fluid, in which may be recognized many shreds of necrotic tissues. Finally, infection of the fissures of the mucous membrane from without by the exploring finger, or the instrument employed, such as catheter, injection tubes, etc., must be admitted as a cause of ulceration.

Prognosis.—Most fissures of the mucous membrane at the entrance of the vagina cicatrize almost without ulceration; a slight secretion is at first thrown out, and in a few days granulations appear, from which fibrous connective tissue is formed. The majority of vulvar and vaginal ulcers in lying-in women heal without further harm, though the patients recover rather

slowly owing to the fever. The cicatrized parts are less yielding and often tear during subsequent labors, but this by no means invariably happens. The prognosis is not so good when the denuded surface presents the above-mentioned eroded appearance, or is covered with a diphtheritic, or croupous membrane, because the fever is usually higher, the recovery more protracted, and secondary affections of the pelvic cellular tissue and of the blood may supervene. At seasons when septic diseases exist in lying-in establishments, puerperal ulcers are more unfavorable, in so far as they augment the possibility of infection, as has already been mentioned in connection with ruptures of the perineum; the same is true of all wounds. The occurrence of retention of urine is, likewise, unpleasant, since the healing of the ulcers may be retarded by the constantly recurring traction and distension, as well as by the irritation produced by the use of the catheter; as far as this goes, the ulcers on the anterior wall in the vicinity of the urethra and its external orifice are less tractable than those at the posterior commissure.

Treatment.—The external genital organs and the vagina must be frequently bathed and cleansed, partly with a view to remove the infectious discharges, and thus guard against the supervention of puerperal ulcers, and partly for the direct effect upon the surfaces of the ulcers already existing.

The following may be used for injections: linseed tea, chamomile tea, weak decoctions of oak-bark, or solutions of carbonate of soda (3 per cent.) three or four times a day. In lying-in establishments, every woman must have her own injection tube or her own tin-box with rubber tube and elastic nozzle, which should be suspended above the bed. The fluids are poured into the tin reservoir, the cock being just above the nozzle, so that the patient can make a constant use of the douche many times a day without exertion. In lighter cases, this treatment is speedily effectual. As a rule, however, the suppurating spots must be more protected from the action of harmful matters from without, which may be effectually accomplished in clinics by dropping a solution of nitrate of silver (0.3–0.6 in 30 grammes) upon the denuded surfaces once or twice a day. This slight cauterization is very painful, but

the effect is beneficial. In private practice, the introduction of charpie soaked in wine of camphor at least 3–4 times a day is advisable. This application must not be left to the patient, for, dreading the pain, she will not place the charpie in the proper position; *i. e.*, deep enough within the vagina. The nurse must be instructed not to plug the vaginal entrance completely with the charpie, and thus arrest the flow of the lochia.

If there is a firmly adherent membrane covering the ulcer, energetic cauterization with the solid nitrate of silver, or with the pure liquor ferri perchloridi, should be practised once or twice a day in order to destroy the membrane.

Compresses wet in lukewarm lead-water may be employed for the œdematous swelling of the vulva; these are simpler and more effectual than the cabbage bags that might likewise be used.

When the seat of the ulcer is on one side, or at the posterior commissure, the lateral decubitus and evacuation of the urine in the knee-elbow position are important precautions. If there is retention of urine, the catheter must be introduced at least three times a day, and at fixed hours. It is self-evident that easy dejections should be procured by means of enemata.

Internal medication is not, as a rule, required for the fever; only when obstinate constipation aggravates the condition, must magnesia, sulphate of soda, and potash be administered.

It must be especially enjoined upon nursing women who are suffering from ulcers, and undertake to introduce the charpie, etc., themselves, not to nurse the child subsequently to this act until they have washed their hands most carefully.

II. Catarrhal Inflammation of the Vagina and the Inner Surface of the Uterus: Colpitis et Endometritis Catarrhalis.

Anatomical Condition.—Erichsen, on pages 12 and 13 of his report, asserts that in every childbed there is developed a certain degree of endometritis, which, however, unless it assumes greater proportions than normal, possesses only a physiological

character, and is part of the normal process of involution in the uterus; he maintains, moreover, that we can only speak of endometritis when the inner surface of the uterus is converted into a discolored grayish-brown sloughing mass, the placental site being then covered with large gangrenous shreds of tissue, while the parenchyma is thoroughly infiltrated and softened. Here sloughing of the superficial tissues is produced by the circumscribed deposits, which assume a highly inflammatory character; sloughing of the superficial tissues, or the formation of isolated diphtheritic ulcerations, may likewise be induced.

This description certainly applies to the more violent stages of endometritis combined with metritis; but, from a clinical standpoint, we should most assuredly be right in the assertion, that there are lesser degrees and other varieties of endometritis, which unquestionably have a pathological importance, and are deserving of attention. On the other hand, it cannot be admitted that "in reality every childbed is followed by metritis;" it might as well be affirmed, that a true ulcer develops from every fissure in the mucous membrane of the os and vagina. Many views prevail as to the state of the inner surface of the uterus immediately after delivery. Cruveilhier asserts, that the uterine cavity presents the appearance of a huge denuded surface, and that the condition of a lying-in woman resembles that of one who has been operated upon. Small abrasions are frequently, in fact almost always, found in the cervix and on the os, as appear in my tables showing the conditions of the genital organs of women when leaving the lying-in establishment; it is certain that the whole decidua is torn off during difficult labors, where interference is required, so that the muscular tissues appear denuded in many spots; this occurs, however, only in operative deliveries. After normal deliveries the superficial layer only of the decidua is generally cast off, the deeper layers remain as the inner surface of the uterus, and in them, of course, the remnants of the utricular glands. There can, therefore, be no talk of an actual denudation of the uterine muscular tissues, but the uterus presents an inner surface invariably covered with mucous membrane, which latter may of course be diseased. I incline,

therefore, to the opinion of Duncan,[1] who maintains that the regeneration of the true uterine mucous membrane is analogous to that of the external skin, and of the other mucous membranes.

The decidua vera begins to form even during involution, and this is the case as early as the third month of pregnancy;[2] while the superficial layers are gradually becoming more loosely connected with the deeper layers, the latter are beginning to grow firmer. Besides the mucous membrane of the uterus proper, that of the cervix of course likewise remains, and there is no question but that this is often diseased during childbed.

According to the investigations of Friedländer, the remaining mucous membrane of the uterus does not possess a superficial epithelium, so that the inner surface of the uterus presents the character of a wound in the connective tissue, with an unquestionable tendency to absorption. During the early days of childbed epithelial and connective tissue cells are found in a state of fatty degeneration; in eight days this layer of cells is cast off, and the inner layers of the mucous membrane form at many points in the glandular epithelium. In the second week the mucous membrane lining the cavity is still very thin, but already presents long continuous expanses of epithelium. In the third week this last is only deficient over the separate projecting thrombi of the placental site, and in the fourth week is everywhere present; the mucous membrane is then 2–3 mm. thick, its epithelium is ciliated. The last trace of the changes that are taking place, is the pigmentation of the placental site. In the simple but very common forms of the so-called catarrhal colpitis and endometritis, the mucous membrane is found to be very hyperemic and swollen, the papillæ prominent, and the secretion more abundant than usual; the lips of the os are tumefied, and this part, as well as the cervix, covered with many œdematous, readily-bleeding granulations. As this variety is very rarely fatal, such affections can, as a rule, only be examined by the aid of the speculum, very rarely in the dead house; it may, however, be occa-

[1] J. Matthews Duncan, Transactions of the Obstetrical Society of London, vol. iv., London, 1863, pp. 106–112.

[2] A. Hegar, Monatsschrift für Geburtskunde, xxi., Supp. heft. p. 5.

sionally seen uncomplicated in the cadaver, when it will be found to extend to the whole cervix, and often to a part of the inner surface, more especially to the placental site. The mucous membrane then sometimes exhibits (case reported by Nagel of a lying-in woman who died after Cæsarean section) small, round, tumefied spots the size of a pin's head, lying close to each other, and discharging a white purulent fluid upon being incised. The subjacent tissue is normal, though occasionally slight œdema of the muscular layers cannot be overlooked; the uterus is, for the most part, well contracted. The inner surface of the uterus is usually covered with a purulent, or muco-purulent, brownish fluid. I cannot subscribe to the opinion of Klob, that puerperal endometritis most frequently attacks the remains of the mucous membrane in the body of the uterus, and that the mucous membrane of the cervix is at times only, and even these only to a subordinate extent, involved. In the lighter as well as the severer cases, the cervix, especially the external os and the placental site, constitute the parts most commonly affected.

Symptoms.—The symptoms, from which an endometritis can be diagnosticated with comparative certainty, when there are no large puerperal ulcers in the vagina, are the offensive odor of the lochia and fever. The character of the odor indicates rapid decomposition of the lochia, and this is often so penetrating, as to pollute the entire apartment, particularly when the bed-clothes are turned down. It is possible, that this decomposition is produced by the secretion of the endometritis, or colpitis, or by extraneous matters from other regions, such as vibrios or fungi (musty smell), to which change the elevated temperature would also contribute; it is further possible, that the very hypersecretion is attended with a fine odor, as is the case in scrofulous ozæna. The lochia, moreover, remains bloody for a longer period than usual. The fever is very remittent, almost intermittent in type; it commonly abates on the evening of the 3d or 4th day, but this may not be observed till a later date, when the disturbance is due to decomposition of the remains of the ovum, as in Case 14. It is certainly associated with the absorption of putrid matters by the blood, and is hence of a purely septicemic character; the curve is well

shown in the case mentioned; the occurrence of secondary fever is quite characteristic. I have already published a rare case of sporadic puerperal endometritis, with the temperature curves, in the *Monatsschrift für Geburtskunde*, Bd. xxii. p. 356, and table ix. A short chill with subsequent feverish sensations is often, but by no means always, met with at the outset, or during the course of endometritis. A severe persistent rigor, on the other hand, points, as a rule, to metastatic pyemia. The local affection generally outlasts the fever by a long period even though mild in its character, while a secondary fever is often induced by a sudden exacerbation of the trouble. It frequently happens, especially in the case of primiparæ, that unusually long and severe after-pains are observed; this is to be regarded as a very favorable symptom, provided these cannot be traced to some abnormal contents within the uterus.

It appears, therefore, that deficient involution of the diseased parts, and especially of the cervix and the placental site, is caused partly by the hyperemia of the inner layers of the uterus accompanying endometritis, partly by the infiltration of the muscular tissues, so often present; secondary hemorrhages and displacements may, therefore, be the indirect consequences of these affections. As an additional complication, the catarrh may be chronic, so that the subsequent sources of irritation, to which the uterus is exposed, may excite anew the scarcely subsiding symptoms. In this way it becomes evident why, in spite of the apparent rapid relief or improvement of the original affection, so very many women remain invalids for months and years.

This last fact is worthy of special attention, because in general the subjective symptoms accompanying these changes are trivial, or intirely wanting. Besides the abnormal persistence of the after-pains, some headache, loss of appetite, slightly coated tongue, irregularity of the bowels, and at the most a sensation of warmth in the abdomen, are other of the symptoms; as these, however, often coincide in time with the first swelling of the breasts, women generally console themselves with the assumption that this is the so-called milk-fever, especially if a chill is superadded; in this view they are gene-

rally encouraged by those around them. A careful examination of the external and internal genital organs, but more especially a record of the temperature taken several times a day, will serve best to indicate to the physician that the fever is not an affair of a day, while the offensive character of the lochia soon calls his attention to an affection of the vagina or uterus. The condition of the abdomen, which is commonly soft, and (like the body of the uterus) scarcely sensitive to firm pressure, as well as examination with the speculum, completely confirm the diagnosis.

The *causes* of the disease in question, are quite well known. In the first place, many pregnant women, and particularly unmarried women, are already thus affected before confinement. In many, it arises during labor from the frequent examinations, especially when the membranes break too early; from exposure of the feet and genitals; and from chilling of the back. During childbed, it is the sloughing remnants of the placenta and membranes already in process of decomposition, which give rise to erosions, congestion, and swelling of the parts with which they come in contact, especially at the abraded spots; these excite a fever (*vide* Case 14) by furnishing a supply of putrid fluids to the blood. Among the other causes to be cited is a cold caught while nursing the child; the application of baths to the genital organs; too few clothes over the feet; getting up too early; and vaginal injections improperly administered, injections having been made too hot or too cold, or being introduced with unclean tubes. Such an endometritis may be regarded as having been propagated from an abrasion in the vaginal *cul-de-sac*, or os uteri, when an ulcer has formed from the latter. Finally, I have repeatedly seen cases of severe endometritis, the cause of which was apparently traceable to infection on the part of a dead fœtus, or to amniotic fluid that had become tainted with meconium. From the nature of these causes, it is evident that endometritis must be of very common occurrence in childbed. In fact it is one of the most frequent affections of lying-in women, so much so that Martin, Buhl, and others assume that it is the point of origin of all uterine diseases in childbed; this statement, however, cannot be admitted. Its idiopathic development, inde-

pendently of all complications, is exceedingly rare, however, but few such instances being on record. This variety of the uncomplicated puerperal endometritis has, since I pointed it out, been corroborated by Schröder (*Monatsschrift*, xxvii. p. 116), whereas Von Gruenewaldt claims to have found 26 cases of pure endometritis among 50 of metritis.

Prognosis.—Under proper treatment, an acute colpitis and catarrhal endometritis lasts, as a rule, 8–14 days, the fever, however, subsiding in 3–7 days; if the affection is neglected, it generally becomes chronic, and the more or less frequent and severe sequelæ confine the patient for another long period to the bed. The disease is not usually dangerous to life, but in seasons when septic puerperal affections abound, it becomes a serious matter, since it augments the risk of putrid, or pyemic, infection. Extension of the process to the whole inner surface of the uterus, and even from this to the tubes and the peritoneum, has been known to occur, but this is exceptional. Since these affections may be followed by a fever of many days' duration, often severe, and generally of septicemic character, while, at other times, they may result in retarded involution of the uterus and other grievous troubles, we have sufficient grounds for considering them pathological, and it is, therefore, incumbent upon us to combat them vigorously.

Treatment.—The morbid secretion must first be regularly removed by mild, warm injections, and, at the same time, the attempt should be made to allay the hyperemia and swelling. Aromatic fluids, such as teas made from the following: chamomile, blossoms of the linden, elder flower, and balm, applied at a temperature of 85° F. should be employed 3–4 times a day for this purpose; these agents are of great benefit in the early stages. If the offensive odor continues unabated, hypermanganate of potash may be added to the injections of warm water, or a three per cent. solution of carbolate of soda may be introduced several times a day into the vagina, and once or twice into the uterus, according to circumstances. With an abundant, but slightly offensive secretion, lead-water (teaspoonful to a syringeful of water) may be preferred, while resort may subsequently be had to the more astringent solutions, such as decoction of oak-bark, tannic acid, alum 3 times

a day. As soon as the abdomen is distended, or when the uterus appears tender only upon deep pressure, tepid compresses must be laid upon the abdomen. Under their influence, a uterus, which was at first as hard as a board, soon becomes softer, the after-pains are less frequent and severe, and the temperature falls. If the after-pains, nevertheless, continue to be very acute, an emulsion of bitter almonds with extract of hyoscyamus or laudanum should be administered. Copious dejections must be secured by castor oil, or, if this be impotent, by small doses (0.1–0.3 grm.) of calomel.

As soon as the woman leaves her bed, the lips of the os and the cervix must be examined with the speculum, and the remedies (tannin, alum, argent. nitr., liq. hydrg. nit. oxydulati) applied regularly once a day directly upon the diseased spots. The injections, already recommended, should likewise be made ; if the colpitis is very severe, hip baths, with astringents, may be tried after the 12th day. It may not be superfluous to add, that unnecessary exposure must be guarded against during the employment of these agents. Deep cauterization with the solid nitrate of silver is not generally needed in these forms of endometritis.

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RECORD OF CASES.

No. 14. *Exacerbation of a pre-existing endometritis by retained portions of the membranes; very severe septicemic fever (remittent fever); beneficial effect from uterine injections of hypermanganate of potash; an early recovery.*

Doris Tessmann, a blonde, 25 years of age, and weighing 172 lbs., menstruated regularly every four weeks since she was sixteen, and for the past four years has suffered from moderate leucorrhea. She was pregnant for the first time, and assigned its commencement to the early part of June, 1865; with the

exception of the mucous discharge from the genital organs she had been quite healthy. The examination revealed a normal condition of the pelvis, and of the abdominal walls, and a second occipital presentation of the child. On the inner surface of both thighs, in the vicinity of the genitals, was a diffuse erythema; a small quantity of muco-purulent fluid was escaping from the vagina; both lips of the os uteri appeared granular and eroded; mucus was oozing from the cervix uteri. The vagina, on the other hand, was smooth, healthy, and but moderately reddened. At 11 A.M. on March 29, the woman first felt the pains, which were, however, infrequent, though they became stronger in the afternoon. The delivery was completed almost normally, with the child in the first occipital presentation. The temperature of the vagina during the delivery was as follows:—

11	P.M.	98.9°	F.—Pulse	84.—R.	26.
12.30	A.M.	98.9	"	"	72.	" 22.
1	"	98.9	"	"	76.	" 22.
1.30	"	98.8	"	"	76.	" 22.

Rupture of the membranes followed the complete dilatation of the os uteri. In the second period of delivery the contractions relaxed somewhat, but this only lasted 1½ hour. The umbilical cord, which was wound about the child, was pushed back over the shoulder. A living girl was born, who weighed 9½ lbs. The student on service was unable to expel the placenta by pressure upon the fundus uteri; but removed it from the vagina about three-quarters of an hour *post partum*, when a part of the membrane tore off. There was no immediate hemorrhage. The temperature on March 30, 3.45 A.M., was 99.2° F.—P. 60—R. 24. Half an hour after delivery, however, a very serious flooding took place, which was arrested by the aid of ergot, and with cold injections into the vagina. On the first day the woman was doing well (A.M. temp. 100.4° F., and P.M. 100.6° F.). On the morning of the second day she also made no complaint, but the lochia was extremely offensive, and a small fissure of the mucous membrane above the posterior commissure began to suppurate. The fundus uteri was hard, not tender, and stood four ctms. above the navel. Temp. 100.9° F.—P. 84—R. 22. At 12 M., the patient had a rigor, lasting over an hour, with an abundant discharge of blood, and acute pains on the inside of both thighs. The anterior surface of the uterus appeared tender upon pressure, but was not otherwise painful, and the abdomen was not distended. The temperature immediately after the rigor was 103.6° F.—P. 100—R. 28. Infusions of digitalis, cold compresses upon the abdomen, and injections of a solution of hypermanganate of potash into the vagina were prescribed. At six o'clock in

the evening the temperature had risen to 105.7° F.—P. 116—R. 24, and the patient now had a flushed face, a severe headache, and the abdomen seemed to be a little distended. Enema. On the following morning (third day) as the temperature was 103.3° F.—P. 96—R. 26, and the lochia in the highest degree offensive, I at once injected a solution of hypermanganate of potash into the uterus, from which the patient experienced no sensation. At 1.30 P. M. the temperature was 104.9° F.—P. 116—R. 28. Six P. M., temperature 102.9° F.—P. 92—R. 24, and the uterus scarcely tender upon pressure. On the next day (fourth), A. M. temperature 100.8° F. —P. 84—R. 24. As the lochia was still offensive, the uterine injections were repeated. At midday the temperature had risen to 102.6° F.—P. 84—R. 24. In the evening, temperature 103.4°—P. 88—R. 26. On the following morning (fifth day), a greater reduction of the temperature to 100.1° F. —P. 88—R. 24, took place, but retention of urine was present (catheter was passed); the third uterine injection was then made, after quite large shreds of the membranes had, for the first time, been expelled that morning. At midday, temperature 103.3° F.—P. 86—R. 24. Evening temperature 104.2° F.—P. 92—R. 22. Spleen measured six to eight ctm. across. The abdomen is no longer tense or painful. Abundant secretion of urine, 1810 cb. ctm. Specific gravity 1017. From this time the patient improved rapidly. On the following day (sixth), in the morning, temperature 101.5° F.; at midday, 102.2° F.; in the evening, 102.4° F.; pieces of the membranes were again washed out by the vaginal injections; the discharge was serous, no longer offensive, the fundus only four ctm. above the symphysis. On the tenth day, the patient first left the bed. She had nursed her child in spite of a trifling eczema of the nipples. On the fourteenth day, she was again more carefully examined, and the condition recorded in the tables of one hundred lying-in women, sub. No. 98. In consequence of the thick, viscous, muco-purulent discharge, an injection of a solution of tannin was made into the uterus, and this, moreover, was not felt by the patient. She was discharged with her child several days later.

No. 15. *Septicemie fever, produced by the decomposition of portions of the membranes retained in the uterus. Steady increase from the 4th day. Duration* 13 *days. It was completely relieved within* 3 *days by injections of hypermanganate of potash into the uterus.*

Auguste Schmiedecke, 32 years old, 4 feet 7 inches tall, weighing 119 lbs., after the third pregnancy had run a perfectly normal course throughout, was delivered, on November

17th, in the Rostock Lying-in Establishment, of a living girl, who weighed 8 lbs. The whole labor lasted about 6 hours, the child being in the second occipital presentation. On November 17th, at 7.45 A. M., the temperature was 99.1° F.; pulse 88–96 (pains); respiration in the pauses 44. At 9.45 A. M., the head was expelled, covered with the amnion; this envelope had to be cut with the scissors. After a while the placenta was expelled by pressure, and passed through the vulva with its uterine surface forwards; on careful examination, it was discovered that only the amnion was attached to it, and of the chorion and decidua there was but a very narrow fringe along the border of the placenta. Immediately after delivery, the temperature was 99.3° F., and rose to 100.4° F. in the evening of November 17th. In the first 3 days of childbed, the patient was pretty well. The after-pains were trifling; several coagula were squeezed out of the uterus. On the third day, we first noticed that the discharge was offensive. Up to the morning of the fourth day the temperature, pulse, and respiration were as follows:—

Nov. 18 (2d day)	A. M.	99.7° F.	64	28
	P. M.	99.7	68	20
Nov. 19 (3d day)	A. M.	99.9	56	28
	P. M.	99.7	60	24
Nov. 20 (4th day)	A. M.	99.7	72	28

The secretion of urine was abundant up to the evening of November 17th; in 8 hours 1350 cb. ctm. was passed. In the succeeding 24 hours 3150 cb. ctm.; from November 19th–20th 1950 cb. ctm.

On the fourth day the woman had temperature 101.3° F., pulse 80, respiration 24, and only 880 cb. ctm. urine was evacuated in the 24 hours. The breasts were greatly distended with milk. The following night she slept but little, owing to severe headache, and on the fifth day several coagula of blood escaped during her three dejections, as did small pieces of the membranes; at the same time, the lochia was still very offensive, in spite of the injection of a solution of hypermanganate of potash into the vagina several times a day. The range of the temperature from the fifth to fourteenth days was as follows:—

5th.	A. M.	100° F.	84	24
	P. M.	101.3	96	24
6th.	A. M.	100.4	76	28
	P. M.	101.1	96	24
7th.	A. M.	101.	76	28
	P. M.	102.4	104	32
8th.	A. M.	100.4	76	20
	P. M.	102.4	92	28
9th.	A. M.	100.4	80	32
	P. M.	102.	80	28
10th.	A. M.	100.9° F.	84	28
	P. M.	102.6	96	32
11th.	A. M.	101.1	100	32
	P. M.	102.6	92	32
12th.	A. M.	101.6	92	32
	P. M.	103.1	88	32
13th.	A. M.	101.6	88	32
	P. M.	102.6	104	32
14th.	A. M.	101.6	100	32

On this day the secretion of urine was very much diminished.

On the seventh day, she had a rigor with abdominal pains, a bad taste in her mouth, a tongue coated gray, a loss of appetite, and a discharge which was still offensive, but no longer so profuse. When I examined her on the fourteenth day, I found the uterus distinctly anteflexed, still rather large, soft, not particularly tender, but, upon pressure against its body, a yellowish, abominably offensive fluid flowed out so profusely that the hand with which I was making the examination was entirely covered with it (lochiometra). I at once made two injections of a solution of hypermanganate of potash, with my enlarged Braun's syringe, into the uterus, by which means the discharge was rendered perfectly free from odor. On this day, the evening temperature was only 101.3° F., pulse 86, respiration 28, an altitude at which it had not stood at this hour since the sixth day.

15th.	A. M.	100.4° F.	84	32	Discharge very trifling.
	P. M.	102.6	80	32	An injection again made into the
16th.	A. M.	100.4	96	32	[uterus.
	P. M.	101.8	68	32	
17th.	A. M.	100.	72	28	
	P. M.	100.2	72	32	
18th.	A. M.	99.7	76	28	
	P. M.	99.9	60	28	
19th.	A. M.	99.5	64	32	
	P. M.	99.5	60	28	

The woman left her bed on the eighteenth day for the first time, and was discharged a few days after perfectly well. It was particularly noticeable that the uterus, although still anteflexed, had very rapidly diminished in size.

III. Inflammation of the Mucous Membrane of the Tubes. Salpingitis puerperalis.

The inflammation of the mucous membrane of the tubes, which occurs in puerperal women, is not accompanied by any prominent, or distinctly marked symptoms as long as it does not extend further. When the secretion is great, and the matter is discharged into the abdominal cavity, it usually results in a most acute peritonitis. We will give a description of this in the chapter upon inflammation of the peritoneum in childbed. (*Vide* pages 182 and 183.)

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IV. Inflammation of the Ovaries in Puerperal Women. Oophoritis Puerperalis.

Although it is the rule, that in cases of peritonitis the ovaries are likewise affected, and that they are also implicated in the deep-seated diseases of the uterus, an idiopathic inflammation of these organs is quite rare in childbed. It does occur independently, but the symptoms and treatment are, for the most part, so similar to those of peritonitis and puerperal parametritis, that they can be better discussed under these heads and thus repetition be avoided.

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V. Inflammation of the Serous Investiture of the Uterus, Perimetritis, and Inflammation of the Peritoneum, Peritonitis Puerperalis.

Anatomical Condition.—Inflammation of the peritoneum starts, in the great majority of cases, from the peritoneal investiture of the pelvic organs, and specially that of the uterus. This appears to be deeply injected, is here and there superficially exfoliated, and soon becomes covered with more or less firmly adherent, yellowish layers of exudation. The muscular tissues of the uterus may be well contracted, of normal hardness, or there may be pronounced endometritis with softening of the parenchyma. Sometimes the primary indications of parametritis are apparent. The serous membranes are, as is well known, greatly predisposed to inflamma-

tions. It still remains to be determined whether these affections are caused by the passage of pus corpuscles into the lymph cavities of the connective tissue, or are excited by fluids from the blood containing pyrogenic matters. When the inflammation spreads to wider stretches of peritoneum, croupous membranes are found deposited upon other organs, yet these are always thickest and most extensive in the small pelvis; they often completely invest the ovaries, tubes, and uterus, as well as the posterior wall of the bladder, and fill Douglas' pouch. The abdominal portions of the tubes are, therefore, frequently thickened and dilated, the fimbriæ red and swollen, the mucous membrane injected, and in their lumina a viscid or purulent secretion, whereas the uterine portions seem unaffected; under the firmly adhering layers of exudation, their surfaces are granular, and upon section small follicular or parenchymatous abscesses, and even hemorrhagic extravasations, are visible. The follicles often increase rapidly in size, their contents become purulent, or hemorrhagic, more rarely colloid; at times, they grow in a few days to be larger than a man's head, as I have myself seen in one instance. The parietal and visceral peritoneum is universally opaque and injected; the mesentery likewise often shows deep, close injections, and a whitish-gray opacity; at times, the retroperitoneal cellular tissue, and the lumbar glands are infiltrated and thickened. The intestinal convolutions, which are usually much distended, are, as a rule, universally glued to each other, and between these are here and there found isolated collections of pus. The fluid exudation is generally very abundant, and consists of a yellowish, or greenish-yellow serum, resembling whey, mixed with fibrino-purulent flakes. The intestines are distended with gas, owing to paralysis of their muscular layer, the whole intestinal wall is thickened and œdematous, the mucous membrane greatly swollen, the follicles hypertrophied, the epithelium detached in spots, and in the jejunum and ileum are often found small ulcers. The liver, spleen, and kidneys are hyperemic, even softened and enlarged, the two former with thick deposits upon them; the capsule of the liver and kidneys is often tense, and with difficulty removed from the friable organs. The diaphragm is pushed upwards by the

distension of the intestines (even to the 3d rib), the heart is dislocated to the left; the lower lobes of the lungs, therefore, seem compressed even to complete atelectasis, whereas the upper ones are more or less œdematous. Sometimes pleurisy is found to have accompanied the peritonitis; the form of the disease in the pleura is precisely similar to that of the peritoneum, in that an abundant fluid effusion takes place mingled with fibrino-purulent flakes, and a croupous deposit upon both layers of the pleura. Broncho-pneumonic deposits are rare complications of idiopathic puerperal peritonitis. Hyperemia and œdema of the pia mater are, at times, associated with this disease.

In *secondary* puerperal peritonitis, which is often but partial, the effusion is either similar to that of the primary, or thinner and of a brown color. Those places, from which the disease has passed to the peritoneum, manifest the oldest and most extensive exudations (tubes, ovaries, uterus, etc.). In peritonitis produced by *salpingitis*, the disease can generally be demonstrated in both tubes; more rarely in one alone. In the first stage, the mucous membrane is usually injected and tumefied, and the secretion augmented, so that a viscid fluid fills the tube. The catarrh soon passes into suppuration, the epithelium is cast off, the secretion appears purulent, of more or less thick consistency, or of a brownish-red serous character. By propagation of the affection to the peritoneal investiture, we have peri-salpingitis, peri-oophoritis, and pelvi-peritonitis. Croupous or diphtheritic ulcers appear in several parts of the tubes. Pyosalpinx may thus be produced by the cohesion of the abdominal opening, or else the pus in the tube may find an exit in various directions. It will discharge most readily into the peritoneal cavity, so that a secondary peritonitis is apt to complicate salpingitis. The fact that the inflammation is most intense about the abdominal opening of one tube, and the changes in the effusion are there the oldest, is a proof that the peritonitis is actually the result of salpingitis in such instances. Buhl and Klob consider the evacuation through the abdominal opening to be the common course in place of perforation of the tubes, as has been maintained by Förster; in the

cases of Erichsen, as well as those described by me, there were no lesions of the tubes.

The pus may also seek an outlet between the layers of the broad ligaments, and discharge into the uterus, and, after adhesions of the tube, into the bladder or rectum; the latter is said to have been quite often observed (Andral). The distension of the tubes may reach the dimensions of a child's head, before they rupture. At times the tubal sac can scarcely be extricated from the mass of exudation. The collection of pus and distension of the tube is generally located in the abdominal half, and is observed to a much less extent in the section adjoining the uterus. Erichsen, wonderful to state, believes that only purulent salpingitis is capable of evoking peritonitis, and makes the assertion (*l. c.*, p. 13) that "it cannot be supposed that a simple catarrh of the tubes is able to excite a peritonitis." Out of five cases of salpingitis, Martin found one complicated with metro-lymphangitis. If inflamed ovaries grow considerably by the accumulation of pus in their follicles, peritonitis ensues, with adhesions between the cyst and the anterior abdominal wall, the bladder, uterus, rectum, intestines, and omentum; there are occasionally several encapsulated peritoneal exudations, particularly about the diseased ovary. The wall of the cyst may gradually be perforated, and its contents escape into the peritoneal cavity, or into the cavities of other organs to which it may have adhered, and thus be discharged. Subperitoneal abscesses over the sacrum, on the psoas muscle, in the canal of Nuck, the lips of the vulva, and in the small pelvis sometimes coexist.

Symptoms.—The peritonitis of lying-in women is very acute, acute, or chronic, in accordance with its mode of appearance and course. The acute form is the most common. A severe persistent chill (from ½ hour to 3 hours) is almost a constant symptom in the early stage of this variety, and is attributable to the circumstance that there is experienced usually a rapid rise of temperature; this is often preceded by abdominal pains. During the rigor, the abdomen begins to be more greatly distended. The pains increase in a marked degree, and are very intense with every respiration, as well as on the patient's turning over, and upon palpation of the abdomen. At first

the pain is limited to certain localities, but soon spreading over the whole abdomen, it becomes shooting, burning, and lancinating in character; at the spots where it is felt, the abdominal walls are distended and hard. At first the patient is usually most intolerant of pressure upon the uterus, which feels large and hard. These pains are at times so intense that the weight of the bedclothes is almost unbearable. Marked elevations of the temperature, and acceleration of the pulse and respirations, accompany the pains. Congestion of the head is indicated by severe headache, redness of the face, ringing in the ears, muscæ volitantes, giddiness, and frequently epistaxis. Effusion into the abdomen begins in the second stage (even after only a few hours), with repeated chills, or a severe rigor; the antecedent tympanitic resonance becomes dull in the lumbar regions, about the uterus, and above the spines of the ilia. The pains increase; besides excessive thirst, the patient is tortured by nausea, and vomiting generally follows, at first of ingesta only, and mucus, but subsequently of fluids either colored with bile, or brown like coffee-grounds. The abdomen is more and more distended until it resembles a drum; meteorism, and even tympanites set in, partly owing to the inflammation of the intestinal mucous membrane, partly because the tone of the circular muscular fibres is lowered by the fever, and thus absorption of the gases that have formed is lessened, and finally in part because the generation of gas is augmented during fever while the absorption of the intestinal fluids is very greatly diminished. The diaphragm and the anterior abdominal wall are bowed upwards and forwards, because their elasticity has been in a measure impaired by the preceding distension during pregnancy. The dyspnœa is exaggerated by meteorism, but not till one or two days later, and only becomes aggravated when the affection is complicated with pleurisy, or catarrh of the respiratory passages (Traube).

The *lochia* is generally diminished, and is more or less offensive according as the inner surface of the uterus is diseased or not. If the uterus is displaced by the formation of a tumor, profuse uterine hemorrhage may result. The excretion of urine is lessened, and the chlorides are rapidly and

greatly diminished. A troublesome and obstinate retention of urine succeeds the pains, in consequence of infiltration of the vesical muscular layer. The constipation, which soon supervenes, is attributable to the same changes in the intestinal walls. In place of the constipation, dysentery generally sets in later, if the mucous membrane of the intestines is implicated and ulcers are present, or when the resistance of the sphincter is overcome by the tremendous meteorism and generation of gases in the intestine.

The *fever* in acute peritonitis is usually of the continued type, and reaches its height very rapidly; the temperature often rises 3 to 5 degrees in a few hours, and fluctuates between 102° and 106° F.; the exacerbations are at mid-day, and in the evening (more frequently). Great remissions (to 100.4° F.) at times occur during or subsequent to extensive effusions. The frequence of the pulse varies from 96 to 132 beats, with an average of 112–120. The character of the pulse is variable; at first it is full and hard; after an effusion, soft and easily compressible; later, it is again slower and more forcible. The respirations amount to 20–32 in the minute, even though pleurisy is not present. The rapid respiration is partly caused by extensive displacement of the diaphragm, and the pain induced by its movement, and partly by the early exhaustion of the other respiratory muscles, which are no longer capable of expanding the chest sufficiently. On this account the respiration is gasping and superficial; the patients breathe with open mouth, and the action of the nasal muscles indicates the extent of the dyspnœa.

In sporadic primary peritonitis, the *mind* is generally unaffected; patients complain of severe headache, abdominal pains, thirst, and loss of sleep. If, however, the effusion increases, and the dyspnœa becomes greater, delirium and picking at the bedclothes often set in; patients hitch down in the bed; many, however, retain their full consciousness up to the last moment.

If the peritonitis remain uncomplicated, the strength of the patient be not too much reduced, and the effusion be not excessive, an abatement of all the symptoms occasionally supervenes after the second stage has lasted six or eight days;

the temperature often sinks to below 100°; profuse sweating, or a rapid augmentation in the secretion of urine takes place. The pains in particular are relieved; the intolerable distension of the abdomen and the dyspnœa begin to moderate; the patient sleeps; vomiting and chills cease, and, with a gradual absorption of the effusion, the patient makes more rapid strides toward recovery than would have been thought possible, in view of the ominous character of the first symptoms.

Whereas, in the acute peritonitis just mentioned, the chill often occurs during labor, or a few hours after, and the effusion is not wont to take place till ten or twelve hours later, in *peritonitis acutissima*, such as accompanies salpingitis, or follows perforation of any of the abdominal organs, or other severe lesions, the effusion is poured out much more rapidly; intense pain suddenly sets in during or immediately after some physical effort, such as passing the urine, defecation, or sitting up; a chill, distension of the abdomen, with acute pain, at first chiefly confined to one side, and an effusion often so abundant as to fill the whole abdominal cavity within a few hours, here almost coincide; the exudation is at times preceded by many painful, loose dejections. The pulse and temperature rise with equal rapidity, while the pulse and respiration attain a very great height (172 and 40–60!). The temperature always falls gradually. Frequent and distressing vomiting, and involuntary escape of feces and urine set in; occasionally the mind is affected, or, on the other hand, often remains entirely undisturbed until death.

The more *chronic* form of peritoneal inflammation in lying-in women is generally more localized and confined to the pelvis. With an initial chill the lower part of the abdomen begins to be tender, an effusion then forms in the pelvis, which, by pressure upon the surrounding parts, gives rise to pain in the lower extremities and obstruction to the passage of urine or feces, as well as swelling of hemorrhoids. The abdomen is only distended below the navel, and the abdominal walls are usually more lax, so that the distended intestinal convolutions beside and above the uterus are visible, forming movable prominences. Fever and rapidity of the pulse and respiration

are not so marked in these cases as in acute peritonitis; the affection usually begins later, more insidiously, and may last for weeks and months, while at the outset great remissions often take place in the morning. Relapses and sudden exacerbations often occur. The symptoms are in no way different when puerperal oophoritis has led to the peritonitis.

The *results* of acute peritonitis are—

First. Complete recovery; by fatty degeneration and entire absorption of the pus and serous effusion. It is generally the termination in primary peritonitis of moderate type, with robust individuals, under proper treatment, but is very exceptional in secondary peritonitis, and with all large effusions. Only a somewhat retarded involution of the uterus, secondary hemorrhages, and displacements of the uterus persist as the residua of the peritoneal inflammation.

Secondly. In acute cases *death* ensues on an average upon the 9th or 10th day, but more frequently still from exhaustion, in consequence of sequelæ, such as pleurisy or a fresh excessive peritoneal effusion. A considerable elevation of the temperature is thus at times observed just before death, or even immediately after it (107.3° has been recorded).

Thirdly. If the peritoneal effusion does not soon disappear by absorption, but, on the other hand, the encysted collections of fluid enlarge, certain secondary affections are developed. The fatty croupous masses undergo disintegration, the peritoneum and the subjacent walls, whether of intestine, uterus, or bladder, are perforated, and the effusion is discharged externally. Fecal masses may subsequently enter the cavity and produce decomposition of the pus, whereby a fresh perforation of the sac in other directions may take place, thus exciting a diffuse, rapidly fatal peritonitis; or may, by perforation into the cavities of the uterus, bladder, or vagina, give rise to recto-vesical, recto-vaginal, or utero-intestinal fistulæ.

Such an origin of a utero-intestinal fistula, observed by Simpson, has already been quoted on page 86. Peritonitis and necrosis of the pelvic bones sometimes result from the decomposition of exudative masses. Erosion of the parenchyma of the liver or spleen, with serious hemorrhages, is said by Klob to arise in this way. If the effusion be very abundant,

the abdominal wall may finally become so thin that it is ultimately perforated. (Cases of George Moore, Ed. Martin, and J. De Laplagne).

The peritonitis *acutissima* generally leads to an early death. Recovery is one of the rarest events. Death commonly ensues 16–48 hours after its development.

Puerperal salpingitis, as a rule, ends fatally on the seventh or eighth day of childbed. The cases in which the peritoneal effusion is not so extensive, or is encysted, or is fully absorbed later, or discharged through the bladder, rectum, or uterus, appear to be extremely rare, for all the twenty-two cases which I have found recorded resulted in death.

Chronic peritonitis, on the other hand, as a rule, terminates favorably, and very seldom fatally. It is, however, injurious, owing to the retarded involution of the uterus, and the false membranes that are left behind, which fasten the uterus, drag upon it by their contractions, and may even flex it; metrorrhagia, menorrhagia, dysmenorrhœa, versions, and flexions of the uterus, are therefore the regular sequences.

The *diagnosis* of peritonitis is easy. The pain, distension of the abdomen, extreme tenderness on pressure, the fever, and finally the vomiting, will direct our attention quickly enough to an affection of the peritoneum. We must, however, seek for its source of origin, and careful examination of the internal and external genital organs should never be omitted. The recognition of the effusion is tolerably easy either by means of percussion, or, when it is abundant and not encysted, by change in the position of the patient, whereby the dulness disappears from the uppermost side.

In case the effusion rises out of the small pelvis, it is sometimes possible to feel it externally; but it is more often accessible from the vagina and rectum. Even if the fluid effusion diminish, the pain subside, and the dulness disappear, yet we have no right to conclude that the effusion is fully relieved. The masses of exudation, encysted between the intestinal convolutions, generally remain longer, and are rarely if ever recognized by percussion or palpation. In this event the thermometer is the most important diagnostic means. If great elevations of temperature still take place in the even-

ing, it is almost certain that such accumulations of pus are present, and that the inflammatory process still exists. The evacuations and the urine must always be carefully examined, to ascertain whether pus is evacuated in them. It is important to administer cathartics or enemata, in order that we may not mistake fecal scybala for a peritoneal effusion. Peritoneal effusions are distinguished from subperitoneal abscesses chiefly by their situation and the character of their surface. The latter generally extend beyond the expanse of the peritoneum, are situated deeper or more laterally in the pelvis, or even in the thighs; their surface is rough, nodular, often more distinctly definable than peritoneal effusions. The development of these abscesses, which generally happens without much implication of the peritoneum, particularly without extensive peritonitis, is all-important for the diagnosis. When both forms of effusion coexist, the discrimination is at times most difficult, though it becomes easier at a later period. The intra-peritoneal effusions are usually larger, and, upon pressure, emit crepitant and gurgling sounds, the intestinal convolutions being adherent to them; which does not occur with those that are external to the peritoneum. Extravasation of blood into the peritoneum, and into the subperitoneal tissues, may be distinguished from inflammatory peritoneal exudations by the symptoms of anemia.

The *recognition* of a peritonitis, due to an escape of pus from the Fallopian tubes, is only possible by exclusion, if a rapid effusion has taken place into the peritoneal cavity, without perforation of the intestines, or other cause being discovered. Such a diagnosis may, of course, be made in the living body, and is capable of an admirable demonstration clinically; but at the autopsy the salpingitis often vanishes suddenly, and quite another disease is found to be the cause. I must deny the assertion of Martin, that the dilated tubes can be felt externally, for the abdomen is very soon distended, and moreover the tubes themselves, unless very greatly dilated, could scarcely be felt on account of their softness and mobility. A probable diagnosis can be made, when, with unmistakable endometritis, painful distension of the abdomen takes place and diarrhœa without effusion. The diarrhœa arises probably

from the pouring out of a catarrhal secretion into the abdominal cavity. I will not venture to express an opinion as to whether the tubes may be felt from the rectum, but this examination is certainly advisable when the vaginal *cul-du-sac* is tender. Menstrual colic, prior to the pregnancy, might perhaps occasionally call attention to a disease of the tubes.

In case of inflammation of the ovaries, and especially follicular abscesses, it is possible at an early stage to recognize their contour and consistence, so that a diagnosis is only difficult when a peritoneal effusion is likewise present. By means of the combined examination through the vagina and the abdominal walls, or through the rectum and abdominal walls, the sharply circumscribed surface, generally smooth, though sometimes covered with irregularities, may be easily felt, and from the distinct fluctuation an ovarian cyst diagnosticated, especially when the uterus can be isolated on one side of it, and is movable independently. The introduction of the sound is not only needless, but even harmful. In my case the diagnosis could be made on the 6th day of childbed.

The *prognosis* depends upon the intensity of the process. It is altogether unfavorable in the very acute peritonitis, is on the whole good in chronic cases, but grave owing to the many evil consequences. In the acute form, it is worse in proportion to the rapidity of its appearance, the abundance of the effusion, and the weakness of the patient. Peritonitis, which is sporadic and primary, without deep-seated disease of the uterus, is more favorable than that complicated with parenchymatous metritis. Traumatic peritonitis, under suitable treatment, has quite a good prognosis. Marked remissions of the temperature and pulse, especially at the end of the first week, always justify a hopeful prognosis; fresh violent exacerbations, on the other hand, are ominous; this is true of the recurrence of chills. According to Buhl, this occurs three times as often in the first week of puerperal peritonitis as in the second. Among 32 fatal cases only two terminated later than the 6th and 8th weeks.

Etiology. — *Primary* puerperal peritonitis often follows wounds of the peritoneum, such as are produced by deep fissures of the cervix, contusions of the uterus against the pelvic bones (contracted pelvis) and by rents and ruptures of

the uterus. Lesions of other organs, such as the bladder and ovaries,[1] contusions due to uterine tumors (myomata), are often attended by peritonitis (one case of this nature is to be found in my Clinical Observations concerning the Pathology of Childbirth, Rostock, 1868, p. 157), as are constrictions, and incarcerations of the intestines that complicate delivery. The peritonitis sets in very early after all these direct lacerations of the peritoneum, and also after the operation for Cæsarean section, where, to be sure, the incision of the peritoneum in itself does not give rise to inflammation, but usually the irritation excited by the presence of the fluids that have been effused into the peritoneum. The violent actions of cold, and sudden changes in the temperature must likewise be regarded as an occasional cause of primary peritonitis. The fact that a long-continued accumulation of feces in the intestines was capable of giving rise to all the symptoms of a peritoneal inflammation was known to Baudelocque, was shown by Lamazurier by an excellent illustration, and more recently was again brought into prominence by Poppel, as stated in the introduction. Peritonitis occurs *secondarily* by the extension of an inflammation from other organs to the peritoneum; this is most common in diphtheritic endometritis. The inflammation spreads by means of the intermuscular connective tissue of the uterus to the periuterine cellular tissue and thence to the peritoneum. It much more rarely extends to the tubes, and from them, by immediate continuity, or by the escape of gas, to the peritoneum.

Catarrh of the tubes, prior to pregnancy, predisposes to salpingitis, for the reason that immediately after delivery a hyperemia of the tubes, broad ligaments, and ovaries takes place, which may greatly aggravate that affection. The fact, that both tubes are most often simultaneously affected, is explicable in the same way; among the 22 cases from the above cited authors, 12 were bilateral, 6 were on the right side, and 4 on the left. Most writers (Vocke, Förster, Buhl, and Martin) assume that the salpingitis of childbed is usually secondary and dependent upon endometritis; salpingitis may, however, unquestionably arise from peritonitis (Erichsen,

[1] Uvedale West, l. c., p. 187.

Fischer), and finally, in rare instances, occur primarily and independently. The case reported by me was of this description. On the whole, salpingitis is quite rare; Buhl found pus in the tubes only 5 times in 35 cases of metro-lymphangitis. I have repeatedly seen catarrh of the tubes in women who have died in childbed, but among very many cases of peritonitis only one instance of characteristic purulent salpingitis. In those cases, where endometritis, salpingitis, and peritonitis are present, the peritonitis may arise from the first affection without the intervention of the second; in such a case the salpingitis would form only an insignificant concomitant.

Because in 32 cases of peritonitis Buhl found pus in the tubes 18 times, it does not follow that this pus was invariably there at the outset, and that the peritonitis was always caused by salpingitis. My views accord much more nearly with those of Fischer, Hugenberger, and Erichsen, in accordance with which the secondary development of peritonitis, after suppuration in the Fallopian tubes, is less common than is affirmed to be the case by Ed. Martin and Buhl.

The occurrence of peritonitis as the result of an abscess within the uterine wall is extremely rare. Finally, the burrowing of an extra-peritoneal effusion, the rupture of an ovarian cyst, extravasation of blood into the peritoneal cavity (hematocele, rupture of the uterus, bursting of a tube, etc.), a periphlebitis with the formation of an abscess, the suppuration of a lymph space in the fundus uteri (case of Spiegelberg), and lastly, the perforation of the intestines with the escape of fecal masses, may all result in inflammation of the peritoneum.

In 33 cases of primary peritonitis, of which I possess records, 17 had been delivered of the first child, 14 of the second, and 1 of the fifth. The labors, which had been followed by inflammation, were easy in 11 cases, tedious and difficult in 2, without requiring operative interference; in 15, operation was imperatively needed as follows:—

Application of the forceps, three times;
Version and extraction, twice;
Perforation and cephalotripsy, twice;

lateral incisions into the external genital organs were made in six instances.

Treatment.—There are no specific remedies for peritoneal inflammation in childbed; it should never be treated in accordance with any definite plan, but regard should be had to the idiosyncrasies of the patients. We can rarely remove the causes of the complaint, and can, at the most, merely relieve obstruction of the intestines, and the disease of the inner surface of the uterus. As prophylactic measures, wet compresses at a temperature of 70°–77° F. should be laid upon the abdomen, and satisfactory evacuations procured by enemata and castor oil, just as soon as the abdomen becomes distended and painful after delivery. If the lochia is offensive, injections of permanganate of potash, or carbolate of soda, may be made into the vagina and uterus, three or four times a day. I have recently made a trial of collodion painted upon the abdomen as recommended by De Latour (*L'Union Médicale* 3, 1859), von Hugenberger, and Dohrn (*Monatsschrift*, xxv. 382), and have learned to value this method highly as a means of controlling the tympanites. If pain occurs in the abdomen, and increases rapidly until it becomes excruciating, 8–12 leeches may be applied to the most painful part, generally at the spot which corresponds with the lateral wall of the uterus, provided the woman is strong, and has not lost much blood during the labor; sleep must be procured by means of morphia or narceïn, and daily dejections secured by small doses of calomel (gr. j–ij three times a day). If, in spite of the loss of blood (and 1–1½ hours of secondary hemorrhage), the abdominal pains are not alleviated, the local abstractions of blood may be repeated once or twice, according to the condition of the woman. If these agents, however, fail to afford prompt relief, or should the state of the patient contra-indicate venesections, three or four ice-bags may be placed upon the abdomen over a thin linen sheet. These should be kept in place, and constantly refilled by day and night (the ice must be renewed every 3–4 hours), until the temperature has fallen sensibly, and the patient complains of discomfort from the bags; the attempt may then be made to give them up; they must, however, be immediately replaced, as soon as the temperature again rises considerably, or the pains recur. As to the

use of ice-bags, which I have often employed with women in childbed for more than fourteen days consecutively, and always resort to immediately for all severe pain in the abdomen, when ice is easy to be had, I can only corroborate the statements of Béhier; I have never seen unfortunate results in my cases, such as diminution of the lochia and lacteal secretion, or affections of the skin, especially gangrene. Veit (*l. c.*, p. 671) also remarks that in mild cases he has substituted rubber bags filled with ice, for the compresses wet with cold water, with which the abdomen was formerly enveloped, or for poultices, applying these bags the moment the inflammatory pains set in, for the reason that a more intense cold proves the more effectual. Hervieux's assertion (*Med. Centralblatt*, 1868, No. 38), that he has repeatedly tried the application of cold to the abdomen, but invariably to the great detriment of the patient, is to me incomprehensible.

I deem it my duty to call attention to the fact that during the past three years, I have only caused leeches to be applied to the abdomen of a lying-in woman a single time, and on that occasion, although the patient recovered, the result did not reach my expectations. I have long been satisfied that the ice-bag is much more often indicated than the local abstraction of blood, yet I have not consequently thought it necessary to discard the latter treatment absolutely, especially in view of the fact that Hervieux again recommends the persistent employment of wet cups. If no ice can be had, a freezing mixture (sal ammoniac, vinegar, and water in the proportions of 1, 8, and 24) may be used with compresses, though no special advantage has been derived from this formula. Painting with collodion, on the other hand, is to be tried morning and evening, this substance being applied in such thick layers, that a firm, continuous surface is formed. I have not observed any considerable fall of temperature after these paintings, as is mentioned by Dohrn, but purpose continuing my experiments for a longer period. An unfavorable result has certainly at times followed this practice. When the collodion contracts on drying, it may produce folds in the subjacent abdominal walls, in which very extensive suppuration takes place, if the

layers of collodion are undisturbed for a long time; in my last case, where the collodion adhered very firmly, several ounces of extremely offensive pus escaped, so that at first sight, I thought that a perforation of the peritoneal effusion had taken place through the abdominal walls. Isolated spots likewise occasionally become fissured, numerous vesicles as large as beans are developed, or erythema and erosions of the integument may form, which give the patients much discomfort. The removal of the layer of collodion is often quite a painful process. All these evil consequences should hardly be taken into account if the decided antiphlogistic action of this remedy was fully corroborated, and of this I can scarcely entertain a doubt, since the communications of Dohrn. If distension of the abdomen is great, in spite of this treatment, enemata with ol. terebinthinæ (15–30 grms.) should be given, which I can recommend quite as emphatically as does Veit. The administration of tobacco enemata (grm. 1 in 120) is sometimes advisable. I can also recommend painting the whole abdomen with Lugol's solution of iodine twice a day, and covering it with wet compresses, or the ice-bag, as a most excellent means of relieving the flatulence. A diminution of the tympanites is not only desirable, but is attainable, and I have been amazed to find the following paragraph in Traube's admirable book (p. 151): "In case of meteorism accompanying diffuse peritonitis, it is better to renounce altogether the treatment of the former." Painting with iodine, and the inunction of mercurial ointment is particularly commendable, when the effusion has ceased increasing. Puncture of the intestine with the explorative trocar for extreme meteorism, as often successfully practised by Levrat and Scanzoni for the temporary relief of the patient, is generally superfluous, and should be only resorted to as a palliative measure in the very worst cases. The catheter must be passed three times a day, if there is any retention of urine.

A good posture is likewise not to be overlooked; the head should not be too low, because of the meteorism; the breech must be supported by an air-cushion, or soft pillow, so that the patient will not hitch down in the bed. As lying-in women are not readily moved, and the urine and feces are

quite likely to escape into the bed and soil the external genitals, these and the buttocks must be washed several times a day with chamomile tea, in order to avert a bed-sore as long as possible.

When the peritonitis is primary, the mind unaffected, the chills infrequent, digitalis should be administered internally (2:180 grms.) every half hour, and persisted in until the pulse has notably decreased in frequence. I omit this treatment only in an acute attack, when soon after delivery the pulse is extremely rapid and small, and the respiration gasping. It is, likewise, contra-indicated in case no effect upon the pulse and temperature can be recognized after the patient has taken 4–8 grms., and when violent vomiting follows its administration. When the fever has notably subsided and the effusion is on the decrease, diuretics, and even cathartics may be employed: acetate of potash, emulsion of poppies, magnesia usta, ol. ricini, small doses of calomel (when the constipation is great). I resort, however, at once to acids, particularly the muriatic or sulphuric, which I give in solutions of 1.25 grm. in 180 water (a teaspoonful every hour), as soon as the general infection is made evident by the repeated chills, the mental derangement, etc. The acids are not simply refreshing to drink, but they diminish the butyric fermentation in the intestine, and by that means tend to allay the meteorism (Traube). If the vomiting is severe, cracked ice, ice-cream, or small doses of opium, hypodermic injections of morphine in the epigastric region, as well as Seltzer-water, soda-water, or champagne in small quantities, relieve the dreadful straining.

The *diet* during the height of the fever should be restricted to soups, and, for a drink, water with the addition of fruit syrups or of some acid. As soon as convalescence is inaugurated, nutritious viands, at first chiefly in the liquid form (extract of beef, yolk of egg, milk) may be prescribed; too rich or solid food must be very carefully avoided for a long time, especially the too highly prized potatoes. I once saw a patient, who, after having passed successfully through a severe attack of peritonitis, overloaded her stomach and intestines with potatoes during the sixth week of childbed, and by this means produced a disrupture of the still recent pseudo-mem-

branes, and perforation of the intestine, from which she died after a few hours. (*Monatsschrift*, xxi. p. 375.)

If the effusion is happily absorbed, the involution of the uterus must be watched, and any hemorrhages from that organ be arrested. The commonly occurring displacements of the uterus must be averted by regulation of the bowels and bladder, by the position in bed, as well as the subsequent occupation and movements.

Quinine, or quinine and iron, in its different preparations, should be resorted to as early as possible to strengthen the patients. It is self-evident that such women should not be allowed to leave the bed until the fever has completely disappeared, and they have somewhat recovered their strength. Warm baths or hip-baths are of great benefit in the after-treatment, but they must not be too warm (90° F.).

If an encysted peritonitic effusion remain, whether it be within or without the true pelvis, an ointment of iodide of potash or mercurial ointment, should be rubbed into the abdominal integument overlying that spot; the latter may be repeated in gr. xviij doses every two hours until salivation is produced; the ointment must be covered with warm compresses. Hervieux recommended that salivation should be brought on as quickly as possible by such inunctions, and kept up until absorption was complete. I know, however, that the desired result may be attained also without resorting to profuse salivation. If one spot of the abdominal walls becomes red and threatens to perforate, the pus must be evacuated by an incision and its discharge promoted by strips of adhesive plaster above and below the point of incision. Blisters and tincture of iodine are useful to carry off the remains of such effusions.

Of the remaining remedies which have been extensively employed for puerperal peritonitis, I must first mention *warm poultices*. With reference to them I concur entirely in the views expressed by Ed. Martin; they increase the meteorism, are untrustworthy in their action, may cause sloughing of the integument, and should only be used to further perforation of the effusion when imminent. I have not resorted to them in a single case of peritonitis during the last five years.

Turpentine stupes, which were formerly prescribed for me-

teorism, are generally inefficient, and are supplanted by cold compresses and the ice-bags.

In like manner I have failed to observe any diminution of the distension after the use of *laxatives* or *opiates*, and consequently coincide in the opinion of Hugenberger as to the value of these agents. Acids, not opiates, afford the best means for the treatment of *diarrhœa*. The favorable action of opium in checking the dysentery is usually offset by the exacerbation of the fever, the loss of appetite, and by the fact that the watery evacuations recur with more violence when the remedy is stopped. (Traube, *loc. cit.*, p. 161.) Astringents (alum, tannin, acetate of lead) should be resorted to only when a speedy collapse succeeds the diarrhœa. The former very common use of venesection has been again specially extolled by Mitchell, on the basis of nearly forty years' experience. It should be practised once, twice, or even three times in succession, according to circumstances, and supplemented by the administration of opium in large doses, and especially violent counter-irritation, by fomentations with hot water and turpentine, or by large mustard plasters. Under this treatment Mitchell claims to have lost but four patients out of 27 cases of peritonitis in 4349 deliveries. He states explicitly, however, that he has never met with any epidemic puerperal affections, and that none of the 27 cases arose from contagion. Mitchell met with but little support in this opinion from Tilbury Fox, Braxton Hicks, and Rauth, who entirely discarded venesection in the epidemic form of peritonitis, admitting its benefits in exceptional cases only (Fox), when the disease was sporadic. The treatment of the secondary affections of the chest, which occasionally complicate peritonitis, will be discussed under the treatment of phlegmon in childbed.

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RECORD OF CASES.

No. 16. *Isolated, idiopathic peritonitis. A continued subacute fever. Recovery in* 8 *days.*

Maria Bohm, 22 years old, a medium-sized, strongly-built woman, weighing 135 pounds, and measuring 5 feet in height, had the first pains at 12 M., on December 3d, after her first pregnancy had run its natural course. She had a chill lasting from 4 to 9 o'clock. At 9.30 P. M. the membranes ruptured. At 10 o'clock she entered the institution. The head was in the first occipital presentation, deep in the true pelvis; was delivered within 15 minutes. The boy, who was born alive, weighed 6½ pounds. The placenta was expelled by pressure, with a great loss of blood, 5 minutes after the birth of the child. Immediately after delivery, 10.30 P. M., I found the pulse 68; respiration 16; temp. 99.9° F. She had a chill lasting 10 minutes.

1st day (December 4th).

	P	R.	T.	Am't of urine.	Sp. gr.
A. M.	74	16	101° F.	1310 cb.ctm.	1010.6
P. M.	110	24	103.4	855 "	

10 o'clock P. M. 112 — At 4.30 P. M. a chill, preceded by profuse perspiration. Abdomen greatly distended, but nowhere tender. No dejection. Infusion of digitalis with an acid, ice-bag, and ol. ricini.

2d day.

	P.	R.	T.	
A. M.	100	33	103.2	Severe headache.
M.	116	22	104.9	Buzzing in the ears, pain in the abdomen upon
P. M.	116	24	104.1	movement; feverishness; uterus very tender; discharge offensive. In P. M. three dejections. A dulness in both sides of the abdomen, changing its limits on alteration of the patient's position. Amount of urine was 1420 ctm. Abdomen was painted with collodion, and covered with wet compresses. Digitalis for the third time.

	P.	R.	T.	Am't of urine	Sp. gr.	
3d day.						
A. M.	78	16	102.7	852 cb.ctm.	1010	Some cough ; the distension of the abdomen is decreasing ; pain especially upon movement. Muriatic acid every half hour.
M.	82	20	103.8	1220 "	1007	
P. M.	80	16	104.1			
4th day.						
A. M.	72	20	102.6	810 cb.ctm.	1009	Severe cough ; muriate of ammonia. Pain only upon coughing. The exudation is perceptibly diminishing on both sides.
M.	76	30	103.1			
P. M.	74	26	103.1	810 2 dejections		
11 P. M.	72	30	102.6			
5th day.						
A. M.	78	28	102.6	810 cb.ctm.	1012	Two small puerperal ulcers at the entrance to the vagina ; great sweating ; the left labium is rather œdematous.
M.	72	22	101.6	530 "	1016	
P. M.	62	22	101.7	no dejection		
11 P. M.	66	24	101.8			
6th day.						
A. M.	72	20	100.3	750 cb.ctm.	1014	The exudation is but very insignificant, the cough slight ; the pain in the abdomen is almost wholly gone.
M.	74	21	101.2	1045 "	1014	
P. M.	64	16	100.8	one dejection		
11 P. M.	88	22	101.6			
7th day.						
A. M.	69	20	99.9	1295 cb.ctm.	1011	No dejection.
P. M.	72	20	100.8	470 "	1018	
8th day.						
A. M.	62	17	99.8	710 cb.ctm.	1020	
P. M.	56	20	102.	1170 "	1017	
9th day.						
A. M.	65	19	99 8	1000 cb.ctm.	1014	The dulness has disappeared. The lochia is no longer bloody. The puerperal ulcer looks well. Considerable sweating.
P. M.	54	16	100.	440 "	1016	
				one dejection		
10th day.						
A. M.	64	16	99.8	775 cb.ctm.	1015	Ol. ricini.
P. M.	60	18	99.9	995 "	1009	
11th day.						
A. M.	70	16	99.5	555 "	1015	One dejection.
P. M.	56	16	99.9	502 "	1011	
12th day.						
A. M.	68	19	100.2	915 "	1016	
P. M.	60	19	99.3	610 "	1012	
13th day.						
A. M.	61	18	99.4	610 "	1009	Patient left the bed for the first time. Fundus uteri still an inch above the symphysis.
P. M.	65	18	100.	735 "	1012	
				one dejection		
14th day.						
A. M.	74	18	100.6	1730 "	1012	Out of bed.
P. M.	56	14	99.3	200 "	1013	

15th day.							
A. M.	64	20	99.6	1495 cb.ctm.		1015	Condition good. 2 dejections.
P. M.	54	13	99.2	355	"	1022	
16th day.							
A. M.	68	16	100.2	1125	"	1009	Blood again discharging from the genitals. Anteversion and deficient involution of the uterus. No exudation to be felt beside the uterus.
P. M.	70	18	100.8				

On the 20th day the patient was discharged. Uterus still anteverted, was larger than is usual at this time; the vaginal portion was still short, the lips of the os eroded; some sanguineous discharge. The peritoneal exudation had completely vanished.

The patient now weighed 108 pounds, and the child $7\frac{1}{4}$ pounds; the former had, therefore (calculating the weight of the whole ovum at $9\frac{3}{4}$ pounds), lost 17 pounds, and the latter, which was nursed by her, had gained $11\frac{1}{2}$ ounces.

No. 17. *Phlegmonous metritis, parametritis, paranephritis, peritonitis, pleuritis, pericarditis. Continued fever.*

M. J., 32 years old, was easily delivered of a living girl—her third child—by version and extraction, while under the influence of chloroform; immediately after birth her temperature was 99.3° F. In the evening pulse 88, respiration 24, temp. 100.6° F.

		P.	R.	T.	
2d day.	A. M.	76	20	99.7	Abdomen distended and somewhat tender.
	P. M.	80	24	100 2	
3d day.	A. M.	136	28	105.2	In the night a chill, feverishness, great restlessness, and tympanites. Digitalis and cold compresses.
	P. M.	120	32	104.7	
4th day.	A. M.	128	32	104.1	Dulness in both inguinal regions; acute pain. Peritonitis. Child taken away.
	P. M.	140	28	103.1	
5th day.	A. M.	136	36	104.5	Diarrhœa. A stitch in her side on drawing breath; cough; pleurisy.
	P M.	120	32	101.8	
6th day.	A. M.	146	32	103.4	Status idem. Great restlessness; screaming aloud; throwing off the bedclothes; delirious, complaining that she must die. Opium quiets her.
	P. M.	140	36	104.1	
7th day.	A. M.	140	36	104.7	
	P. M.	140	36	103.6	
8th day.	A. M.	132	36	104.1	No longer has diarrhœa.
	P. M.	140	32	104.5	
9th day.	A. M.	140	32	104.1	Broncho-pneumonia, pericarditis; coughing is very painful. Much delirium in the night.
	P. M.	136	36	104.7	
10th day.	A. M.	140	32	104.5	
	P. M.	140	32	105.2	
11th day.	A. M.	Death at 7 o'clock in the morning.			

Autopsy made by Prof. Ackermann, 14 hours post mortem. Cadaver of medium size, in good condition, and pale-yellow. Cadaveric rigidity of lower extremities and of the muscles of mastication.

Thoracic Cavity.—The fatty and connective tissues of the mediastinum anticum appear rather œdematous. About 18 ounces of a light reddish-yellow, thick fluid, with an admixture of flakes of pus, in both pleuræ. In the pericardium about 4 ounces of a thick, pale reddish-yellow fluid containing many dirty white flakes. On the surface of the left ventricle, especially toward the base of the heart, are many confluent ecchymoses, varying in size from minute points to hemp-seeds. The apex, as well as the superior and inferior border, and the anterior surface of the right auricle exhibit many granular concretions. In the left auricle are reddish-black coagula, and a small quantity of brownish-red fluid blood.

The left lung is not adherent. The pleura shows on the lower half of the upper lobe as well as where the upper and middle lobes overlap each other, and on the lower lobe, a great number of confluent concretions, from the size of a lentil to that of a three-cent piece; these do not project into the substance of the lung. The bronchi of both sides are thickly covered with petechiæ and red spots, and are filled with a moderate quantity of a thin mucus. A section of the lower lobe at its posterior and inferior part exhibits a perfectly smooth, dirty, brownish-red surface, and is to the extent of half an inch perfectly hepatized. From the surface of a section made through the upper lobe, a pale brown, frothy fluid oozes, and from the cut ends of several bronchi, especially in the anterior segment, small purulent masses are protruding.

In the *abdominal cavity* the small intestines are extensively glued together, and to the omentum, by fresh pale yellowish exudations; in the pelvic cavity, especially around the uterus, there is about 12 ounces of a fluid, yellow, thick exudation. The parietal peritoneum exhibits many reticular and ramifying injected spots, which are also found upon the mesentery and visceral peritoneum. The *liver* has upon its convex upper surface two vascular concretions as large as a silver three-cent piece, and on tranverse section is seen to be of an intense brownish-yellow color, and very full of blood. The *spleen* is 13 ctm. long, 9 ctm. broad, and 2½ ctm. thick, pale and flabby; the connective tissue in the capsule is thickened in several places.

The capsule of the left kidney, and the connective tissue near it are very œdematous; the capsule quite firmly adherent and somewhat thickened. The parenchyma moderately full of blood; the glomeruli are very distinctly visible, but devoid

of blood. The vaginal mucous membrane is of a pale purple color and its surface firmly granular. The neighbourhood of the external orifice of the uterus is of grayish-black color, the orifice itself has a great number of flat rents and 2–3 cysts of Naboth as large as hemp-seeds. The mucous membrane of the cervical canal is spotted and striped with red. The uterus is 15 ctm. long, and its wall at the fundus 2½ ctm. thick. The inner surface is pale, the seat of the placental attachment is on the posterior wall, has a diameter of 8 ctm., and neither in it nor elsewhere on the inner surface of the uterus are there any ulcers. On the left lateral wall of the uterus the sub-peritoneal connective tissue is very œdematous, and lymphatics in great numbers are distinctly visible. On the right wall the sub-peritoneal connective tissue is yellowish and gelatinous, and in the parenchyma adjoining there are several lymphatics filled with thick, pale-yellow, fatty bodies (lymphatic thrombi). In the substance of the cervix uteri as well as on the left side there are several dilated lymphatics filled with a viscous, pale-yellow fluid mass. The right ovary is large, extremely soft, and contains many lymphatic vessels filled with dirty, pale-yellowish masses, most of them small narrow canals, but a part dilated into larger cavities. The right tube is somewhat dilated at its abdominal orifice, and filled with white viscous fluid.

VI. The Puerperal Phlegmon.

Inflammation of the Uterus, of the Subperitoneal and Pelvic Cellular Tissue. Pelvic Effusions. Metritis. Parametritis. Phlegmone Pelvis.

Inflammation of the cellular tissue, taking its rise in the substance of the uterus, may be local, and remain confined to the pelvis, or it may rapidly assume greater dimensions and spread to all the organs of the abdominal and thoracic cavities. In the former alternative, the parametric pelvic exudations form, in which the inner surface of the uterus is often slightly or not at all affected; in the latter a more or less extensive diphtheria of the vagina or uterus is apt to be present. Virchow was the first to give parametritis its full value, inculcate its importance, and to assign this name to the process which we are about to describe. In connection with lacerations or ulcers of the cervix (*vide* Case 18), or even independently of these (Case 17), the intermuscular connective tissue of the uterus begins to swell by the transudation of an

albuminous fluid into it. The connective tissue at the base of the broad ligaments, about the uterus and the vaginal cul-de-sac, likewise soon begins to show a tumefaction in certain directions and spots, then becomes firmer, and at times gelatinous. Under the microscope, the connective tissue corpuscles appear enlarged, their contents grow thicker, more abundant, at times distinctly granular; the cellular corpuscle appears as an opaque body; rows of small, round, roll-shaped granulation cells form by enlargement of the nuclei and subsequent division of cells. The enlarged or swollen elements very soon undergo a fatty metamorphosis, which is not often entire. It is very probable, from the recent investigations of Cohnheim into inflammation and suppuration, that a large part of these granulation cells are to be regarded as wandering white blood corpuscles. The whole of the subserous tissue of the uterus, as well as of the broad ligaments, is swollen; the many-nucleated elements form in continuous lines (purulent deposits), and the two layers of the broad ligaments may be separated and the serous covering be peeled from the uterus.

Waldeyer supplements this description by Virchow with the statement, that he is convinced that most of the finely-granular masses, so difficult to illuminate, discovered by Virchow in diphtheritic parametritis, are bacteria. Waldeyer has found bacteria, as we have, in fresh cadavera of lying-in women that were still free from decomposition, on the inner surface of the uterus, in diphtheritic membranes, in the puriform masses taken from the lymphatics of the uterus and of the ligamenta lata, in the peritonitic effusions and the whitish-yellow fibrino-purulent flakes; in one instance, in great numbers even in the fluids from the cavities of the pleura and pericardium. These facts have already been repeatedly confirmed by Klebs, Recklinghausen, Tiegel, Hunter, and others. It is, at all events, very probable that parametritis is a peri-uterine, subperitoneal mycosis.

This process next invades the fasciæ of connective tissue, and may then extend to the pelvic cellular tissue, where, gaining rapidly in dimensions, it leads to the formation of large tumors. These may be as large as a hen's egg, or even a man's head; they take their rise primarily and chiefly from

the lateral wall of the uterus, so that, when not very extensive, their outlines can with difficulty be made out; they soon, however, spread in every direction, speedily reach the walls of the pelvis, increase in front and behind the uterus, push up the peritoneum, extend over the psoas and iliacus muscles, and project downwards beside the vagina even below the level of the external os. The lymphatics are, as a rule, involved to a subordinate degree in these simple and very common pelvic phlegmons. Complete absorption of even very large tumors of this description takes place by means of a fatty metamorphosis of these granulation cells. If this does not occur, an abscess forms, burrows its way either through the rectum, the bladder, the uterus, the vagina, the abdominal walls above Poupart's ligament, or even through the sciatic foramen beneath the glutei muscles. The pus is discharged, and the remains of the tumor gradually disappear. The peritoneum is often so greatly elevated from the ileo-psoas muscles that a puncture may be made an inch above Poupart's ligament, without danger of wounding it. On pelvic tumors, which are generally of considerable hardness, small, soft, almost fluctuating spots develop, that contain pus, and are termed by König, cavities in the tissues. It is very rare that the opportunity presents of studying such parametric tumors of considerable dimensions in the cadaver. I have only had one marked case of this sort, which I consequently report below (No. 19). I possess microscopic sections of this tumor, to which the above description of Virchow exactly applies. It is unnecessary to state that no trace of fungi or vibrios could be found in the tumor. The occurrence of pelvic abscesses in lying-in women has long been known, and the tumors just mentioned have been so precisely described by other observers, such as Bell, Schweizer, Chomel, Rayer, Velpeau, Grisolle, Battersby, Schmidt, Lever, Aran, Deutsch, and Guéneau, that they cannot be mistaken. These authors, however, were mistaken in their conception of the source of these affections; they believed that the pelvic cellular tissue was usually the first to be affected, or, at any rate, only the peritoneal investiture of the uterus, and consequently named the disease pelvic cellulitis (!), in short, pelvic effusion or parametric abscess. It was known that these were of com-

mon occurrence in epidemics of puerperal fever. Deutsch asserted, even as late as 1857, that these abscesses were not the result of inflammatory affections of the organs in the pelvis, but were in many instances the local metastasis of a general state of the blood (!), designated as puerperal fever. From all the recent investigations, there is no longer any doubt that this affection is purely local, and most commonly starts from the wall of the uterus, though occasionally—much more rarely—from the other pelvic organs, and their subperitoneal connective tissue, in which latter case it subsequently extends to the uterus. If the abscesses that occur in the pelvis are to be classified, they may be divided into intraperitoneal or perimetric, and subperitoneal or parametric; a further subdivision of the latter into subaponeurotic and suprafascial is not readily accomplished, owing to their rapid extension.

Symptoms.—The affection begins, as a rule, with chills, in the first week after delivery, often with a rigor, abdominal pains and fever. The pain is especially evoked by pressure on one side or the other of the uterus; at first it is circumscribed and arises from the peritoneum being involved; at times it is very intense. The abdomen generally appears to be distended, but by no means universally tender; the spontaneous pain occasionally intermits, but the elevation of the temperature nevertheless remains considerable; on careful bimanual examination it is often possible, after two or three days, to recognize a swelling beside the uterus at the spot where the severest pain was felt. This is at first small, often difficult to define from the surrounding tissues, sometimes feels like a thin round cord, but generally exhibits quite a rapid growth; as soon as it has reached the lateral walls of the pelvis, it becomes immovable and by its increase in size pushes the uterus toward the opposite side. The tumor extends anteriorly and posteriorly around the uterus, and often presents toward the vagina rough, nodular projections. As it spreads upon the sacrum, it compresses some branches of the crural nerve, the external cutaneous and at times the obturator. Lancinating pains gradually invade the renal and lumbar regions and run down the thigh; they often persist for days, and may be very acute. Mobility

is often impaired, especially that of the adductor muscles, sometimes owing to pressure upon the sciatic plexus; this likewise occurs in the other muscles of the thigh, so that the patients can only drag themselves about with difficulty, crooking the leg, and walking with the body bent over; sometimes they are utterly unable to put foot to the ground, and can only rise and move by means of their hands. These pains were met with twice, and paralysis of the affected limb also twice, in 24 cases of pelvic effusions of this character which are entered in the records of the Rostock Institution. Schröder only saw them twice among 31 cases of circumscribed parametric exudation. Troublesome disorders of micturition, such as incontinence, pain on passing the urine, or complete retentions (1 : 24) are comparatively rare. By displacement of the uterus and interference with its circulation, involution is retarded, and the lochia, at first scanty and at times offensive, often again appears bloody. The commencement of the process may generally be referred to the first week of childbed, and could be recognized at that time in the six cases cited.

On the	1st	day	twice,	in	Schröder's	cases	10	times.
"	"	2d	" 5	times,	"	"	17	"
"	"	3d	" 5	"	"	"	7	"
"	"	4th	" 3	"	"	"	5	"
"	"	6th	" 1	"	"	"	1	"
Subsequently			4	"	"	"	6	"

My experience, like that of Veit (*l. c.*, p. 131), has been that in the cases, where a tumor has been discovered beside the uterus in the later days of childbed, the history will generally speak of chills or fever as present in the earlier days. I, therefore, refer the inception of the disease to the beginning of childbed, and consider that a subsequent increase of the previously slight suffering is almost invariably due to a recurrence of the tumor. It is not unusual to find that when the original exudation has begun to diminish, a fresh extension of the tumor takes place at several points, with exacerbation of the fever. The tumor may in this way, move from side to side, become fully absorbed on the left, and yet come to perforation on the right side.

The *fever* in parametritis is at first very considerable, and of the subacute continued type; Schröder found a continued fever lasting up to the 23d day in 35 out of 47 cases, and the highest temperature within the first 5 days in 40 cases. A noticeable remission generally manifests itself toward the morning of the 7th or 8th day. The highest temperature that I have taken during this first period is 106.1° F. in the vagina; Schröder has, however, seen 106.7 four times; on the average it has rarely exceeded 105° in the evening. The remissions are in the morning. After the first of these, a remittent fever persists which is not unusually followed by a perfect intermittent with great evening exacerbations; this gradually subsides into the normal temperature. Whereas Veit found that in 13 cases of this sort the fever lasted 17 days on an average, in the cases I have had, it has persisted for a longer period, and the patients were seldom entirely free from it before the end of the 3d week. I have repeatedly met with cases in which the tumors remained over 3 months without suppuration, and irregular feverish attacks recurred almost every 10–14 days. The pulse in the morning fluctuated between 72 and 104, in the evening between 80 and 116 beats; the number of respirations between 14 and 32. Relapses are common. They are generally ushered in by a chill, accompanied by severe pains in the affected side, and with an increase of the tumor; the elevation of temperature is very considerable, its duration is often only 1–3 days, but commonly 7–8 days. If a hectic fever sets in with repeated chills, if the exacerbations are severe, suppuration of the effusion generally ensues, which then perforates at one of the above-mentioned places. After evacuation of the pus, the patients generally rally with great rapidity, the pain and fever subside in case the pus has a free exit; an interruption of the discharge, however, gives rise to fresh pains and high fever, which again pass away on free evacuation. Guéneau states, that where the effusion breaks into the rectum, an extensive ulceration sometimes takes place in the rectum and large intestine, which may be associated with profuse exhausting diarrhœa. The entrance of feces or urine into the cavity of the abscess, does not occur as a rule, owing to the oblique direction of the

perforation, the pressure of the abdominal walls upon these places, and the usually dry condition of the dejections (König). When we investigate the character and cause of the fever, we discover that it may be called a simple suppurative fever, since pyrogenic matters are absorbed into the blood from the collections of pus in the tumor. At the outset of the inflammation, until the lymph spaces are compressed, the formation of pyrogenic matters takes place very abundantly, and these being subjected to considerable pressure are forced in great quantities into the primary lymphatics, whence arises a high persistent fever. If the tumor ceases growing, and the pressure in it diminishes owing to absorption, the fever becomes remittent. Subsequently, the extensive absorption of pyrogenic material into the blood only occurs periodically, with a fresh swelling and the consequent increase of tension and suppuration, hence the intermissions and the isolated attacks of fever; finally, a rapid defervescence follows the discharge of the pus by perforation or incision.

The following are the results of the affection in their order of frequence:—

1. *Complete absorption of the effusion*, occurring 12 times in Veit's 13 cases, and 19 times in the above 24 cases. Its duration depends upon the size of the tumor; in one case where the tumor had risen to a point almost a hand's width above the symphysis, it lasted 91 days; it averages, however, only 42 days.

2. *Suppuration* and *perforation* of the pus occurred five times in the above 24 cases: once into the bladder, once through the uterine wall, and three times through the abdominal walls just above Poupart's ligament. According to König, burrowing under Poupart's ligament is the most frequent course; the pus may then either follow the track of the vessels, the muscles, or the external cutaneous nerve. Next in frequence come perforations into the rectum, then into the bladder and vagina, while that into the uterus, through the perineum, through the greater sciatic foramen, into the peritoneal cavity, as well as along-side of the quadratus lumborum muscle, are all equally rare.

3. *Decomposition of the effusion*, followed by *septicemia* and *death*, is unusual; as is,

4. *Death by peritonitis* due to perforation, or by exhaustion consequent upon the fever.

Diagnosis.—Parametric effusions are not uncommonly overlooked in private practice, because they are usually unaccompanied by any symptoms other than pain and fever, and because physicians unfortunately still quite often neglect to make the indispensable vaginal examination, as well as to take the temperature. It cannot be too often called to mind, that the height of every fever in a lying-in woman is precisely indicated by the temperature, and that, when fever exists, a careful examination of the genitals should be made. The discovery of a tumor beside the uterus is then often a simple matter. In a great number of such cases no primary peritonitic symptoms precede the formation of the tumor; there can, moreover, hardly be a doubt as to whether a tumor beside the uterus is extra or intra-peritoneal. Occasionally (3 : 24) these tumors develop with the symptoms of peritonitis; the diagnosis is then more difficult; the rapid extension of the effusion beyond the confines of the peritoneum, for instance along the vagina down to the level of the os uteri, or its rapid burrowing under Poupart's ligament, point at an extra-peritoneal location. These pelvic effusions are as a rule harder at first and become gradually softer at distinct points, whereas the intra-peritoneal effusions are softer and larger at the outset, and become harder and smaller by absorption (König). A mistake of these tumors for ovarian, which has certainly often occurred, can only be avoided by an exact study of the whole course; an acute cystic development in its early stages, may, as we have seen, give rise to peritonitic symptoms during childbed. Less firmness, greater mobility and a gradual growth always indicate an ovarian tumor; a hard, firm, nodular character, immobility, sometimes a rapid diminution, and, as a rule, complete disappearance of the tumor verify the diagnosis of a parametric effusion. These exudations might also be confounded with retroflexion of the uterus; but in the former alternative a careful external and internal examination will disclose the fundus uteri in its normal position, and the irre-

gular shape of the mass felt will show that it is not the uterus. A careful consideration of the early symptoms and an investigation into the general condition of the patient, especially if there are symptoms of anemia, will guard us against confounding this affection with *retro-uterine hematocele*. These exudations can scarcely be mistaken for *hydatid cysts* between the vagina and rectum, owing to the irregular shape and firm consistence of the former.

Etiology.—Inflammation of the cellular tissue during childbed may occur primarily in and around the uterus, as well as in other localities, without the existence of any laceration or other affection of the uterus. I have reported a case of this description (No. 18) where disease of the inner surface of the uterus could be quite certainly excluded, or at any rate must have been very slight. Such tumors sometimes form, however, subsequent to laceration, contusion, or even ulceration of the inner surface. I once met with an extensive pelvic effusion as a result of great irritation of the inner surface of the uterus, from an extremely difficult version. It occurred upon the side on which the hand had been introduced, and had with great effort brought down the feet.

Of the above 24 cases 7 had been delivered of the first child, 6 of the second, 6 of the third, 3 of the fourth, 1 of the fifth, and 1 of the seventh. Of Schröder's 82 cases 57 were primiparæ, and 25 multiparæ. The seat of the exudation seems to be more frequently on the left than on the right side. I found it, in those 24 cases, 12 times on the left and 8 times on the right side; twice first on the left and subsequently on the right side, and twice precisely the reverse. Schröder records it 36 times on the left side, 25 on the right, and 12 on both. The following comparison is interesting:—

On the left side it occurred 10 times after the 1st occipital presentation.
" " " " 3 " " 2d " "

On the other hand

On the left side it occurred only 3 times after the 2d occipital presentation.
" right " " " 4 " " 1st " "

It is noteworthy that the children were very large (9 pounds) in 7 of those 24 cases. Even Lever pointed out that in "inflammation of the pelvic cellular tissue" that part was

more likely to be affected, which had been most exposed to pressure, especially of the occiput, during a tedious labor or one completed by artificial means. These figures just cited seem to corroborate this fact. Parametritis occurs secondarily after a diphtheritic affection of the inner surface of the uterus and vagina; and, on the whole, rarely after diseases of the tubes and ovaries. Finally, pelvic phlegmon may result from caries of the pelvic bones (coxitis and carious destruction of the acetabulum) from periphlebitis and suppuration as well as laceration of the vagina and bruising of the same against the walls of the pelvis.

While the *prognosis* of pelvic effusions that arise secondarily, differs greatly according to the nature of their causes, and is, on the whole, unfavorable, a good prognosis may generally be given of the primary parametritis with subsequent inflammation of the pelvic cellular tissue. These affections are scarcely ever dangerous to life; not one of Veit's 13 and my 24 patients died. The trouble, to be sure, is of long duration, and when suppuration takes place, the women usually have to endure much pain until the pus is evacuated, and are likewise much exhausted by the long and high fever. An abscess, however, forms in only one of seven cases, and, as soon as the effusion is discharged, the sufferers commonly recover with great rapidity. The patients may, therefore, be assured that the tumor is not dangerous to life, and that perforation may be averted by strict attention to the directions given; yet it must be understood that the convalescence will be tedious and protracted to 5 or 6 weeks at the least.

Parametritis and pelvic effusions in general are quite as likely to be sporadic, isolated, and to occur in private houses as in lying-in establishments, yet there are plenty of cases in the latter, such as is recorded under No. 18, for instance, in which infection may, to a certainty, be excluded. On the other hand, these affections often appear as epidemics, and are attributable to causes which we shall discuss further on. At times, when such epidemics are on the wane, it is often very difficult, at times impossible, to determine with any approach to certainty whether a given case has originated spontaneously or by infection. The thermometer gives us certain data for

predicting the dissolution of the tumor, as we can usually recognize the commencement of absorption from an early fall and persistent low stand of the thermometer, the imminence of suppuration from frequently recurring great evening elevations, and relapses or burrowing in other directions from fresh exacerbations after evacuation of the pus. König's assertion, that a halting gait, sterility, derangement of the menses, and pain during coitus may be the permanent results, is certainly true, but they are at all events rare. The limp and pain in the thighs disappear, and the uterus gradually returns to its normal size. In December, 1868, the patient, whose case is reported in full under No. 18, was again successfully and easily delivered in our institution of a child weighing nearly 9 pounds.

Treatment.—The *prophylaxis* is the same in parametritis as in peritonitis. As soon as the trouble is recognized, all conditions must be relieved, which may increase the congestion of the pelvic organs, or retard the flow of blood; as nearly a horizontal posture as possible, careful avoidance of all needless movements, and the use of enemata, etc., are necessary. When the abdominal pain is acute, and the individual strong, a local abstraction of blood may be made from the abdominal walls at the outset of childbed; I consider, as stated in the introduction, that eight or ten leeches applied to the vaginal cul-de-sac are of no use. As a rule, however, resort should not be had to blood-letting, but a speedier effect is produced by ice-water compresses and the ice-bag, the use of which has already been discussed under peritonitis. As soon as the pain has disappeared, and the ice-bag can be dispensed with, inunctions should be made with fifteen grains of mercurial ointment every two hours until salivation begins, or with iodide of potash ointment together with warm compresses. If the discharge is offensive, injections must be made into the vagina, at first with a solution of tar-water, or of hypermanganate of potash, later with mucilaginous fluids. Poultices are only indicated, when we wish to accelerate suppuration and perforation externally. In most cases absorption must be promoted in every way, because by far the majority of cases make a perfect recovery by complete absorption of the effusion. If, how-

ever, the fever, with tenderness and tension of the tumor, indicates suppuration, the pus must be evacuated as soon as possible. Relief of pain is to be afforded by the administration of opiates (hypodermically), and the strength of the patient supported by nutritious diet. Veit's plan of thinning the walls by pressure upon the effusion cannot be free from danger, and at all events is rarely needed. Incision at the most prominent spot—usually half an inch above Poupart's ligament, an inch from the anterior superior spine—may, for the sake of safety, be preceded by puncture with the trocar. Roser recommended dissecting down upon the inguinal ring, introducing forceps, and stretching the opening by their dilatation. If the tumor projects most towards the vagina or rectum it may be tapped by a curved trocar through these organs, and thus evacuated.

When the fever subsides, diuretics and especially iodide of potash (a teaspoonful 3 times a day of a solution grm. 8 to aq. 200) may be administered *internally*, the good action of which I have tested.

The subsequent treatment should be hip-baths, vaginal suppositories of iodide of potash, internally quinine, iron, and nutritious diet; movement, except in bed, should not be allowed for a long time, and then only with great care.

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RECORD OF CASES.

No. 18. *A considerable hemorrhage after a normal delivery of the second child; a moderate parametritis with remittent fever sets in on the* 3*d day, improvement during the succeeding* 8 *days; on the* 13*th day there was a relapse with serious peritonitic and parametritic exudation. Continued fever. Neuralgia in the leg. Almost complete absorption of the exudation in* 35 *days.*

Lisette Abow, 25 years old, a blonde in good condition, 5 feet 1 inch tall, and weighing 142 pounds, was admitted Nov. 16, 1865. She was pregnant for the second time.

She first menstruated when 15 years old, and has since been regular every 3–4 weeks; the flow of blood has always lasted 8 days and not been attended by any great pain or annoyance. Her first pregnancy, 4 years ago, was completed at the full period by the birth of a living boy in an occipital presentation; the duration of the delivery was 13 hours; no interference was required. During the first 5 weeks after delivery, there was a constant loss of blood. The course of the present pregnancy had thus far been normal. The vagina was wide and smooth; immediately behind its entrance was a fluctuating cyst, as large as a horse-chestnut, in the posterior walls; on puncture a clear, viscous substance was discharged. The cysts did not afterwards refill.

On November 28, the head was felt in the left hypochondriac region, the back directed to the right; the fetal heart-sounds heard at the umbilicus. Through the anterior *cul-de-sac* a foot could be felt presenting.

On December 13, the back was to the right, and the head presenting in the anterior *cul de-sac.*

On Dec. 31, 9.45 A. M., the labor began. The head was in the second occipital presentation.

10 o'clock, temp. 99.9° F., pulse 96, respiration 20.

10.15 o'clock, membranes ruptured; there was some meconium in the amniotic fluid.

10.45 o'clock, a considerable rent of the mucous membrane took place on the passage of the head. A fully developed, living girl, weighing six lbs. was born, and the placenta easily expelled by pressure.

Post-partum, 11.15 o'clock, temp. 99.8°, pulse 76, resp. 14.

After removal of the placenta, blood continued to flow profusely; the fundus uteri stood on a level with the navel; the contractions, excited by rubbing and kneading the uterus, ceased as soon as the irritation was interrupted. Secale cornutum was administered at intervals of fifteen minutes.

At 1 P. M., the flooding had not stopped, nor was it arrested

when the catheter had drawn off 900 cb. ctm. of urine with a specific gravity of 1002, at a temperature of 85° F. The fundus uteri, which was on a level with the umbilicus, and also the anterior wall, are somewhat tender; upon pressure many coagula were forced from the vagina. Prescribed ergot and cold-water compresses.

Evening, temp. 100.2°, pulse 88, respiration 17.

The hemorrhage had persisted until 4 P. M., when the bladder, which was full, was again emptied with the catheter. The loss of blood amounted to twelve ounces in all. Uterus tender on the left side. Urine now passed spontaneously: 1640 cb. ctm. sp. gr. 1003, at 64° F. (patient had only drunk one glass of water since delivery).

		Temp.	Pulse.	Resp.	Urine.	Sp. gr.
Jan. 1, 1866.	A. M.	100.1° F.	72	16	2005 cb.ctm.	1007.5 at 68.° F.
	P. M.	99.9	68	20	535 "	1008.5 " 62.6

Uterus very slightly painful on the left side. Patient has quite a severe cough.

January 2.	A. M.	100.1	74	18	1420 cb.ctm.	1011.5 at 67.5° F.
	P. M.	100.3	72	16	325 "	1025. " 67.

Fundus uteri an inch below the navel. There is tenderness upon pressure in the neighbourhood of the insertion of the left tube.

January 3.	A. M.	101.1	84	24	365 cb.ctm.	1032. at 61.7° F.
	P. M.	103.3	106	22	1290 "	1008.5 " 65.4
	11 P. M.	102	112	26		

Uterus nowhere painful; abdomen much distended. A chilliness from 9 to 11 P. M. Ol. ricini.

January 4.	A. M.	101.1	78	20	620 cb.ctm.	1016.5 at 61.7° F.
	P. M.	102.9	108	25	1600 "	1005. " 68.
	11 P. M.	102.2	90	26		

Uterus dislocated a little to the right; nowhere tender. Lochial secretion quite profuse, but neither sanguineous nor offensive. Toward evening great feverishness and severe frontal headache. Ol. ric. $\bar{z}\frac{1}{2}$.

January 5.	A. M.	101.3	86	25	1345 cb.ctm.	1008 at 70.5° F.
	P. M.	102.6	84	28	1000 "	1008 " 67.5
	11 P. M.	100.9	80	24		

Still severe headache. Tongue with a yellowish-brown coat in the middle throughout its length. Fundus uteri one and a half inch below the navel; a little tender on the left border. Enema.

January 6.	A. M.	100.4	84	21	1050 cb.ctm.	1012.5 at 71° F.
	P. M.	100.6	78	28	315 "	1015. " 64.9

Uterus again very painful to pressure on the left side. Lochial secretion not bloody, or very offensive. No tumor could be felt.

		Temp.	Pulse.	Resp.	Urine.	Sp. gr.
January 7.	A. M.	100.4°	82	19	350 cb.ctm.	1021.5 at 59° F.
	P. M.	100.3	69	16	1165 "	1009. " 64
January 8.	A. M.	100.7	72	22		
	P. M.	102.9	92	20	730 cb.ctm.	1017.5 at 64° F.

In the morning the patient felt an acute pain in the left inguinal region which lasted fifteen minutes. The lochia was quite profuse, sanguineous again, and rather offensive.

January 9.	Temp.	Pulse.	Resp.	Urine.	Sp gr.
A. M.	100.8° F.	74	20	505 cb.ctm.	1021 at 61° F.
P. M.	102.6	94	28	340 "	1018 " 62.6

Abdomen moderately tender on coughing. Uterus two inches above the symphysis.

January 10.					
A. M.	100.8	81	20	1000 cb.ctm.	1015 at 65° F.
P. M.	100.5	72	19	150 "	1019 " 63.3
January 11.					
A. M.	100.2	80	20	1380 "	1014 " 65.5
P. M.	100.1	76	20	480 "	1020 " 63.

The pain has ceased, and the patient feels quite well. She is nursing her child, and has quite a large quantity of milk.

		Temp.	Pulse.	Resp.	Urine.	Sp. gr.
January 12.	A. M.	100.1	80	20	1150 cb.ctm.	1012 at 70° F.
	P. M.	103.4	94	24	355 "	1022 " 66.2

In the morning the uterus, in its left upper part and just above the left Poupart's ligament, was quite painful on pressure. At midday, in very windy disagreeable weather, the patient walked across the courtyard to the outhouse.

January 13.	A. M.	102.6	100	20	550 cb.ctm.	1027 at 62.6° F.
	P. M.	105.1	116	20	555 "	1018 " 67
10	P. M.	104.1	110	22		

Since the night of January 11th–12th, the patient has experienced an acute excruciating pain in the left thigh and bend of the knee; the region over the left Poupart's ligament was likewise very painful. Abdomen not distended. The hypogastric region was very tender upon pressure; nothing abnormal could be discovered by external palpation and percussion; the left thigh was perfectly normal, and in no part tender upon pressure. Per vaginam a hard, very tender spot could be felt to the left of the uterus. In the evening the abdomen was quite distended, and very sensitive upon pressure, as well as when undisturbed. A dulness was found over the spot which was particularly tender on the right side; at the corresponding point on the left side there was also dulness on percussion. Appetite poor, and tongue moderately coated. Prescribed ice bladder on the abdomen, infusion digitalis ℥ss–℥vj aq. For the night, morphia muriat. gr. ¼.

January 14.	A. M.	102.9	102	19	1115 cb.ctm.	1012 at 66° F.
12	M.	102.4	93	24		
	P. M.	103.4	96	24	825 "	1008 " 62.6
10	P. M.	102.1	84	24		

The dulness reaches on both sides almost as high as the ant. sup. spines of the ilia; its limits vary upon a change of the patient's position.

		Temp.	Pulse	Resp.	Urine.	Sp. gr.
January 15.	A. M.	100.9°	80	18	975 cb.ctm.	1010 at 67° F.
1	P. M.	108.8	76	16		
	P. M.	101.2	80	20	220 "	1018 " 65.3

Pain in the abdomen only upon motion and coughing.

January 16.	A. M.	100.2	76	16	455 cb.ctm.	1027 at 65° F.
	P. M.	101.8	94	20	330 "	1022 " 64.2

Rather severe cough with profuse muco-purulent expectoration.

January 17.	A. M.	101.8	86	17	1090 cb.ctm.	1014 at 64° F.
	P. M.	102.7	94	24		

Excruciating pain in the left leg. Morph. hydrochlor. gr. $\frac{1}{4}$.

January 18.	A. M.	102.9	100	19	970 cb.ctm.	1014 at 67.5° F.
	P. M.	104.8	104	18	920 "	1010 " 68.2

Acute pain in the left thigh. Abdomen above the left Poupart's ligament is very tender upon pressure. Bloody discharge. Hypodermic injection morph. muriat. gr. $\frac{1}{8}$, whereupon the pain entirely ceased for a while, then returned with less intensity.

January 19.	A. M.	102.	88	16	360 cb.ctm.	1016.5 at 64.9° F.
	P. M.	102.9	90	19		

Slight cough. Abdomen very tender in the neighbourhood of the left Poupart's ligament, as well as in the right hypogastric and right umbilical regions. The dulness to the right is unchanged; on the left the tone is tympanitic. Above the left Poupart's ligament a tumor is felt to-day, which stretches from the middle of this band toward the right, as far as the median line. Upon exploration per vaginam, a large, uneven, hard tumor, tender to the touch, was found to the left of the uterus; this extended forward to the obturator foramen, and to the left as far as the linea innominata; it can be a little displaced from its position beside the uterus. Prescribed an enema every day. Inunction with unguentum hydrargyri. Tepid injections into the vagina.

January 20.	A. M.	100.4	80	18	465 cb.ctm.	1024 at 64.4° F.
	P. M.	102.	75	17	400 "	1030 " 68

Quite profuse discharge of blood. In the morning several coagula were washed out by the vaginal injection.

January 21.	A. M.	109.	81	19	680 cb.ctm.	1021 at 66.2° F.
	P. M.	104.2	96	20	585 "	1019.5 " 68.2

The exudation in the abdominal cavity has considerably diminished.

		Temp.	Pulse.	Resp.	Urine.	Sp. gr.
January 22.	A. M.	100.6°	76	20	370 cb.ctm.	1022 at 65.4° F.
	P. M.	101.	75	22	265 "	1025 " 74 3
January 23.	A. M.	101.1	81	17	430 "	1022 " 64.9
	P. M.	103.6	88	19	430 "	1019 " 66.6

The sub-peritoneal tumor reaches anteriorly to the upper border of the obturator foramen, posteriorly to the os sacrum, to the left and inferiorly almost down to the spines of the ischia; there was but little tenderness when it was touched.

January 24.	A. M.	101.2	86	15	510 cb.ctm.	1022 at 64.° F.
	P. M.	104.	100	18	235 "	1022 " 65.5

Prescribed potassium iodidum ʒj, aq. destill. ℥vj, of which a tablespoonful every three hours.

January 25.	A. M.	101.1	88	16	980 cb.ctm.	1013 at 68.7° F.
	P. M.	103.3	94	15	660 "	1014 " 70.7

The tumor extends to the left ileum, and descends, at a distance of one-third inch from the ant. sup. spine, beneath Poupart's ligament on the thigh. The integument, covering this spot, is tender and reddened.

January 26.	A. M.	101.3	82	16	425 cb.ctm.	1025 at 64.8° F.
	P. M.	102.8	96	18	475 "	1025 " 66
January 27.	A. M.	100.6	84	14	340 "	1016 " 64.8
	P. M.	100.8	78	16	680 "	1012 " 69
January 28.	A. M.	99.5	70	16	515 "	1020 " 64
	P. M.	99.4	63	16	575 "	1017 " 67

A tablespoonful of a solution of potassium iodid. (ʒij–℥vj) was given internally three times a day.

January 29.	A. M.	99.4	64	15	1080 cb.ctm.	1014 at 68.5° F.
	P. M.	100.	60	18	455 "	1014 " 69.7

The tumor has greatly diminished both above and below Poupart's ligament; is uneven and only moderately tender upon pressure on its outer side. Per vaginam it feels much harder than before. Discharge from the vagina is slight and not bloody.

January 30.	A. M.	99.5	69	16	1025 cb.ctm.	1015 at 64.8° F.
	P. M.	100.	72	16	1050 "	1015 " 64.4
January 31.	A. M.	99.7	64	16	1415 "	1015 " 63.7
	P. M.	100.	66	13	1010 "	1015 " 63.7
February 1.	A. M.	100.1	72	15	1260 "	1009 " 64.8
	P. M.	100.8	80	20	675 "	1013 " 67
February 2.	A. M.	100.2	78	18	1190 "	1011 " 64.2
	P. M.	99.2	84	16	850 "	1009 " 69
February 3.	A. M.	99.8	80	16	950 "	1014 " 66.2
	P. M.	100.3	84	16	715 "	1014 " 74.7
February 4.	A. M.	101.2	88	16	560 "	1025.5 " 64.2
	P. M.	101.	84	18	530 "	1016 " 66.2

The tumor, which has up to this time been steadily decreasing, is to-day somewhat larger; not tender; uneven.

		Temp.	Pulse.	Resp.	Urine.	Sp. gr.
February 5.	A. M.	99.9°	72	16	1020 cb.ctm.	1011 at 67.5° F.
	P. M.	100.3	76	16	475 "	1017 " 75.2
February 6.	A. M.	99.8	72	16	1015 "	1019 " 67.8
	P. M.	99.9	72	18	300 "	1019 " 64.4
February 7.	A. M.	99.6	70	13	in twenty-four hours.	
	P. M.	100.6	80	18	1705 cb.ctm.	1014 at 66.6
February 8.	A. M.	100.	88	16	725 "	1020 " 64
	P. M.	100.6	82	20	460 "	1020 " 66.9

Profuse discharge.

February 9.	A. M.	100.2	78	16	1160 cb.ctm.	1011 at 67.5° F.
	P. M.	100.4	76	16	365 "	1020 " 64

The tumor has diminished greatly in size, and no longer extends to the venter of the left ilium, nor down to the external os uteri; anteriorly, it scarcely reaches to the middle of the obturator foramen; and posteriorly, to just above the middle of the os sacrum. It is as large as a small apple, of a stony hardness, and no longer painful.

Feb. 10.	A. M.	100.2	84	18	1010 cb.ctm.	1015 at 65.3° F.
	P. M.	100.4	84	18	225 "	1014.5 " 66.2
Feb. 11.	A. M.	100.2	80	18	1505 "	1014 " 66.2
	P. M.	100.5	76	18		
Feb. 12.	A. M.	100.2	78	18	1530 "	1012 at 67.8° F.
	P. M.	100.3	82	20	265 "	1021 " 66.2

Patient was out of bed for nine hours. No discharge of blood.

Feb. 13.	A. M.	100.2	84	18	1150 cb.ctm.	1015.5 at 65.5° F.
	P. M.	100.5	82	20	415 "	1024 " 63.5

Patient was up all day. Slight discharge of blood.

Feb. 14.	A. M.	100.2	78	18	1155 cb.ctm.	1010 at 65.5° F.
	P. M.	100.6	84	20	685 "	1019 " 70.9
Feb. 15.	A. M.	100.8	90	18	1750 "	1014 " 66.4
	P. M.	100.3	76	20	550 "	1014 " 62.6

Fundus uteri still to be felt at the plane of entrance to the pelvis. A small tumor in the region of the left Poupart's ligament can be felt through the abdominal walls. Uterus is displaced a little to the right; posteriorly, and close to it, are several bulbous projections. Above, and to the front, nothing is to be discovered of the tumor in the left side. Uterus is very hyperemic, anterior lip rather thicker than the posterior, both free from erosions. Vagina considerably reddened.

Feb. 16.	A. M.	100.2	74	20	1550 cb.ctm.	1007 at 62.6° F.
	P. M.	100.6	72	18	1895 "	1019 " 65
Feb. 17.	A. M.	100.6	78	18	1710 "	1010 " 69.3
	P. M.	100.6	76	22	450 "	1010 " 62.6

A little discharge of blood.

Feb. 18.	A. M.	100.8	90	20	1120 "	1011 " 62.4
	P. M.	100.9	80	18	650 "	1012 " 64
Feb. 19.	A. M.	100.2	76	18	1940 "	1014.5 " 63

Tumor unchanged. Uterus well involuted; neither flexion nor version present. Mother was discharged, together with the child, which she had continued to nurse throughout her sickness. The mother's weight was 114 lb., that of the child was 8 lb.

No. 19. *A difficult forceps delivery with prolapse of the umbilical cord. Ulcers on the cervix uteri are the sources of a parametric exudation, as large as the fist, on the right side, with a severe continued fever. Patient died quite suddenly on the sixth day with symptoms of pulmonary œdema. The autopsy showed fatty degeneration of the heart.*

Caroline Blücher, 35 years old, suffering from cyphoscoliosis, and pregnant for the fifth time, had to be delivered with the forceps on June 11th, 1868, because of a prolapse of the cord, and the sudden arrest of pulsation in the protruding loop, before the os uteri was completely dilated. The extraction was very difficult, and the child much asphyxiated; quite an amount of meconium was sucked from its bronchi; electricity was employed to revive it, but all to no purpose. Whereas during the delivery the temperature of the patient had not exceeded 100° F., after birth it rose steadily as follows:—

1st day, 5.30 P. M. 100°; 7.30 A. M. 100.4.
2d " P. M. 102.9°; A. M. 102.7.
3d " M. 104.1°; P. M. 104.9; next A. M. 104.2.
4th " M. 104.9°; 5 P. M. 105.3; 9 P. M. 104; 10.30 P. M. 103.7; 7 A. M. 101.4.
5th " 2 P. M. 101.5°; P. M. 103.1; 9 P. M. 103.8; 10.30 P. M. 103.3; 7 A. M. 104.8; 11 A. M. 103.3.
6th " 12 M. 103.4°; 3 P. M. 103.6; 5 P. M 104° F.

The puerpera reported having had a slight chill on the first evening, succeeded by great headache; a chronic bronchial catarrh, which she had had for a long time, had notably increased. The cough was very distressing, and the expectoration of a thin frothy fluid was abundant; there was also considerable dyspnœa. The abdomen was greatly distended, and on the evening of the third day a moderate quantity of a very fluid exudation could be diagnosticated; the after-pains were distressing, but relieved by the use of ice. On the fourth day the abdominal pain was less, the breasts very full, and the subjective condition improved—but with a sudden increase of the cough and dyspnœa, accompanied by great restlessness, the patient fell into a somnolent condition, and died 124 hours after delivery with symptoms of œdema of the lungs. At the autopsy, made by Prof. Ackermann (on the day after death), we found great rigor mortis and considerable tympanites; the conjunctivæ slightly icteric.

Half an ounce of serum in the left pleura. Both lungs

expanded by adhesion of their serous investitures to the costal pleuræ. Right pleura empty. One and a half ounces of clear, pale-red serum in the pericardium. In the right side of the heart quite an amount of partly fluid and partly coagulated blood, together with several thin fibrinous clots. The substance of the heart is relaxed, anemic, and of a yellowish-gray color at the septum, and, more especially on the anterior wall of the left ventricle, apparently fatty (this was corroborated by the microscopic examination). The endocardium of the right side much discolored by imbibition. Right auricle and ventricle rather dilated; the left ventricle a little soft. The endocardium at the base of the mitral valve is cloudy for some distance. A narrow transverse stripe of fat is on the inferior surface of the aortal extremity of the mitral valve. The left lung is small and its upper lobe very emphysematous; the lung is throughout a little œdematous, rather hyperemic in the lower posterior part, and has, in addition, several large (up to the size of a silver half dollar) atelectases. The right lung is in a similar condition.

The bronchi of both lungs are lined with a dark-red mucous membrane, which is covered with a thick, viscous secretion. The large intestine, especially the descending colon, is greatly distended. The spleen is 13 ctms. long, 9 broad, and 5 thick. The retro-peritoneal connective tissue is very œdematous, even up to the kidneys. Left kidney very movable, soft, and œdematous; the cortical substance is gray, opaque, with large and small extravasations. The line of union of the cortical and medullary substances is very hyperemic. The right kidney is also precisely the same.

The *liver* (29 ctms. broad, 22 deep, and 9 thick) is soft, pliable, anemic, and œdematous. The centre of the acini very full of blood.

In the *stomach* are numerous large and small cicatrices of ulcers.

Vertebral column: greatly bowed to the right in its thoracic part. The aorta exhibits the same abnormal curve. Quite extensive fatty changes in the aorta descendens.

The *vagina* is 15 ctms. broad, pale and smooth; on its posterior surface are three superficial, longitudinal, sharply-cut excoriations of the mucous membrane (forceps) two inches long.

The mucous membrane of the cervical canal is ulcerated throughout nearly its entire length; between these ulcers are hemorrhagic shreds of mucous membrane. The uterus is 20 ctms. long, 13 broad, and its walls 2½ ctms. thick. The site of the placenta is on the posterior wall, somewhat to the right. The serous investiture of the uterus shows a few short pseudo-membranes here and there. The right ovary is glued to the

tube, and its posterior surface covered with a thin coating of fibrin. The connective tissue in the right broad ligament is very hyperemic, and developed into a tumor almost the size of a fist; upon section the surface is seen to be traversed by fibres of connective tissue and dilated lymphatics, and the patulous lumina of the plexus pampiniformis can be recognized. The capsules of both ovaries are somewhat thickened and their parenchyma œdematous.

The wall of the *small intestine* is a little swollen. Peyer's patches and even the solitary follicles are quite swollen and still more so in the great intestine.

In this highly interesting case, the affections of the heart, kidneys, and bronchi are clearly of old date, and probably the consequences of cyphoscolyosis; the very high fever, produced by the parametritic exudation, precipitated her death by bringing on a sudden paralysis of the heart.

DIPHTHERITIC INFLAMMATION OF THE VAGINA AND UTERUS, WITH THROMBOSIS OF THE LYMPHATICS AND DIFFUSE PHLEGMON, FORMERLY KNOWN AS METROLYMPHANGITIS. COLPITIS, ENDOMETRITIS DIPHTHERITICA, PARAMETRITIS CUM THROMBOSI VASORUM LYMPHATICORUM. PHLEGMONE ABDOMINALIS DIFFUSA.

Anatomical Condition.—Diffuse phlegmon almost always arises from ulcers of the vagina or uterus. Their most frequent seat is near the fourchette, or around the entrance of the vagina, but more especially along its anterior wall, in its *cul-de-sac*, in the cervix, and at the placental site. Their edges are reddened, irregular, often serrated; their base grayish-yellow, cheesy, discolored, ragged; their secretions are offensive, purulent, have an alkaline reaction, and contain, in addition to a finely-granular detritus, numerous vibrios. C. Hueter found in a diphtheritic wound of the finger, among the epithelial and pus cells, many round and oval bodies, with a dark contour, which he considered to be a conglomeration of spores. These bodies were also discovered by him in the apparently still healthy portions of the finger, and likewise in the blood of another individual affected with diphtheria. According to Buhl's recent investigations in diphtheria, a fungus invariably occurs, which penetrates the epithelial layer of the mucous membrane, and contributes in a great measure to the size, grayish color,

sharp contour, dull appearance, and membranous character of the plaques. The elements of the fungus are said to be so small that they may be confounded with the granules of tissue undergoing decomposition. Buhl leaves it undetermined whether this fungus is peculiar to and characteristic of diphtheria, or whether it is the leptothrix which occurs so commonly in the mucus of the mouth. Since the publication of Buhl's paper I have had but one opportunity of examining a diphtheritic membrane. I scraped it with a knife on January 5, 1869, from the right glosso-palatine arch of a patient, and found in it an immense mass of long and large mycelium and spores, which, situated between the epithelial layers, formed a thick bed. The stems of the mycenium were in part of very considerable length—0.01–0.02 mm. long, and 0.001 mm. broad—with bifurcations and knotty swellings (basidia) in their continuity, and constrictions (conidia) at their extremities and on the basidia. The isolated, oval or round, spore-like bodies exhibited here and there granular contents. A few days after, in the presence of several students, a shred was scraped from the same spot, and placed at once under the microscope. Again the same fungus was found in thick masses. These were, however, much larger, longer, and broader than the varieties of leptothrix, and were provided with branches. The above description of Buhl does not, therefore, apply to them. On the other hand, they resemble, in length, breadth, spores, etc., the, by no means uncommon, vaginal fungi already described by Grenser, Ed. Martin, L. Mayer, and myself—so that, without wishing to join issue with special mycologists, I should take these fungi for one and the same structure. By this supposition I am forced to the further conclusion, that these fungi play only a subordinate role, engrafting themselves upon tissues that are already diseased. They may, to be sure, exacerbate the affection, but they are not, either directly or indirectly, the cause of it. Yet a single swallow does not make summer, and the most extended and careful investigations can alone inform us, whether the presence of the forms described is purely accidental in diphtheritic membranes, or whether they are actually the causes of the disease. It has been very recently established, almost to a certainty, by the

important researches of Klebs, Waldeyer, Hueter, Tiegel, Recklinghausen, and others, that the causes of the changes in pus which produce pyemia and diphtheria, are in reality not fungi, but exclusively what are termed by F. Cohn the spherical bacteria (kugelbacterien), which are of rather an oval shape, and are joined together in short chains of from four to ten. Oetel, Klebs, Waldeyer, and subsequently Birsch and Hirschfeldt, have discovered the bacteria within the pus corpuscles themselves, so that these migratory cells seem to possess the power of introducing the bacteria into the organism surreptitiously. Waldeyer, together with F. Cohn, has demonstrated them in great numbers likewise on the inner surface of a diphtheritic uterus, in the lymphatics, and in peritoneal, pleural, and pericardial effusions. The tissues surrounding diphtheritic ulcers in the vagina and vulva are swollen and œdematous; the ulcers extend far out on to the perineum, even to the thighs, as well as into the vagina. Small gangrenous spots and minute extravasations of blood may be recognized in its edges. There have even been epidemics, in which gangrene of the vulva invariably accompanied diphtheritic ulcers. Dubois refers to such an epidemic, in which on the first day after delivery an ecchymosis often appeared on the inner surface of one or the other labia majora, which a few hours later presented a sloughing character, with large suppurating surfaces, and involved the vulva, perineum, and even the nates. The inner surface of the uterus is covered with a yellowish-gray purulent fluid, is very hyperemic, and at the placental site, as well as in the collum uteri are several large or small, round or elongated, more or less deep ulcerations, with firmly adherent exudations, quite analogous to the vaginal ulcers. These ulcerations often encircle the inner os, occasionally running in narrow slits from the placental site down to the cervix, corresponding to the course of the corrosive secretions (Erichsen) discharged by the part originally affected. Shreds of sloughing tissue hang from the placental site. The muscular walls of the uterus are partially softened. In extreme cases not only can collections of pus be found in several spots, but the whole uterus is a mass of corruption. The clots are broken up, the ends of the veins are gaping, the necrosis

extends to the peritoneum, which at this point also exhibits a diphtheritic membrane, and is finally perforated. (Klob, Scharlau.)

Such conditions were described by Boër as characteristic of a virulent diphtheritic endometritis, and distinguished by the name putrescentia uteri. The bladder also participates in the process, diphtheritic membranes being found here and there in the mucous membrane of this organ, while its muscular layer appears infiltrated and thickened. The subperitoneal connective tissue is swollen, opaque, gelatinous, and from it the process extends to the sheaths of the vessels and to the peritoneum. The lymphatics are almost invariably affected; they appear varicose or dilated, like a wreath of roses, their walls thickened, their contents firm and friable or soft and yellowish, almost like pus; this applies, as a rule, to those on both sides of the uterus, often enough, however, only on the side corresponding to the most extensive ulcer of the inner surface, that is to say, to the placental site. A diffuse extravasation of blood (Buhl, *l. c.*, p. 239) sometimes takes place along the course of the greater vessels. The retro-peritoneal lymphatic glands are swollen, pale, œdematous, and, in exceptional cases, contain pus. *Tumefaction of the ovaries* is a very common condition, the result of an acute œdema, followed by an acute softening, of such a nature that the tissue of the organs tears upon the least touch, and dissolves into a dirty mucous mass. (Virchow.) The process extends likewise to the broad ligaments, and passes upwards along the vasa-spermatica to the kidneys (paranephritis phlegmonosa). The affection may also creep along the peritoneum to the mesentery, finally reaching the intestine. In this case the part of the colon which is in apposition with the outer surface of the uterus, especially the cecum and sigmoid flexure, exhibit diphtheritic deposits on their mucous membranes. The liver, spleen, and kidneys likewise participate in the process, being, as a rule, swollen, enlarged, congested, soft, and friable. The peritoneum is often affected at times throughout its whole extent, but at times only partially; the process being confined to the pelvis. By means of the diaphragm, the disease may extend to the pleura, and thence to the pericardium, thus giving rise to croupous peritonitis, pleu-

ritis, and occasionally also to pericarditis. The muscular tissue of the heart is here soft, flabby, and friable; the primitive fasciculæ are in a state of disintegration. From the thoracic organs the trouble may be propagated to the thyroid and axillary glands. In the skull, cerebral œdema and an increase of the serum in the ventricles is a frequent complication, but meningitis is rare. The joints of the extremities are at times involved, resulting in pyanthrosis, especially in the shoulder and knee-joints, but the smaller joints are at times diseased, particularly in the thumbs and between some of the phalanges of the fingers. Finally abscesses may occur simultaneously in the different muscles; I have observed abscesses of this sort attain a considerable size in the upper arm and in the gluteals. In Hueter's and Tommasi's inoculations of diphtheritic membranes, a characteristic inflammation of the muscular tissue occurred in the immediate vicinity of the points inoculated; it was quite inodorous, free from all traces of putrescence, was completely choked with lively organisms, while hemorrhages took place in the neighbourhood of the inflamed parts, in which the above-mentioned organisms could be demonstrated.

By former writers, especially those following Meckel, it was universally held, that lymphangitis was the chief factor in this process, and only a few years ago Buhl attributed most affections of this class to lymphangitis. Virchow, on the other hand, was the first to point out that the affection of the lymphatics was mainly a thrombosis of those vessels, and that this condition instead of disseminating the disease tended rather to interfere with the spread of the infection, by separating the injurious matters, that were developed in the phlegmonous collections, from the general circulation of fluids in the body. He explained these affections as a continuation of the metritis and parametritis or what has been called erysipelas malignum internum puerperale. Erichsen is of the same opinion, and bases the analogy between the processes upon the similarity of their symptoms; the equal tendency to a rapid, uninterrupted dissemination; the similar character of the secreted products; the frequent coincidence of their occurrence, especially in the form of phlegmons of the uterine appendages,

together with diffuse erysipelas of the abdominal walls and thighs.

Against the correctness of Buhl's view, may be brought one of his own observations, that as a rule only the lymphatic glands in the vicinity of the source of infection (retro-peritoneal and inguinal glands), appear to be affected. The thick mesh-work of medullary substance, and the follicles of those glands, must both retard the passage of the infecting matters, just as they present an obstacle to the flow of the lymph. This, however, stands in contradiction with the rapidity with which the general infection follows (Erichsen). It must, therefore, be assumed, that the dissemination takes place either through the continuity of the connective tissue (perhaps by the transportation of the infectious matters, or pus corpuscles, in the interstices of the connective tissue, Recklinghausen, Fischer, *l. c.*, p. 59); or by the transmission of infectious matters from the primary lymphatics to the glands, from which they are taken up by the capillaries and rapidly carried off by the bloodvessels. Buhl has, subsequently, somewhat modified his original opinion, and explains the serous infiltration of the connective tissue as equivalent to the repletion of the lymphatics with yellow pus. He says: "the lymphangitis corresponds to the inflammatory infiltration of the connective tissue." Clinical experience and the examination of diphtheritic membranes, as well as the results of various experiments, force me to the conclusion, that in diphtheria we have to do with the absorption of a specific poison by the diseased mucous membrane, whence it passes into the blood; but, as to the nature of this *materies morbi*, we are as yet in absolute ignorance. Hueter and Tommasi have, as the result of experiments, arrived at the opinion, that diphtheria in man, whether occurring upon wounds or mucous membranes, is invariably produced by the introduction into the blood of very small round organisms in active motion, which exist in the same form in the tissues of diphtheritic wounds, and, also, in the diphtheritic coat of mucous membranes. The development of the diphtheritic infectious matter is, in accordance with this view, probably dependent upon these organisms. It is, furthermore, probable that the

infectious material of diphtheria may form in certain phases of the decomposition of albuminous fluids. Yet, it is not asserted, that this substance is identical with the infectious matter of putrid fluids which evoke symptoms of septicemia. Thus it is hardly necessary to state, that according to all the recent investigations, the affection of the lymphatic vessels can no longer be regarded as the primary and main factor in diphtheria, but that the changes in these vessels clearly result from the action of the diphtheritic poison.

Symptoms.—The origin of the affection often dates from the first period of labor (*vide* Case 21); occasionally it is first observed during pregnancy, but it commonly appears during the first twenty-four hours of childbed. There is first noticed an abnormal elevation of temperature, either during or soon after delivery; pre-existing fissures of the mucous membrane or of the perineum next become discolored; the discharge usually becomes offensive; then with a rapid rise of the temperature, follows a severe rigor. I can positively affirm, in support of the statements of other writers, that the rigor is preceded by a considerable elevation of temperature, and the appearance of local symptoms. The chill is almost immediately followed by distension of the abdomen, spontaneous pain in the abdomen as well as tenderness to the touch, ringing in the ears, muscæ volitantes, restlessness, distress, and nervousness. After this prodromal stage, which is usually short, the local affection spreads very rapidly. The tissues around the fissures in the mucous membrane of the vulva and vagina swell; the character of the extremely offensive lochia varies, at one time being scanty, thin, and of flesh color, again it is abundant, brownish-yellow, feebly or very alkaline, and contains, besides pus corpuscles, diphtheritic membranes, detritus, vibrios, and mycelium. Retention of urine often occurs; or at other times, the act of micturition is attended with pain; and during the subsequent somnolence, the contents of the bladder are discharged involuntarily; the urine is very scanty and contains at times some albumen; the chlorides are greatly diminished; the urea and sulphuric acid are increased, while biliary pigments are rarely present. The secretion of milk, if already established, is, as a rule, arrested

very early; the breasts remain soft and flabby. Tympanites is constant in the severer cases, with great tension of the abdominal muscles, which is not due to passive distension, but, to an active, at times even voluntary, though generally reflex (owing to the pains) contraction (Traube). Diarrhea is occasionally seen at the very outset, and is generally attributable to catarrh of the colon, or is the result of diphtheritic affection of the latter; this symptom may, however, be absent. Blood, pus corpuscles in great numbers, vibrios, triple phosphates, and granular detritus have been observed in the loose dejections. These are generally colored with bile (Fischer). Dreadful retching is frequently observed, and vomiting at first of mucus, but subsequently of masses having a greenish hue, and blackish-brown from the presence of blood. Bleeding from the nose is not uncommon at the beginning and during the course of the disease. The disturbance of respiration caused by meteorism has already been discussed under peritonitis. The superficial gasping respiration of purely costal character, in which the auxiliary muscles are brought into play, occurs in the most severe forms of diffuse phlegmon. Marked cyanosis of the fingers, face, and neck, is not an unusual result of the deficient oxydation of the blood. The mental faculties are, in my experience, as a rule, early affected in the rapid cases of infection; the patients soon appear somnolent, work themselves down in the bed, are slightly delirious, paying attention and responding only when addressed in loud tones. On the whole, they utter but few complaints, and euphoria sets in early; at times, however, they are agitated, and even become maniacal, as I have repeatedly seen. The pain due to peritonitis or pleurisy sometimes, but not always, retards the supervention of the sopor, so that the sufferers remain conscious up to the last moment.

Pleurisy, occasionally unilateral, but generally double, is a frequent symptom, and begins, as a rule, with a sudden stitch in the side. If dyspnœa was previously absent, it sets in rapidly, inducing very great distress; the violent pains elicit loud complaints on the part of the sufferers, and give rise to piteous attempts to relieve the stitch by change of posture. *Pericarditis* is much more rare, as it commonly occurs just

before death, and, generally speaking, without prominent symptoms. Inflammation often appears in the different joints after a few days, with redness, swelling, and tenderness of the parts; this is occasionally so considerable, that the patient is roused from the sopor when the inflamed joints are touched. Fluctuation may sometimes be felt, when the process has lasted several days. Patients generally succumb, however, before it advances to suppuration, and particularly before perforation.

The *fever* is of the continued type in the pernicious forms of the disease; the temperature rises with extreme rapidity and reaches 107.6° F., occasionally remaining at that height from the delivery continuously until death; a fall of temperature from the greatest elevation is often seen as death is approaching, without any decrease in rapidity of the pulse and respiration; this fall is occasionally succeeded, immediately before, or just after death, by a rise which exceeds all previous ones. The pulse generally ranges between 120 and 160 beats; as the fatal moment approaches, it is at times small and threadlike (in consequence of the irritation to which the heart is subjected by the accumulation of carbonic acid—Traube). Considerable remissions are very rare; they are favorable, as a rule, but may be followed by serious and rapidly fatal relapses.

The results are:—

First, death within 2–21 days; between the 7th and the 9th day in sixty-five per cent. of the cases (Nos. 20 and 21).

Secondly, recovery with complete absorption of the effusion (No. 22).

Thirdly, sequelæ, such as encysted peritoneal effusions with perforation in different directions, metrorrhagiæ, changes in the position and form of the uterus, etc.

It occasionally happens, that death does not follow the first stage of the disease, the process in the uterus and neighbouring organs being almost completely arrested, whereas the disease advances in various parts of the peritoneum, and results fatally, owing to pleurisy or some other complication. When the patient begins to improve, the remission is accompanied by more or less sweating, and an increased secretion of urine, followed by a gradual fall of temperature to the normal point.

Crises are unusual. The variety of pernicious puerperal fever here described is not unfrequently complicated with venous thrombosis, and foul disintegrations of the clots, with metastatic deposits in various organs, which lesions will be discussed in the next chapter. As I have not any very marked case of this kind at my disposal, I would refer to the very interesting report of one recently published by Veit (*Monatsschrift*, xxvi. p. 150, Case VIII; see also Leyden's case, *l. c.*, pp. 66–68, No. 42).

The *diagnosis* of the diphtheritic ulcers of the vagina, endometritis, and peritonitis is simple, and has already been given. To facilitate the recognition of ulcers on the os and cervix uteri, the introduction of the speculum is of course indispensable. The diagnosis of pleurisy under these conditions is more difficult, as a thorough physical examination of the patients is very grievous, owing to the difficulty of moving them, and especially to the augmentation of the peritonitic pains. Friction sounds can only be heard at the outset, and mistakes may be made on percussion, owing to the high position of the liver. Considerable elevation of the temperature during labor, when followed by a great rise immediately after delivery, frequent severe chills, an extremely quick spread of the process, rapid failure of strength, the early supervention of somnolence, form the chief characteristics of these pernicious phlegmonous diseases, which break up the most robust constitution, and present throughout a striking resemblance, at least in their external appearance, to the severe cases of typhoid fever, although the anatomical basis is quite different.

The etiology of these processes will be discussed at length hereafter. They form a large proportion of all epidemic diseases; they were observed, for example, by Hugenberger in 385 instances in the St. Petersburg epidemics of 1845–59; that is to say, in one-third of all the affections. By their extremely rapid course, and the appalling violence of their symptoms, they have from time immemorial excited alarm in the minds of both physicians and the laity. "They are to be classed among the most fearful diseases, attacking the most vigorous, robust constitutions, and extinguishing life in a few days."

The *prognosis* is consequently, in general, very unfavorable.

Recoveries do indeed occur, but they are rare, and the high rate of mortality shows how fatal is the affection. A great fall of temperature, occurring in the first eight days, is decidedly of good omen; the prognosis is still more encouraging when only peritonitis is present; less so when unilateral, and hopeless when double, pleurisy has set in. There are, to be sure, cases in which recovery has taken place (Fischer, *loc. cit.*, p. 101) even when complicated with pleurisy, but unfortunately these instances are very exceptional. A fall of the temperature, without a change in the rapidity of the pulse and respiration, is a very ominous sign. Improvement in the appearance of the ulcers, with remission of the temperature, is favorable; but relapse may occur as long as the diphtheritic membrane remains.

Treatment.—This very form of puerperal disease is the one which has been attacked with the greatest variety of therapeutic agents, and has given rise to the most violent conflicts as to the best method of treating "puerperal fever," not only in former times, but even very recently. It must, at the outset, be again stated that there are no specific remedies, or methods for cutting short these phlegmons; all the extolled methods of cure, such as venesection, emetics, (!) the administration of mercury, camphor, quinine, turpentine, aconite, etc., have unfortunately proved inefficient. If the view is sustained that the diphtheritic ulcer is always the source of infection for the whole system, the local treatment of the spots thus affected in the genitals must necessarily be considered the first and most important indication. Tampons with wine of camphor, a solution of chloride of iron, or of nitrate of silver, applied three or four times a day, or even every two hours, by means of a brush; injections of antiseptic solutions (aqua picea, aqua chlori, and, above all, permanganate of potash and carbolate of soda), either into the vagina alone, or even several times a day into the uterus, are suitable for this purpose. These injections, when early resorted to, afford the best means of destroying at once the animal forms which exist in the diphtheritic membranes. For the last two years I have entirely given up cauterizing the ulcers, or the lips of the os, with the solid nitrate of silver; the injections, when carefully made, serve the

purpose best. As a prophylactic measure against impending peritonitis, the treatment given on pages 193, 194 must be employed. The child must be weaned at once. In robust individuals with a full, hard pulse, I begin the internal treatment with a strong infusion of digitalis (2 : 180 grms., of which a teaspoonful every half hour), which should be administered (3–4 times) until the pulse and temperature have fallen considerably. If the fever is, nevertheless, very high, the pulse continuing very rapid, and the chills recurring more frequently, I prescribe acids (muriatic acid 1.2 : 180 grms.), on the ground that they make a cooling antiphlogistic draught, which, when sufficiently diluted, is very acceptable to the patient. If peritonitis exist, I resort to cold compresses, the ice-bag, morphine subcutaneously for the pain, employing castor oil and small doses of calomel as laxatives, and an enema of tepid water every day, with or without the addition of turpentine, according to the degree of tympanites. For the pleuritic stitch in the side, blisters, or chloroform liniment are of most service. The joints, when tender, should be wrapped in cotton-wool or painted with collodion.

In many cases we must employ tonics very early; wine, especially champagne, quinine, and castoreum have done me good service. When the dyspnœa is great, paregoric is very soothing. I have also repeatedly heard the action of a warm bath recommended for patients, who were already much reduced, as relieving temporarily the dreadful sufferings.

Most writers of the present day agree that no benefit is to be expected in diphtheritic affections either from the local or general abstraction of blood.

In common with many others, I have failed to see any favorable action from *opium* in the majority of cases; it has occasionally arrested the dysentery very rapidly, but has increased the fever and the meteorism.

I cannot advocate the treatment of these affections by means of violent purges, such as the compound infusion of senna, large doses of calomel, castor oil, croton oil, and jalap, which have of late been resorted to, especially in England, have received upon the continent the approval of the Prague school, and have been particularly recommended by Breslau

of Zürich. I am inclined to regard the views propounded by Hecker, Holst, Ed. Martin, Gusserow, Scanzoni, and others, as firmly established. In light cases a favorable action may, perhaps, be occasionally obtained by this course; in those forms, however, which are severe from the outset, this treatment cannot fail to have an unfavorable influence, its effect being decidedly to favor the collapse. Drastic purges seem to me to be peculiarly unsuitable, since swelling and even isolated ulcerations of the intestinal mucous membrane are, as a rule, present. Besides, even if the diphtheritic poison could be wholly, or even in great measure, expelled from the system by the watery evacuations, the numerous organic affections, induced by the presence of the virus, could hardly be relieved by that means. At all events, much better results must be shown from this treatment than those obtained in Prague, Zürich, and Berlin, before it can commend itself to the approval of the profession.

I have as yet had but a limited experience of the mercurial course, which has lately been particularly extolled by Fischer (based upon the experience in Traube's clinic), and was tried and commended long before by Velpeau; a grain of calomel is given every two hours, and at the same time eighteen grains of mercurial ointment rubbed into different parts of the body. The appearance of salivation is supposed to be generally associated with a favorable change (as Hugenberger, Fischer, Veit, and others assert, although it is well known that salivation occurs at very different times, not only in different individuals, but also according to the different methods by which the mercury is introduced into the system); subsequently the mercurials should be discontinued, and laxatives administered. During the treatment, enemata or castor oil must be regularly given, since diphtheritic states of the intestines may be produced by decomposition of the calomel, if there be any constipation (Fischer, *Bericht*, pp. 67–69). In Veit's opinion the mercurial treatment has given relatively the most favorable (!) results, although it only arrests the progress of the peritonitis in the minority of cases (*l. c.*, p. 132).

Finally, the following remedies have been especially recommended: First of all *quinine*, in small or large doses by

Guérard, Beau (in large doses), Pippingskoeld, Schoefl, Kehrer, and Cabanellas; *quinine with opium* by Retzius, Faye, Guérard, Pippingskoeld, Pfeufer; *quinine combined with other stimulants* (camphor mixture) by Kehrer; *tincture of veratrum viride* by Barker (New York), with the special object of reducing the great rapidity of the pulse, and allaying the fever. Veratrin itself would certainly be better, and is worthy of further trial. In one case where I tried veratrin, quite a severe diarrhœa set in with reduction of the temperature; in another, on the contrary, where 0.003 grm. of veratrin was taken daily, the fever was entirely uninfluenced, and no new symptoms were developed.

Emetics—especially ipecac, which was formerly much used at the commencement of the disease, and when the tongue was covered with a thick white coat—were first recommended by Doulcet in 1782, were employed during a Paris epidemic in 1829, and likewise with good results by Dubreuilh (fils) in 1845—have, so far as I know, found no advocates during the last two decades.

Camphor, first recommended by Hoffmann, later by Werloff, and especially by Berndt, Jr., and regarded by some as an actual specific, only has value as a stimulant, when collapse is imminent, but even then is inferior to wine.

Finally, Tessier, in 1846, employed tincture of aconite for this form of puerperal fever, administering it as soon as the inflammatory symptoms were allayed by antiphlogistics; yet this remedy has as yet obtained but little credit.

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RECORD OF CASES.

No. 20. Disease before the commencement of labor, a rapid delivery notwithstanding uterine diphtheria; salpingitis duplex; peritonitis diffusa. Death on the 5th day of childbed, and the 7th of the affection.

Marie Dahse, 26 years old, a large, strong person, now pregnant for the third time, had had a nervous fever when only 7 years old, but had been otherwise perfectly healthy; the catamenia first appeared when she was 18, and have recurred regularly every four weeks since; of late years, they have been very profuse, and attended with pain in the abdomen and back. She had had two easy deliveries, and had served both times for nine months as a wet-nurse. Her 3d pregnancy ran a normal course up to Jan. 21, 1869. On the morning of Jan. 21st, she was first examined in the erect posture by myself and by four students successively. As several of the latter could not satisfy themselves that the internal os readily admitted the finger, and that through it the membranes and head could be reached, she was repeatedly examined in bed, when they all, one after another, passed their fingers through the cervix and os uteri. For 15 months, we had had no case of diphtheria in the Institution, and most of the childbeds had been healthy throughout. An epidemic of diphtheria had been raging in Rostock since the end of 1868, and in the hospital in the city the students came in contact especially with children affected with this disease. I premise this in order to call attention to the possibility of this first case arising from direct infection.

About 28–30 hours (on Jan. 22) after the above-mentioned exploration, the woman had a chill, according to story of the other patients, but, as she did not report it, no further examination was made.

At midday, Jan. 23, there was a second more severe rigor, succeeded by great feverishness and headache. According to her assertions, she had not been out of the establishment all day, and mentioned as the only cause of her chill, that on the morning of Jan. 23d she had scoured a chamber.

At 5.30 P.M. (Jan. 23), the first pains set in, but were of very

short duration and recurred only after long pauses. At 8 P.M. she entered the lying-in ward, when the following condition was discovered. The patient had a very flushed countenance, and complained of severe headache. The tongue was dry in the middle, moist upon the edges, and retained the imprint of the teeth. The soft palate was somewhat reddened. The abdomen was symmetrically distended, and had a circumference of 107 ctms. The height of the navel was 23 ctms., that of the fundus uteri was 32 ctms. Above and to the right, small fetal parts could be felt; to the left in the fundus the breech, and below to the left the back. The fetal heart-sounds were best heard the width of a hand to the left and somewhat below the navel; their frequence amounted to 14 beats in 5 seconds (168 per minute). The uterus was nowhere particularly painful, the intervals between the pains were regular. Upon internal exploration we found the os internum dilated about 1.5–2 ctms., the external os was directed a little posteriorly (she had rather a pendulous abdomen). The vagina was hot and discharging profusely. Passing from the anterior vaginal cul-de-sac through the internal os, the head could be felt presenting as a large, hard, round body, and quite fixed. The pains lasted about 20 seconds, the pauses 3 minutes. The woman's pulse was quite hard, full, and numbered 112 beats to the minute. The temperature was 102.9° F. The physical examination of the thoracic and abdominal organs gave no explanation of the high fever. The only noticeable point was that the first sound of the heart was deadened though strong, and the spleen was a little enlarged (9 : 9½ ctms.). The subjective symptoms, feverishness, pain in head and back, did not account for the high temperature. The urine, of which a small quantity was drawn with the catheter, was dark, looked rather cloudy, and contained a small amount of albumen. A feeble uterine murmur was at times heard. The umbilical murmur was not audible. The patient received ipecacuanha gr. 2, and tea from time to time. Half an hour later, she vomited a greenish-yellow fluid with some hard lumps. During the delivery the following observations were made.

8.45 o'clock: Temp. 102.9°, pulse 116; fetal heart-sounds 168 to the minute. The power of the contractions had somewhat augmented, the pains lasted 30 seconds, the pauses 1–2 minutes. During the pain, the internal os was somewhat larger than a silver half dollar. The frequence of the fetal heart-sounds remained the same during the contractions as in the intervals.

9.15 o'clock: Temp. 103.3° F., pulse 124; heart-sounds 14, 14, 15, resp. 28. The anterior lip of the os was still to be felt as quite a thick swelling; the os in the intervals of the pains was larger than a silver half dollar. The sagittal suture could be

felt in the transverse diameter. The following observations were made during pains:—

Interval.	Stage of increase.	Acme.	Stage of decrease.
1.30″	10″	15″	5″
30″	10″	20″	10″
50″	10″	30″	10″

9.45 o'clock: Temp. 103.4°, pulse 116; heart-sounds 14, 14, 13, respiration during the pain 13, in the interval 28. The frequence of the heart-sounds was still about the same between and during the pains. The os uteri was now larger than a silver dollar, the cervix not yet entirely obliterated, the sagittal suture still in the transverse diameter. The pains, which were now very powerful, exhibited the following course:—

Interval.	Stage of increase.	Acme.	Stage of decrease.
55″	10″	25″	10″
45″	5″	20″	10″
1.5″	10″	45″	15″

10.15 o'clock: Temp. 103.4° F., pulse 120; heart-sounds 13, 13, 14; resp. 28. In one interval between very powerful pains, the fetal heart-sounds had become so unrhythmical that they could not be taken. The cervix was pretty well obliterated, the os uteri had a diameter of about 1½ inches, the head rested upon the anterior lip, so that a small extent of it had to be drawn down in order to reach the former. A little blood and bloody mucus adhered to the finger during the examination. At 10.35 o'clock a small quantity of very dark urine was spontaneously evacuated.

10.45 o'clock: Rupture of the membranes prevented the temperature being taken. A very great amount of amniotic fluid was discharged. The head had already entered the vagina, the large fontanelle presenting. The next two pains expelled the head, in the first occipital presentation, entirely from the external genitals, and the body immediately followed. The child—a girl—screamed at once. The placenta was brought away five minutes later by powerful pressure upon the fundus, during which very little blood escaped. The uterus contracted directly after the delivery. At 11 o'clock, temp. 102.5°, pulse 116, resp. 32.

The child weighed 7 pounds, and showed all the signs of being at full term.

The placenta weighed 1 pound and 3 ounces; had almost a quadrilateral form, and showed nothing particularly worthy of notice upon the fetal surface. There were several whitish spots, as large as silver three-cent pieces--superficial fatty degeneration of cotyledons—and some small chalky concretions upon the uterine surface.

The membranes were complete, and nowhere torn from the

border of the placenta. The rupture in the membranes was 4–5 ctms. from the edge.

The umbilical cord measured 45 ctms., was poor in gelatinous substance, had many spirals and varicose nodules. It had a lateral insertion, only three-fourths of an inch from the border near to which the rupture of the membranes had taken place.

The temperature, which immediately after delivery had fallen from 103.4° to 102.6°, rose toward night, and at 1 o'clock stood at 104.3°, although the woman had taken tinct. digitalis gtt. 20, and ice bladders had been applied to her abdomen.

On 24th, 1 A. M.: Temp. 103.8°, pulse 112, resp. 28. The patient had not slept through the night, owing to the distressing after-pains. The uterus stood the breadth of a finger above the navel, was hard, large, and very tender on the right side of the fundus. The external genitals were not swollen. The urine was spontaneously evacuated, and amounted to 600 cb. ctm., with sp. gr. 1024. No dejection. The subjective symptoms were satisfactory. The woman took eight doses of tinct. digitalis (gtt. 10) in the course of the day. The use of the ice-bladder was continued.

5 P. M.: Temp. 106.1°, pulse 128, resp. 28. A small coagulum of blood had been discharged. The patient complained of pain in her back and abdomen, but only upon moving. 350 cb. ctm. of urine, with a sp. gr. 1010, was passed spontaneously. As there had been no dejection, 0.3 grm. of calomel was administered.

25*th*, 8 A. M.: Temp. 105.6°, pulse 124, resp. 32. The patient had slept a little in the night, and only complained of shortness of breath. The discharge was offensive. The fundus uteri stood the breadth of a finger below the navel; two dejections; 1016 cb. ctm. of urine with a sp. gr. 1016.

10 A. M.: Pulse 24, rather irregular; whole face flushed; tongue slightly coated, swollen, moist at its edges. Pupils are not particularly dilated, and contract naturally. Breasts soft, and secreting a yellowish fatty milk. Abdomen painful, especially to the right. Discharge offensive. Subjective state good. Nursing the child was forbidden. Prescribed intra-uterine injections of a solution of carbolate of soda.

1 P. M.: Temp. 105.2°, pulse 120.

5 P. M.: Temp. 105.1°, pulse 112. Subjective condition perfectly good; three dejections.

26*th*, 8 A. M.: Temp. 104.5°, pulse 128, resp. 28. Patient had slept till about two o'clock, and only complained of pain in the abdomen upon coughing. Seven dejections.

1 P. M.: Temp. 105°, pulse 132.

5 P. M.: Temp. 105.3°, pulse 144, resp. 32. Subjective symptoms are good, except that she complains of shortness of

breath. Uterus very tender on vaginal examination; the lips of the os are swollen; one spot to the right is more resistant and painful. The patient has vomited several times, and a tremor of the upper extremities, and chattering of teeth have been frequently noticed. Her speech is slow. Four dejections. Prescribed quinia sulph. 0.6 grm.; a bath for twenty minutes at a temperature of 81° F. Her temp. was 104.4° after the bath.

27*th*, 8 A. M.: Temp. 103.9°, pulse 140, resp. 30. The patient has had great pain in her abdomen during the night; became delirious toward three o'clock, and could scarcely be held in bed. The distension of the abdomen is greater than before, now reaching to the epigastric region, less marked below than above the umbilicus. The abdominal walls are tender and distended. There is distinct dulness on both sides of the abdomen, extending in the median line 9 ctms. above the symphysis. Passing from the navel outward I came upon dulness about 2 ctms. beyond the axillary line on both sides. The tongue is much reddened and swollen; papillæ are very prominent upon its edges; in the middle it is rough and mostly dry. Speech is indistinct. The discharge is not profuse, but rather brownish. The subjective symptoms are comparatively good. She has had several slight chills. The pulse is small, soft, undulating, and dicrotic. Three dejections. Prescribed, in addition to ice-bladders and injections of carbolate of soda in solution, a bath the same as yesterday, quinia sulph. 0.6 grm., milk with cracked ice and some wine.

1 P. M.: Temp. 103.4°, pulse 144. Tremor of the limbs and indistinctness of the speech have increased; she is also insensible.

5 P. M.: Temp. 102.3°, pulse 148, resp. 28. The patient passed urine and feces in bed. Her whole body was shaking violently. At ten o'clock she began to vomit blood, and continued to do so at short intervals until her death, which took place at three o'clock at night.

Autopsy made seventeen hours post mortem. The following points, taken from the records, are worthy of attention:—

Muscles of the trunk are dark-red, the color of a larded goose. In the left auricle of the heart is a small fibrinous coagulum, tinged by imbibition; in the left ventricle some dark fluid blood; in the right auricle and ventricle a somewhat more extensive, extremely firm fibrinous coagulum, together with an inconsiderable quantity of dark, very fluid blood. In the abdominal cavity is at least 500 c. c. of a dirty-yellow, muddy fluid, intermixed with numerous fibrino-purulent shreds and flakes. The intestinal convolutions are quite firmly adherent to each other, to the greater omentum, to the

remaining organs of the abdominal cavity, and to the walls of the latter, and are covered with many strips and flakes of a fibrino-purulent exudation, that is easily rubbed off. The parietal peritoneum is œdematous, and much injected in its lower segments. The small and large intestines, especially the upper parts of the former, are much distended by gas. The spleen, attached to the surrounding tissues by old adhesions, is somewhat enlarged, and of an extremely pliable consistence. The mesentery is œdematous, but its glands are unaltered. Quite a quantity of an hemorrhagic fluid in the duodenum and stomach. On the posterior wall, and along the smaller curvature of the stomach, in the immediate neighborhood of the great submucous veins, are quite numerous extravasations into the mucous and submucous layers. The parenchyma of the liver is rather soft. The uterus rises the width of a hand above the symphysis, and exhibits upon its external surface a greatly thickened serous membrane, which is covered, especially upon the sides, with an extensive fibrino-purulent coating. The fimbriæ on the right side are swollen and hyperemic, and the tube shows a considerable, and, in spots, somewhat nodular swelling. The channel of the tube is dilated, lengthened, and very sinuous; its mucous membrane is infiltrated with pus, hyperemic, and covered with quite an amount of thick mucous pus. The alterations in the left tube were very similar to those in the right, but less pronounced. The length of the whole uterine cavity was 20 ctms., a fourth of which belonged to the cervix. Passing from the internal os toward the fundus, the inner surface of the uterus appeared in part of a light grayish-green color, with shreds here and there which are easily rubbed off, though in other places firmly connected with the substance of the tissues; a few narrow processes passed downwards into the muscular layer. In several spots, particularly about the internal orifice of the uterus, there were superficial ulcers within these diphtheritic deposits. No implication of the placental site in these changes could be recognized. The substance of the uterus in the neighbourhood of the left ligamentum ovarii showed numerous dilated lymphatics, with transparent yellow contents. There were several small changes of a similar character, also, in the muscular layers of the uterus, corresponding to the diphtheritic deposits; yet these alterations were all trifling, with the exceptions of those first given.

In the inferior vena cava and the large veins of the pelvis, there was fluid blood and some fresh coagula. The solitary follicles throughout the whole extent of the small intestine were rather prominent, but Peyer's patches did not appear to be changed. The veins of the pia mater were very full, and

in the sinus was a considerable amount of loosely coagulated blood. The cerebral substance was quite full of blood, and somewhat œdematous.

The microscopic examination of the muscles showed an incipient fatty degeneration and a longitudinally striped condition of the smooth fibres, most of which still had a distinct nucleus. No traces of fungi or vibriones could be detected in the uterine tissues beneath the diphtheritic parts of the inner surface. Of the transversely striated muscles examined, the sartorius, the pyramidalis, the sterno-cleido-mastoideus, and others—in all of which the transverse striæ seemed to be rather faint—the longitudinal markings were distinct, the muscular fibres could be easily torn apart, and in all, but particularly in the pyramidalis, the muscular corpuscles were greatly increased in numbers, several lying so close to each other that proliferation could no longer be questioned. Abscesses were nowhere to be found in the muscles.

No. 21. *Diphtheritic colpitis and endometritis developed from a catarrhal endometritis during labor. Metro-peritonitis commencing during labor. Death on the 5th day.*

L. V., 22 years old, and 4 ft. 7 inches high, had, as a child, suffered from rachitis, and did not learn to walk until her 4th year. She has menstruated regularly and without trouble from her 16th year; the last time was on Oct. 13, 1863. In this first pregnancy, besides an obstinate constipation, she suffered from an acute colpitis granulosa with endometritis colli and a very profuse muco-purulent discharge. The pelvis was contracted antero-posteriorly, the conjugata vera measuring but 3 inches. The course of the delivery has been already reported in another place.[1] I will only mention here that extremely violent spasmodic pains persisted for more than 24 hours, that the membranes ruptured prematurely, and it was found necessary to incise the os uteri, that after the first period had lasted more than 24 hours, the temperature had risen from 99.9° to 101.5° F., and a slight shivering, nausea, and violent vomiting ensued. The temperature later in the 1st period reached an altitude of 102.3°, toward midday it fell again, but only to rise again rapidly from 100.4 to 100.5, 102.7, 103.6, and 104.3°. Finally, it became possible to apply the forceps, though the os was not quite fully dilated; an asphyxiated girl weighing 6⅓ lbs. was extracted, who soon revived, but died in convulsions 3 hours after birth. The placenta had to be removed owing to the very serious flooding. On

[1] Monatsschrift, xxv. pp. 256-266.

completion of the delivery, at 8 o'clock in the evening, the temperature in the vagina was 104.3° F.

1st day. The following night the patient slept but little, much blood had escaped, the abdomen was painful; the urine was passed without assistance.

Pulse 140, resp. 38, temp. 102.2° F. At 2 P. M.—18 hours post partum—she was suddenly attacked by very intense pains, which soon radiated throughout the whole abdomen, without another chill being felt; desire to vomit, great thirst, and headache, soon followed; 3 ice-bladders were laid upon the abdomen, and 10 leeches applied to the right inguinal region. Infusio digitalis, vaginal injections of aqua chlorata. Lint soaked in wine of camphor was laid on the puerperal ulcers.

7 P. M. Pulse 168, resp. 36, temp. 104.1°. Morph. acet. compresses upon her forehead.

2d day. Pulse 160, resp. 36, temp. 104.9°, extreme tympanites. Retention of urine. Diphtheritic membrane upon the rents in the mucous membrane at the entrance to the vagina, and profuse exudation from them. Small pieces of the membranes were removed from the vagina.

P. M. Pulse 160, resp. 51, temp. 105.1°. Morph. acet. Catheter passed.

3d day. Pulse 156, resp. 48, temp. 104.9°. Cold extremities. Collapse. Stitch in the right side upon inspiration. Extreme tympanites. R. Castorei sibirici gr. j, Sacchari lactis gr. x. Ft. chartulas No. xij—a powder to be taken every hour.

P. M. Pulse 168, resp. 48, temp. 105.1, very restless, great pain. Morphine.

4th day. A. M. Pulse 160, resp. 32, temp. 104.3°. Involuntary defecation.

P. M. Pulse 160, resp. 32, temp. 107°. Great restlessness, convulsive movement of the upper extremities; she cries out at times, and clutches at her abdomen as though she wished to scratch herself. She became quieter upon the application of wet compresses to her head. Death on the 5th day at 5 A. M.

Autopsy 26 hours post-mortem by Prof. Ackermann. Rigor mortis. Very marked cadaveric spots upon the back. Upon opening the abdomen a serum clear as wine, with a few yellow flakes, gushed forth. In the right inguinal region, just above the plane of entrance to the pelvis, the parietal lamina of the peritoneum were covered with a thick, greenish-yellow, purulent coating, as were also the convolutions of the small intestine which lay on that side. In addition, there was a very abundant fibrino-purulent exudation in Douglas's *cul-de-sac*, which partially attached the uterus to the rectum by a sort of

narrow bands. This deposit was greatest on the posterior surface of both ovaries.

The uterus lay with its fundus just above the entrance to the pelvis, and was likewise invested with exudations of the above description. It measured 21 ctms. in length and 13 ctms. in breadth. The two commissures of the os were transformed into large discolored ulcers of irregular outline, and with a grayish-yellow—in part firmly adherent—coat; upon their borders were elevations, through which ran shreds of sloughing tissue; on the right, the extreme edge was $\frac{1}{2}'''$ from the vaginal *cul-de-sac*, but on the left the ulcer extended into the *cul-de-sac*. The vagina was otherwise entirely intact, except its orifice, where ulcers were found, precisely similar to those upon the os.

The cervix uteri showed several discolored losses of substance, especially at the internal os, while just above the posterior lip was a deep ulcer almost $\frac{1}{4}''$ across. The attachment of the placenta was chiefly upon the left part of the anterior wall. Pieces of the membranes were still here and there adherent to the inner surface, which was covered with a grayish-brown coating. The substance of the uterus beneath the placental site was firm, pale, and devoid of coagula. The subperitoneal connective tissue was infiltrated and of a yellow gelatinous consistence. An extensive yellowish-green infiltration was visible upon the lateral wall of the uterus in the neighbourhood of some greatly dilated lymphatics; just beneath the left tube was an abscess, about the size of a pea, filled with a greenish-yellow mass. A yellow, thick gelatinous, diffuse œdema was clearly visible, especially in the cervix.

Both ovaries were enlarged, their substance very œdematous; the right was the size of a crab-apple, very soft, flabby, and upon its capsule were numerous small deposits; upon section, several dilated lymphatics could be seen containing thrombi.

The kidneys were very hyperemic, and the capsule was readily separable.

The spleen was 12 ctms. long and $7\frac{1}{2}$ broad. Its parenchyma was pale-brown and firm; the capsule was free from deposits.

The liver was very hyperemic, and had numerous false membranes. The acini were very distinct and yellowish. It was otherwise normal.

Thoracic cavity. The pleura on both sides had a few deposits, and contained a slight amount of serum, more being found in the right side than in the left. The other organs were normal.

No. 22. Colpitis and endometritis diphtheritica. Metritis developed after delivery. Diffuse peritonitis. Gradual subsidence of the disease in 7–9 days. Recovery complete on 14th day.

Maria Grahl, second pregnancy, 26 years old, a medium-sized strongly-built blonde, entered our lying-in establishment on March 18, 1865. Except for leucorrhœa she had always been healthy. At 4.30 P. M. on May 9th, the waters escaped, and at 8.30 o'clock slight pains set in. The first period lasted 4½ hours, during which the vaginal temperature was 99.7° F. at 8.45 P. M., 100.1° at 9.45, 99.9° at 10.45, 100.1° at 11.45, 99.7° at 12.45. After 11.45 P. M. the pains were very acute, so that tinct. opii. gtt. x–xij was given several times. After an hour's duration of the second period, the head became engaged in the first occipital presentation, and at 1.45 A. M. a living boy was born, who weighed 9½ pounds. The placenta was expelled soon after 2 o'clock, with the loss of a moderate amount of blood; it weighed 1½ pounds, and presented no abnormity. Immediately after delivery the vaginal temperature was 100.6° F., pulse 80, resp. 30.

Childbed.—First day. A. M., temp. 101.2°, pulse 46, resp. 24. P. M., temp. 100°, pulse 76, resp. 22. The abdomen was somewhat distended and a little tender. Urine was passed spontaneously. Discharge of blood was moderate. Compresses with tepid water upon the abdomen.

2d day. A. M., temp. 100.1°; pulse 82, resp. 22. P. M., temp. 104.1°, pulse 128, resp. 40. In the night, she had a rigor, lasting an hour, and followed by feverishness and headache; in the afternoon she had a second more severe rigor, lasting 1½ hours, with very acute pain and greater distension in the abdomen, headache, dizziness, singing in the ears, and muscæ volitantes. The uterus was very painful, especially on the right side. Prescribed oleum ricini, enema, ice-bladders upon the abdomen, infusio digitalis (2 : 180 grms.) with potass. nitrat. ʒj. Compresses with vinegar and water upon her forehead.

3d day. A. M., temp. 104.3°, pulse 124, resp. 36. The patient slept tolerably well, and had several dejections in the night. The tongue was moist and red at its tip, but was elsewhere covered with a thick grayish coat. She lay upon her left side, and asserted that she could not rest upon her back owing to the pain. Her countenance was sallow, her eyes dull and with difficulty held open. She complained of very severe headache, and worked down toward the foot of the bed. The abdomen was moderately distended, but less tender than the uterus, which was extremely painful. Per-

cussion revealed dulness in both inguinal regions an inch above Poupart's ligament, and in the mesogastric region beyond the axillary. The limits of dulness altered with a change of position. The discharge from the genitals was offensive and scanty; in the mucous membrane of the posterior commissure of the vagina was a rent with a diphtheritic membrane. Beneath the clitoris there were also two narrow fissures in the mucous membrane, but these looked healthy. Upon examination with the speculum four fissures were visible in the os uteri, of which the two in the anterior lip were coated with a diphtheritic exudation. The secretion escaping from the cervix was of a brownish-red color, and had some pieces of diphtheritic membrane mixed with it. Prescribed cauterization of the spots with nitrate of silver. Injections of aqua chlori three times a day; the digitalis and ice-bladders to be continued. P. M., temp. 106.1°, pulse 124, resp. 32. The patient passed her urine and feces in bed. She complained of great pain in her abdomen and head, especially in the crown. Liver and spleen were normal. The urine drawn with the catheter was of a brick-color, smelt feebly alkaline, and deposited an abundance of sediment. Ice-bladders to her head. The child had been weaned the day before. 11 P. M., temp. 105.2°, pulse 116, resp. 28. Patient somewhat brighter.

	Temp.	Pulse.	Resp.	
4th day.				
A. M.	104.5°	124	24	Feces still voided in bed. Her senses otherwise appear to be clearer. Retention of urine. Urine, drawn off with the catheter, contained $\frac{1}{12}$–$\frac{1}{10}$ of its volume of albumen. No change, except a slight chill. Morph. acit. gr. $\frac{1}{4}$.
1 P. M.	103.3	108	24	
P. M.	105.1	128	36	
5th day.				
A. M.	104.1	104	20	Sleep quite good. Patient seems easier. The exudation beginning to diminish, and the abdomen only painful upon an attack of coughing.
P. M.	104.2	108	20	
6th day.				
A. M.	104.6	104	22	The retention has persisted. The lochia is more profuse, and still offensive. Acid. hydrochlor. 1.2 : 180 grms. every $\frac{1}{2}$ hour.
M.	104.9	108	28	
P. M.	104.7	108	26	
7th day.				
A. M.	102.4	94	24	Catarrhal sputa. Cough moderate. Exudation notably decreasing. The ulcer looks better. Urine was passed spontaneously in the afternoon.
P. M.	102.9	94	18	
8th day.				
A. M.	101.4	84	20	For ice bladders, which had till then been regularly applied to her abdomen, tepid water compresses were substituted, at the same time the abdomen was painted with tinct. iodini, and tar water injected into the vagina.
P. M.	102.8	96	24	

	Temp.	Pulse.	Resp.	
9th day.				
A. M.	100.3°	84	22	
P. M.	102.9	92	24	
10th day.				
A. M.	105.5	108	26	Diarrhœa; no chill; no pain. Feces finally passed almost involuntarily.
P. M.	103.7	104	22	
11th day.				
A. M.	99.7	80	22	
P. M.	101.7	88	20	
12th day.				
A. M.	101.8	88	22	
P. M.	102.2	106	18	The exudation gradually diminishing, the cough becoming less, the discharge more abundant, and no longer offensive.
13th day.				
A. M.	100.5	92	22	
P. M.	101.7	96	20	
14th day.				
A. M.	100.5	92	16	
P. M.	100.5	100	16	
15th day.				
A. M.	99.2	84	20	
P. M.	99.4	72	18	
16th day.				Convalescent.
A. M.	98.9	78	18	
P. M.	99.7	80	24	

On the 23d day the patient was discharged fully recovered.

N. B. Here belong also cases Nos. 30, 31, 33–35, and 49.

CHAPTER V.

PUERPERAL THROMBOSIS AND METASTATIC PYEMIA.

I. Thrombosis of the Uterine Veins and Metrophlebitis with Metastatic Pyemia.

Thrombosis of the uterine veins originates either at the seat of the placental attachment, or at some other part of the uterine wall. In *placental, or traumatic thromboses*, the coagula, which are ordinarily formed, may extend from the placental site into the substance of the uterus, and, as was observed in one instance by Erichsen, even throughout its entire length. The second form of thrombosis is due to *dilatation;* it may arise in any portion of the uterine wall which is for any length of time imperfectly contracted. In this, as in other forms, the blood coagulates, because the velocity of the current is retarded at those points. Beside these two varieties, thrombosis may occur in the uterine wall, or in the uterine plexuses, and especially the pampiniform, as the result of compression, provided there be any cause to produce a passive dilatation of the peripheral parts, at the same time that the vena hypogastrica or iliaca are compressed. This form of thrombosis is, on the whole, rarely met with in the uterus, but, on the other hand, is common in the lower extremities. The coagulum which is thus formed arrests the flow of blood, and produces a passive hyperemia. If the coagulum undergoes no change, it is in itself harmless; it may become organized, however, by the immigration of movable cells of connective tissue, a process which is possibly aided by the presence of the blood cells inclosed within it, and thus transform the vessel into a firm band of connective tissue. A channel is sometimes formed through this band, possibly by the passage of red corpuscles, so that later the flow of blood may be re-established. If, however, suppuration, and especially mortification, occur in the neighbourhood of such a thrombus, a foul, purulent degeneration takes place, as Wal-

deyer has proved by experiment. Bubnof has also shown that pus and connective tissue corpuscles, which have been colored with cinnabar, pass from around the walls of the vessel into the thrombus, whereby a true suppuration may be established. In this way, a phlegmonous inflammation in the perivascular connective tissue can most easily give rise to a foul, purulent liquefaction of the thrombi. According to Waldeyer's researches, the assumption is admissible that an epithelial proliferation originating in the wall of the vein, the result of an adjacent inflammation, that is to say, endophlebitis, may lead secondarily to the formation of thrombi.

A thrombus which has grown by aggregation, often extends a great distance, passing from the uterus into the *vena spermatica interna*, and even as far as the *vena cava;* or into the *vena hypergastrica*, *iliaca communis*, and thence into the *vena cava*. The innermost layer of the walls of these vessels appears to be thickened, irregularly rough, and impregnated with a greenish purulent, or even diphtheritic, infiltration. At times the origin of the thrombi may be easily traced to the placental site; the affection is often attributable to the presence of putrefying masses in the substance of the uterus or its attachments, especially in the ovaries. Recklinghausen found in one instance that it had originated from a softened corpus luteum. Parenchymatous abscesses in the uterine walls are sometimes found in the neighbourhood of the affected vessels, which generally proceed from the adventitia. For the rest, the inner surface of the uterus is either fully intact, and in a relatively healthy condition, or the placental site may be covered with shreds of the sloughing parenchyma, smeared with a brownish-black, putrid fluid, while here and there, diphtheritic ulcers may be seen, covered with a firmly adherent deposit. The uterine parenchyma is then soft, flabby, and infiltrated. The ovaries are swollen, enlarged, and at times riddled with abscesses.

The peritoneum was shown to be more or less involved in 11 out of 27 cases of metrophlebo-thrombosis (including 7 of Erichsen, 9 of Leyden), and in 4 a marked peritonitis was present, which affords a complete refutation to the assertion of Buhl that, as a rule, this variety of the disease runs its course

free from peritonitis, and, therefore, the name proposed by him, "pyemia without peritonitis," is inappropriate.

The thrombus is first softened in the centre by purulent or putrid degeneration, owing to the accumulation at this point of the pus corpuscles; it then breaks up, and small particles —emboli—enter the circulation, by which they are transported to the different organs, most frequently to the lungs. Such masses derive inflammatory properties from the degeneration of the thrombus, and, therefore, lead to *embolic deposits in the lungs*, such as are found in 75 per cent. of the cases, and these deposits are, as a rule, accompanied by *fibrino-purulent pleuritis*, as soon as they approach the pleura. At times, there are found very numerous (as many as 100 according to Kiwisch) hemorrhagic infarcts, both recent and old, varying in size from a pea to a walnut, or even a hen's egg, while in the branches of the arteria pulmonalis are seen the accompanying emboli.

The septic infection of the thrombus may be brought about at times by chemical agencies, the contagion being implanted by means of putrid muscular or connective tissue, at times by animal agencies, being attributable to the presence of bacteria. According to Hueter (*Deutsche Zeitschrift für Chirurgie, I. i.*) the metastatic diseases, especially those of the lungs, are more likely to be due to the formation in the branches of the arteria pulmonalis of emboli, filled with monads (bacteria), than to the mere wandering (Klebs) of these animal parasites. It is possible, however, that the pyemic inflammation of the joints and serous membranes may be referable to the latter process.

Small spots of lobular pneumonia are also observable, with an exudation of fibrine into the pulmonary vesicles, and later into the metastatic abscesses. These masses are in general wedge-shaped; they are at first brownish-red and friable; appear granular upon section, with yellowish-gray points in their centre, surrounded by a zone of yellowish-gray, firmer, and even granular substance; then comes a reddish pneumonic zone, which, in turn, is usually encircled by a hemorrhagic zone. The shape of the suppurating portion will be round in proportion as the process extends to the whole infarct. If the emboli are infiltrated with ichorous matter, the metastatic deposits in the lungs are extensive, putrescent, and encompassed by slight

pneumonic inflammations. The most frequent seat of the metastases is in the superficial layer of the lungs, generally bilaterally, in the inferior, external, sharp borders of the lower lobes, but they may be scattered throughout the entire lung, though very rarely seen in the apices. At the same time hypostatic deposits in the liver are found, so that we should be on our guard not rashly to pronounce all deposits found to be of an embolic nature. The mucous membrane of the bronchi is usually hyperemic and swollen.

In these cases of metrophlebitis, the *spleen* is always considerably enlarged, and in 10.2 per cent. of all cases is filled with wedge-shaped deposits—resembling the metastatic deposits in the lungs; these are generally round, seldom putrefy, and may be very numerous. The *kidneys* usually appear hyperemic, and next in order to the lungs are most frequently filled (14.30 per cent.) with metastases. The *liver* is large, soft, and exhibits varying degrees of congestion: the hepatic cells are enlarged, the contents cloudy, the nuclei often indistinct, while within the cells numerous fat globules are visible. Metastatic abscesses are less frequent here (5.1 per cent.) than in the spleen, and smaller than in the lungs; they arise either from emboli which have passed through the lungs, from such as have become broken off from thrombi of the pulmonary veins, or finally, according to Busch (Berlin), from reflux of the blood, which carries emboli from the vena cava inferior into the liver (C. Hueter, *l. c.*, p. 79). The *intestinal mucous membrane* is generally for the most part œdematous, its follicles and lymphatic glands being swollen.

The occurrence of endocarditis, in connection with thrombosis of the uterine veins, has been repeatedly observed by various authors (Kiwisch, Virchow, Leyden, Buhl, Klob, etc.); Virchow has called attention to its occurrence on the left side, and Buhl to the same on the right side. A new source of metastases is thus shown, since in Buhl's case of endocarditis with thrombosis of the right ventricle, and also of one of the large pulmonary arterial branches, gangrene of the lung had taken place; whereas Virchow found an ulcerative inflammation of the mitral valve with a crumbling off of the softened particles and metastatic deposits in the parenchyma of the

heart, in the kidneys, spleen, liver, and in both eyes (in the retina and choroid).

Decornière has published 22 cases of puerperal endocarditis, and expresses the opinion that the puerperal state predisposes the woman in a marked degree to endocarditis, inasmuch as the blood is at that time peculiarly rich in fibrine, though it must be admitted that this lesion may also be attributable to a rheumatic diathesis. Most of the above cases, however, involved an endocarditis conjoined with a formation of vegetations, which in one instance assumed an ulcerative form. The other sequelæ of the affection are infarcts in all the organs, hemiplegia, and softening of the brain.

The *ophthalmia*, which complicates metrophlebitis in 8.16 per cent. of all cases, commonly begins with great hyperemia of the choroid and iris, as well as the conjunctiva; small extravasations of blood sometimes occur, but more commonly a diffuse, suppurative inflammation supervenes, the pus which is formed, making its way between the choroid and retina; the latter is penetrated, and suppuration of the crystalline lens ensues, followed by a discharge of pus into the anterior chamber, perforation of the cornea, and destruction of the entire eye. The organs within the cranial cavity are more rarely (4 per cent.) affected in metastatic pyemia proceeding from thrombosis of the uterine veins, yet an extensive suppurative meningitis has been at times observed (Erichsen), and also meningitis following thrombosis, phlebitis and periphlebitis of the sinus of the sella turcica (Leyden), thrombosis of the right arachnoidal vein (Virchow), and thrombosis of the cerebral and meningeal veins (Ducrest, Hertzfeld?). Passive hyperemia and slight œdema of the pia mater have often been observed as coexistent lesions. Mention should be made, furthermore, of the thrombosis of both the internal jugular and the subclavian veins, extending as far as the vena cava superior, evidently a puerperal thrombosis, noticed by McClintock, complicated with an abscess in the right side of the heart; the vertebral and external jugular veins had served in this case to convey the blood back from the brain. Metastatic inflammation with *suppuration* occurs in the parotid and mammary glands (compare remarks on etiology of parenchymatous mastitis in

Section II. Chapter III.), in the thyroid gland, and in the tonsils. On the surface of the skin there may appear either diffuse erysipelas, miliaria, varioloid exanthema, or large pustules. Inflammation and suppuration of the *joints* frequently occur (in 21.6 per cent.), especially of the shoulder, elbow, hand, knee, hip, sterno-clavicular, and pelvic joints. The synovial membrane is usually thickened and reddened; the perichondrium is unchanged, or appears somewhat cloudy; cartilages at times become necrosed which may result in caries of the bone with perforation of the pus externally. Finally in 22 per cent. of the cases, numerous abscesses form in the muscular and cellular tissues, which generally proceed from the connective tissue of the muscles. It has not yet been definitely shown whether these abscesses as well as those in the joints are also of embolic origin, or are developed in a manner analogous to the idiopathic inflammation of the serous membrane, from an absorption of pyrogenic and phlogogenic substances by the blood.

Symptoms.—When a thrombosis has formed at the placental site, or in the uterine wall, and the thrombi become early the seat of a purulent or putrid degeneration, further consequences often rapidly follow, being developed even within the first 24–48 hours of childbed. It commonly happens, however, that these results are gradually developed from apparently insignificant symptoms, particularly those of endometritis and parametritis; being observed in the latter period of childbed, when the patient has already begun to leave the bed, having previously enjoyed perfect health. In such cases, it is common to hear afterwards that the woman had previously felt weak and exhausted, and had also from time to time had a slight chill, and unusually profuse sweating, or feverishness; that she had, however, paid but slight attention to this indisposition, until at a later period severe hemorrhage, or an acute abdominal pain with high fever, had set in followed by a *violent rigor*. The first, most important, and alarming phemonenon is almost always the appearance of *intense rigors*, which are, as a rule, not only of several hours' duration, and of peculiar violence, but recur with great frequency. Profuse exhausting sweats supervene, which often give rise to a miliary eruption. The *lochia* is then generally sanguineous and offensive; it is

first abundant, and then scanty, and contains small coagula. The abdomen is at first soft and yielding, while the uterus alone is tender upon deep pressure. When a chill ceases and the temperature begins to fall, the patient is relieved, becomes more cheerful, and recovers her appetite.

If, however, the chills speedily recur, as is usually the case, the patients sink, for the most part, very rapidly; the skin becomes loose and flabby from the rapid emaciation: insomnia and loss of appetite follow: great thirst, and less frequently vomiting and intense headache rack the sufferer; the countenance assumes an anxious expression, and, in the intervals, when a respite from the chills is obtained, she rallies slowly, always fearing a recurrence of the dreaded chills. At times *neuralgic affections of one or both lower extremities* set in, followed by œdema of the feet and a loss of the power to move them: symptoms of peritonitis also appear, such as abdominal pain, diarrhœa, and vomiting. In a few cases, the puerperal metastatic pyemia is preceded by diffuse peritonitis; although the temperature may subside, yet the unusual rapidity of the pulse, insomnia, and severe, constant nervousness all indicate that the disease is only latent; the recurrence of the chills, and the metastases which follow, affording satisfactory evidence of its presence (case No. 24).

A symptom more frequently observed is the *intense icterus* (noticed in three of the nine cases reported by Leyden, and seen by me, in a very marked degree, three times), which often appears at the very beginning of the trouble, the dejecta being then always colored with bile. *Metastatic affections* are at times developed within the first twenty-four hours, appearing usually at first in the lungs, as indicated by a very accelerated respiration, attacks of dyspnœa and coughing, a stitch in the side upon respiration, and later, bloody expectorations with rusty sputa; the latter, however, are by no means characteristic. *Lesions of the eyes* next supervene; the conjunctivæ swell, appear chemotic; hypopyon is found in one or both organs, and the patients lose completely the power of sight in the affected eyes. This condition sometimes improves; the pus disappears from the anterior chamber; and the patient barely retains the ability to distinguish light from darkness;

swelling of the joints now sets in, extreme pain being occasioned by every movement; the affected joints become red, and an effusion soon takes place within them. These symptoms also abate after a time, and other parts are in turn invaded. Isolated, red, thick spots appear in the skin of the extremities, and small tumors are, of a sudden, developed, giving a distinct fluctuation, although the integument is still white. If these tumors are incised, they discharge an immense quantity of offensive pus, mixed with blood.

Thus with frequent chills and intense pain, puerperal metastatic pyemia gradually conducts its victims—in the course of weeks or at times of months—through the exhausting fever to the grave. During the intervals between the paroxysms, the patient may often rally, so as to appear tolerably comfortable, and regain her spirits, but a new metastasis and a fresh chill completely blight her slender hopes. It is noticeable, that the patients are, as a rule, conscious of the full danger of their position, and seldom, if ever, manifest that extreme nervousness, which so often characterizes diphtheria and septicemia.

At other times, the process comes to an end much more speedily. An embolus may lodge in the pulmonary artery, producing dyspnœa, distress, cyanosis, opisthotonos, and *sudden death:* or a severe chill may take place, succeeded by *bloody expectoration*, dyspnœa, coughing, stitch in the side, etc., and, at a certain part of the thoracic wall, dulness, with fine vesicular crepitation, may be detected: collapse soon follows amidst fresh chills; delirium, sopor, death. In spite, however, of pulmonary metastases, the symptoms of stitch in the side, cough, and expectoration may all be absent, or, on the other hand, notwithstanding the irritation, pain, and subsequent pleurisy, the seat of the embolus and the metastatic deposits cannot at the outset be diagnosticated. The period, at which the pulmonary affection occurs, varies greatly with the character of the primary thrombus; metastatic deposits appear in the lungs earlier, in proportion to the rapidity of the process of softening and degeneration of the thrombus; when these deposits are numerous, and the thrombus becomes putrid, pulmonary gangrene results, which, as a rule, ends in death. The lungs are most frequently the first organs to be affected, the

emboli passing without obstruction from the venæ spermaticæ and the vena cava inferior by a direct route into the heart, and thence into the capillaries of the pulmonary arteries, where they meet with the first obstacle to their advance. Puerperal metastatic pyemia is distinguished from that resulting from wounds by the fact that in the former the lungs are often free, while the kidneys, on the other hand, are three or four times more frequently the seat of deposits than in the case of non-puerperal pyemia (*vide* C. Müller, *l. c.*). Though, in these affections, death is generally to be expected, yet there are cases (20 per cent.) in which a pronounced metrophlebitis with numerous metastases, and a great number of chills, may still terminate in recovery, unmistakable proofs of an old phlebitis having repeatedly been found at autopsies of women who have previously borne children, and cases of this description with recovery have been put upon record (by Beitler, Hervieux, Woillez, Hugenberger, and others) where no doubt existed as to the correctness of the diagnosis. The case reported by me in the appendix (No. 25) belongs also to this class.

Multiple metastatic deposits, formed internally from material brought from the distal extremities of the bloodvessels, are among the most favorable of the secondary affections; 5 cases only resulted fatally out of 17 cases of this sort mentioned by Hugenberger.

The disease lasts on an average 18½ days. The chill, which may certainly be attributed to phlebitis, may occur upon the first day after delivery. In 75 per cent. of the cases, the chills commence in the first week of childbed. Death most frequently takes place in the second or third week.

With reference to the *fever* accompanying this malignant puerperal disease, it was a fact known to the older physicians that the chills frequently assume almost an intermittent character, and that in the intervals the women rally in a measure. This affection was, therefore, formerly designated *intermittens maligna puerperarum.* In cases which have run their course for a time free from all complications, the fever is usually of the following type: At first *continued* or slightly remitting; subsequently quite severe rigors ensue, followed by very *marked remissions, or even complete intermissions.* The

pulse is commonly very rapid during the chills, and for a short time before and after; in the intervals, it is retarded during the early stage. When a new chill sets in, the pulse rises to 120–140, the respiration to 36–56, the temperature to 104°–106°; then follows quite as rapid a fall of the temperature, until the normal point is nearly reached. Such intermissions may repeatedly occur; but ultimately, when metastases are formed, a continued fever is commonly established, which rages unabated until death; at times there will be observed a gradual fall of the temperature, accompanied, as the end approaches, by a diminution of the pulse.

If, on the other hand, early metastases occur, the intermittent stage of the fever is often entirely omitted and only irregular, quite distinct remissions can be noticed. For exact researches respecting the temperature during the affections we are indebted to Leyden, by whom nine cases were communicated in the above-mentioned report. Remissions from 104–98.6° F. upon the same day were repeatedly observed by this writer, whose observations have been many times corroborated by myself (*vide* Cases 23, 24, and 26), and more recently by Veit, Schröder, and others.

The height of the fever and the rapid rise of the temperature first induce a chill, the frequency and intensity of the rigors being explained by the rapidity and extent of the introduction of purulent, and especially ichorous, masses and fluids into the blood, usually preceding new metastases. As soon as these foul fluids or débris of thrombi become arrested in their course, the new disturbance ceases, recurring only upon the introduction of new morbid matter. Every fresh mass forms a new source of pyrogenic matter, but the number of chills does not correspond to that of the metastatic deposits.

The *icterus* was formerly explained in a similar way, by ascribing it to the changes in the blood induced by the disintegrating action of these foul matters upon the blood corpuscles. This theory was based upon the fact that, as a rule, no gastro-duodenal catarrh is present in these cases, a theory accepted more recently by Kiwisch and Leyden. Andral, to be sure, was able in one such case to demonstrate the existence of "inflammation of the mucous membrane of the stomach

and duodenum." Virchow has questioned the accuracy of this theory, and attempts to refer the source of this form of icterus to the liver, alleging that it originates in a mechanical obstruction in the intestinal portion of the ductus choledochus. The liver is here entirely yellow in spots, being the seat of a fatty degeneration; the parenchyma is soft, the hepatic cells granular, and in a state of complete degeneration. Buhl has also shown that in metastatic pyemia, even where no icterus is present, a destruction of the hepatic cells takes place, precisely analogous to acute atrophy of the liver. The urine evidently contains biliary coloring matters, some albumen, but no biliary acids (Leyden, *loc. cit.*, p. 112); it has a high specific gravity, and is poor in chlorides.

Although in cases of metrophlebitis the chills form a most frequent symptom, inspiring the patient, and also the attendants, with extreme anxiety, yet these phenomena are at times almost entirely absent; or possibly a slight chill occurs, which may easily be overlooked; and this may happen in cases where extensive metastases have occurred. (Compare, especially in this connection, Cases Nos. 23 and 24, and the report of Case No. 26, given under the head of phlegmasia alba.)

The chills may be said, therefore, to be the most significant *diagnostic* sign, but their absence by no means excludes the idea of metrophlebitis. For the rest, the recognition of the disease is, on the whole, easy, as soon as the chills become frequent. It may be easily distinguished from *intermittens quotidiana*, and other affections, by the entire irregularity of the chills, the irregular fall of the temperature, and the metastases which are seldom absent. In former times, this disease was unquestionably confounded ofttimes with intermittent fever, and it is perfectly conceivable that many a so-called intermittent fever, occurring in childbed and terminating favorably, was in reality a metastatic pyemia. In order to distinguish the great remissions and intermissions of the fever, the thermometer must be resorted to, especially at midday and in the night. It is at times possible to feel the plugged vessels of the ligament distinctly through the vaginal cul-de-sac, or per rectum; sometimes the vena iliaca communis or externa may be made out resting upon the sacrum, provided the ab-

dominal walls are not œdematous or painfully distended. This digital exploration must naturally be undertaken with the greatest care, that a finger may not break up the thrombi and cause their fragments to be swept away.

An important point in the diagnosis of a thrombus of the uterine veins, is its frequent complication with a secondary phlegmasia alba dolens. Hemorrhages from the uterus recurring frequently, must be regarded as pointing to the probable existence of thrombosis, provided no other cause can be assigned for them. In those cases where the process runs a more insidious course, and the severer chills ensue only after the patient has left her bed, the diagnosis is at first more difficult. The thermometer is then of great value, inasmuch as it affords us some definite information, at least during the course of the feverish symptoms, and before there is evidence of decided metastases. The diagnosis is particularly difficult if the metrophlebitis is accompanied by other affections, especially a phlegmonous metritis and thrombosis of the lymphatics. Here these last diseases furnish so often the most prominent symptoms, and tend to accelerate to such an extent the course of the malady, that the former trouble may easily be overlooked, and not discovered until the autopsy. Hence, it resulted, as was maintained by Kiwisch, that with the early authors, the symptomatology of phlebitis was very confused, because they included in their general description of the malady, the symptoms of these accidental complications; we can consequently understand why, in the official returns of clinical institutions, metrophlebitis has been sometimes reported as extremely prevalent; almost as frequent, for instance, as peritonitis, whereas, it is incomparably rarer; and is even much less common than the true phlegmonous affections of childbed.

The diagnosis of a metastatic deposit in the lungs is often extremely difficult. If this deposit is a large one, dulness is present it is true, and a pleuritic friction sound is audible; but, in the case of small, scattered, atelectatic portions, the pitch only is higher, while the sound is not deadened. The expectoration is often absent, is not always pneumonic; while the increased frequency of respiration, though commonly met

with, is not an invariable symptom. A negative result of the examination of the lungs, by no means excludes the presence of metastatic deposits. As is evident from the foregoing statements, the diagnosis of the disease in question is often difficult, but is not (as has been affirmed by Scanzoni, Kiwisch, Hugenberger, and others) to be considered impossible. On the other hand, we are justified in asserting, that in a large number of cases, an accurate diagnosis is possible.

Etiology.—There is no question, but that puerperal thrombosis occurs far more commonly at times when other epidemic puerperal affections are raging. The same causes which affect the wounded surfaces of the vagina and uterus, may also produce decomposition and breaking up of the existing thrombi, and subsequently lead to the development of emboli, pyemia, and septicemia. It is indeed true, that puerperal pyemia has its invariable origin in self-infection, but putrefactive changes, occurring antecedently upon the wounded surfaces of the vulva, vagina, and uterus, may extend by contiguity to other wounded surfaces, and thus play an active part in the development of metastatic pyemia. We find then that the latter affection may prevail:—

First: in epidemic form accompanying endometritis and colpitis diptheritica, parametritis without any affection of the inner surface of the uterus, and also gangrene of the vulva, vagina, and uterus.

Second: it is developed sporadically:—

a. As thrombosis due to dilatation, accompanying and succeeding severe hemorrhages of the uterus, after atony of the placental site, and after placenta prævia (*vide* C. Müller, *l. c.*). The contractile power of the uterus and heart is lessened by extensive loss of blood, the *vis à tergo* diminishes, whence numerous long thrombi form, and there is consequently developed a greater danger of pyemic infection.

b. When upon detachment of the after-birth, pieces of the placenta and membranes are retained; since placental fragments, by their protrusion into several venous branches, prevent their contraction, and produce continuous dilatation, so that the blood coagulates in them; on the other hand, by decomposition, they often cause a putrid degeneration of the coagula

that have formed; this is equally true of the remnants of the membranes.

c. As thrombosis due to compression: occurring after lesions and contusions of the walls of the veins, whether caused by the fetal parts, or by instruments applied during delivery: occurring, moreover, especially after births where operative interference was required, and in case of exudations in the neighbourhood of the great venous plexuses.

It generally happens, however, that the affection is the result of many causes combined, since, as has been already remarked, a degenerative metritis and phlebo-thrombosis by no means invariably follow the retention of portions of the placenta; it is rather the character of the uterine contractions, the antecedent affections of the inner surface of the uterus, the quantity of blood in the retained masses, and the firmness of their attachment to the uterine walls, that contribute essentially to the development of that disease. The malady develops therefore, most frequently, by self-infection from the retained remnants of the placenta, when at the same time, owing to the loss of blood, the uterus has remained imperfectly contracted, and a foul decomposition has been promoted by the infecting germs introduced by the air, or by the presence of endometritis. It is found, moreover, quite as often in primiparæ as in multiparæ, and, as regards the frequency of its occurrence compared with that of the phlegmonous process, the proportions stand as 1–7 or 9. Even Kiwisch did not fail to observe that the malady prevails especially toward the end of more extensive epidemics, while at other times, it is far less frequently encountered. In the records of the Rostock Institution, but four cases are to be found in 816 confinements. I have seen it but eleven times, of which six were sporadic, three associated with phlegmasia alba, and one with lymphatic thrombosis. About 14 per cent. of the cases of metrophlebitis are accompanied by phlegmasia alba (*vide* C. Müller, *l. c.*).

The *prognosis* is extremely unfavorable. Recovery is the rare exception, and the sufferings of the patients up to the hour of death are often dreadful. The physician must not rashly indulge in premature assurances of improvement, based upon a decided fall in temperature of the patient; he would do better to direct

the attention of the family at the outset to the dangerous nature of the disease, and they should be especially warned not to allow any seeming, but delusive, improvement to excite hopes not justified by the actual state of the woman. Intermissions of the fever, accompanied by a corresponding reduction in the frequence of the pulse, would admit of a more favorable prognosis. The longer, more constant, and more severe the chills, so much the earlier and more frequent are the metastases. Of these, the most unfavorable are the extensive infarcts of the lungs with pleuritis and thrombosis of the cranial veins. An intense icterus is a very bad sign. Kiwisch states, that he has never heard of a case of recovery after metastatic ophthalmia, and my own experience is the same. Multiple abscesses of the glands and skin are, as has been observed, more favorable. Actual hopes for the patient may be entertained only when, after a long (*i.e.* for an entire day) freedom from chills, the temperature gradually sinks, the general condition improves, and the existing metastatic deposits are removed. As a rule, however, more than 95 per cent. of those attacked die.

In contrast with metrophlebitis, phlegmasia alba dolens is far less dangerous, although in case of the latter also, very extensive, long, and severe thrombi may occur, attended by periphlebitis and endophlebitis. If we consider, however, that in case of the former affection, the thromboses originate most frequently at the seat of the placental attachment, where the thrombi are invariably more or less exposed to noxious influences, the more evil significance of metrophlebitis will be readily explained. To this it may be added, that the venæ spermaticæ internæ are so largely developed and distended in pregnancy, that they, being unprovided with valves, are, therefore, very much predisposed to the formation of coagula; and that the coagula find their way more easily and rapidly, the course being shorter and more direct, through them into the heart. In the same manner an embolus can be conveyed into the lungs more rapidly than from the vena hypogastrica cruralis and iliaca externa.

Treatment.—It is to be regretted that no such advance has been made in the treatment of this malady, as in our know-

ledge concerning its nature and causes; the results of treatment are still quite as unsatisfactory as ever, and, as our knowledge of the nature of the malady increases, the confidence in many a renowned remedy becomes shaken. This should not deter us, however, from prescribing in exact accordance with certain indications, and can in no way justify our blindly following a crude empiricism. In the first place, as a *prophylactic measure*, the labor, and especially the post-partum period, is to be watched, in order to ward off all causes which might produce severe uterine hemorrhages. Any indications of endometritis, or parametritis, are to be allayed as promptly as possible, and the decomposition of the coagula already formed is to be prevented by exciting the contractions of the uterus; vaginal and uterine injections are to be employed if the lochial discharge is putrid. Especial caution must, moreover, be exercised in granting permission to leave the bed; and women who have had severe fever, or secondary hemorrhages, in the early days of childbed, or who have been ill in other respects, should not be permitted to rise on the ninth day after delivery. If the woman is anemic, a nourishing diet of bouillon, milk, eggs, beer and wine, should be ordered in the very first days after confinement, with the view of imparting strength, and stimulating the heart's action. Finally, every condition is to be relieved which tends to heighten the congestion of the pelvic organs, and impede the return of the venous blood. Among these conditions may be enumerated constipation, retention of urine, or a cough; the woman should be cautioned against any straining while handling the child, sitting up frequently in bed, etc. In this way we may, in many cases, succeed in warding off the disease.

If, however, thrombosis and disintegration of the clot have already occurred, there is no longer any means of preventing their further consequences. Local, or even general abstractions of blood, are by no means indicated. The idea of the local abstraction of blood should, at the most, be entertained only at the beginning of the affection in case of an inflammatory disease of the peritoneum, but is rarely of any service, and, by weakening the action of the heart, may even contri-

bute to the development of the thrombosis. For these reasons this operation has been almost universally discarded.

The employment of *mercurials* in puerperal thrombosis (in the manner described under phlegmonous metritis, p. 235), has many more advocates, though these agents have been abandoned by Kiwisch and Scanzoni; by the latter, because he believed that they tend to promote the absorption by the blood of putrid matters. I, for my part, am convinced that the employment of mercurials is well justified. Although we do not fully know how they act, yet it is certain that they reduce the swelling and infiltration of the tissues surrounding the plugged vessel, and allay the painfulness of the part affected; whether, in addition, by their passage into the blood, they neutralize the putrid matters, remains to be determined. This much is sure, that mercurials have been used by many with advantage; and I have, likewise, repeatedly administered them with favorable results, always in the form of an *inunction*. Inasmuch as the metastatic abscesses in the joints generally heal by absorption, with or without anchylosis, there is nothing gained by opening them. In case of the existence of painful spots in the skin, we can recommend wrapping the affected extremity in cotton batting, care being taken to insure a comfortable position.

The internal administration of mineral acids, such as acidum phosphoricum, muriaticum, or sulphuricum, may be recommended for the sake of their cooling, refreshing action, especially when combined with quinine. The best effect obtained from quinine is the diminution of the terrible chills. No action can be expected from small doses; but the drug should be administered freely after the chill, just as soon as there is a decided fall in the temperature; 0.6–0.9 grm. may be prescribed at one time, or 0.3 grm. every hour in the form of pills. When anxiety, excitement, and sleeplessness are present, it may be advantageously combined with small doses of morphine. In this manner I have often given as many as 90 grains of quinine in a few days, and have seen the chills at first become slighter and rarer, and afterwards entirely cease. (*Vide* Case 25.) Quinine is chiefly indicated in case of putrid decomposition of a thrombus (septico-pyæmia metastatica), since

it has not only a strong antipyretic action (Liebermeister), but, by the destruction and diminution of the white blood corpuscles, it acts also as an antiphlogistic and antizymotic, since it arrests the processes of decomposition and fermentation. (Binz, A. Martin.) As has been remarked, this agent must be administered in very large doses, and, according to Binz, preference is to be given to the muriate of quinine. The carbolate of quinine, in the form of pills, has also been used by Bernatzky "for puerperal fever" in Braun's Clinique in Vienna. (*Vide Med. Centralblatt*, 1868, No. 21.)

As a profuse and sometimes offensive lochia is commonly present, and the uterus is also sensitive, it is well to order vaginal and uterine injections of chlorine water, or of a solution of hypermanganate of potash, to be administered three times a day; easy and abundant evacuations of the bowels should be induced by the aid of cathartics and enemata. The diet should be liquid, nourishing, and given in small quantities every two hours; as a drink, lemonade, or water with fruit syrups. If the strength sinks rapidly, stimulants must be resorted to, such as wine, or champagne, given every half hour in doses of a tablespoonful. Attention should be given to the position of the patient; this should be horizontal and comfortable, without her being subjected to the pressure of heavy bedclothes. A cool temperature of the room and fresh air are very revivifying to the patient.

I can corroborate the effect upon a chill of warm baths as recommended by Kiwisch; these tend to allay the chill, and to render the sweating less exhausting; to soften the dry, rough skin, and impart to the patient a general sensation of relief. Packing with cold water, or sprinkling followed by frictions (as recommended by Priessnitz) prove, as I also have often found, agreeable to the patient, and have a tendency, moreover, to lower a very high temperature.

If we consider with how much enthusiasm the mercurial course has been adopted in phlegmonous metritis and lymphangitis, and the successful results claimed for it, it would surely appear that it must be all the more speedily accepted in metrophlebitis, inasmuch as the latter affection is more frequently

fatal than the former; for this reason, a purely expectant treatment of the phlebitic processes would also seem the less justifiable.

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RECORD OF CASES.

No. 23. Pyæmia metastatica with phlegmasia alba dolens after thrombosis of the left hypogastric and crural veins. Abscesses in the lungs and in the left shoulder joint. Death on the 28th day.

Wilhelmine Lösch, 39 years old, in her 4th pregnancy, was admitted to the Rostock Lying-in Establishment on Feb. 22, 1866. Her previous pregnancies, as well as the present one, had been free from serious discomforts. The labor began at 1.30 P. M. on March 24th, and was completed without mishap in 3 hours; the membranes ruptured at the proper time, and the child was in the 2d occipital presentation; much blood escaped when the placenta was expelled by pressure. The girl, who was alive, weighed 7½ lbs., the placenta 1 lb. 7 oz.; the amnion alone seemed perfect, the other membranes were mostly torn off and retained in the uterus. As only a small portion of these could be extracted with the fingers, injections of a solution of hypermanganate of potash were ordered. For the

purpose of keeping a careful watch upon the patient, I at once caused the curves of the pulse, respiration, and temperature, as well as the estimates of the urine, to be taken, in order to obtain a precise record of the course of the disease.

Day of childbed.	Pulse.	Respiration.	Temperature.	Urine.	Remarks.
March 24.					
3.30 P. M.	96	..	105.2° F.	.....	In partu.
5 P. M.	72	18	98.2	.....	Immediately after delivery.
1st day. A. M.	80	18	100.6	1105 c.c.	
P. M.	88	18	100.2	680 "	
2d " A. M.	96	18	100.3	550 "	Coagula of blood discharged.
P. M.	100	24	101.1	525 "	
3d " A. M.	104	22	100.9	1380 "	
P. M.	96	20	101.5	1600 "	
4th " A. M.	102	19	100.5	900 "	Abdomen rather painful.
P. M.	116	24	102.4	512 "	
5th " A. M.	108	20	102.4	.....	Many shreds of membranes were expelled by an injection into the uterus.
P. M.	108	24	104.4	.....	
6th " A. M.	112	24	102.3	.....	
P. M.	84	18	103.	.....	
7th " A. M.	116	22	103.2	.....	Profuse fetid coffee-colored discharge.
P. M.	88	22	102.7	.....	
8th " A. M.	112	20	102.3	.....	
P. M.	116	22	103.3	.....	
9th " A. M.	104	20	101.7	.....	
P. M.	104	18	103.6	.....	
10th " A. M.	108	24	103.7	.....	
P. M.	108	20	104.1	.....	
11th " A. M.	108	26	105.2	.....	Œdema vulvæ. Small peritoneal exudation. Ulcera orificii uteri.
P. M.	108	24	105.3	.....	
12th " A. M.	102	20	103.7	.....	
P. M.	100	20	103.8	.....	Pieces of the membranes again discharged.
13th " A. M.	94	20	100.8	.....	
P. M.	108	20	104.1	.....	
14th " A. M.	92	20	101.	.....	
P. M.	92	20	102.4	.....	
15th " A. M.	92	18	100.6	.....	
P. M.	108	24	105.5	.....	
16th " A. M.	80	18	100.2	.....	Œdema vulvæ still present.
P. M.	120	20	102.9	.....	Pain in the calves of both legs, especially on being touched.
17th " A. M.	120	20	103.4	.....	
P. M.	80	16	101.5	.....	
18th " A. M.	126	20	105.7	.....	
P. M.	126	20	106.2	.....	
19th " A. M.	116	18	104.5	.....	
P. M.	100	18	101.6	.....	
20th " A. M.	112	22	104 7	.....	
P. M.	108	18	103 7	.....	

Day of childbed.	Pulse.	Respiration.	Temperature.	Remarks.
21st day. A. M.	108	26	103.4° F.	Swelling of both legs up to the knee, especially the left. In the evening she had the first rigor, which lasted an hour.
P. M.	104	24	103.	
22d " A. M.	116	29	105.8	
M.	116	28	105.2	
P. M.	122	36	105.8	Thighs already swollen. Dyspnœa; vertigo; mind clear.
23d " A. M.	124	34	105.	
M.	122	29	105.3	
P. M.	128	32	106.1	
24th " A. M.	124	28	104.3	At 3 A. M. second rigor lasting thirty minutes; at 915 A. M. the third, which was shorter. Miliaria crystallina over the whole abdomen.
M.	120	32	103.	
P. M.	120	32	103.2	
25th " A. M.	120	24	103.4	No more chills (after quinine). Miliaria also on the thighs.
P. M.	122	26	102.4	
26th " A. M.	112	21	103.8	
M.	...	..	101.9	
P. M.	120	24	101.5	Cough with frothy expectoration. Rattle in trachea.
27th " A. M.	116	24	102.7	
M.	...	..	101.5	
P. M.	128	32	103.1	Mind affected. Left shoulder very painful, but neither reddened nor swollen.
28th " A. M.	128	72	102 2	
April 21. 11 A. M.	128	68	102.2	
1 P. M.	124	50	102.2	Crepitant and fine vesicular rales on the left side at the end of inspiration.
3 "	128	76	106.	
5 "	136	64	106.3	
6 "	140	60	105.6	
8 "	140	65	104.5	
10 "	136	60	104.2	
12 "	132	60	103.2	
1 A. M.	108	51	103.4	
2.15 "	...	..	.....	Death; 30 minutes after temp. 103.6; 6 hours post-mortem, temp. still 102.9°.

After delivery, blood continued to be discharged quite profusely until about 7 o'clock in the evening; from time to time intense after-pains set in, at the same time the uterus was particularly painful on the left side. The urine had to be drawn with the catheter on the first day. Otherwise the general condition was good during the first 4 days, except for a little tenderness of the nipples. As ol. ricini and enemata produced no dejection, 5 grains of calomel were given several times with the effect of bringing on satisfactory defecation.

From the 4th to the 7th days, the disease of the peritoneum was unmistakable, being characterized by distension of the abdomen accompanied by pain, while the presence of a fluid exudation was easily recognized. From the 8th day, when these appearances had subsided upon the use of the ice-bladder, the patient frequently complained of debility, dizziness, a feeling of faintness, and frontal headaches, which last became so severe upon the 12th day, that she laid the ice-bladder upon her head. At this time the fetid discharge was still very profuse, and the vulva swollen and œdematous; the rents in the os uteri had a grayish-yellow coating, while a row of dilated follicles were to be seen upon the lips of the os; pieces of the membranes were still washed out by the injections. The abdomen was soft and not tender, the fundus uteri still 5 ctms. above the symphysis; the bowels were constipated, the tongue was moist, coated in the middle line, and the appetite poor. The temperature did not fall despite the administration of acids and digitalis. After the 11th day, quinine was given in large doses and a tablespoonful of red wine every 30 minutes. A very short intermission in the fever was noticed on the morning of the 16th day, with this exception it continued remittent; on that day pain was perceived in the calves, and swelling of both legs upon the 21st, while on the 19th day, the vein was felt as a hard, tender cord at the inner border of the gastrocnemius in the left calf. The quinine and wine were still administered. On the 21st day, quite a violent diarrhœa set in, whereas until then, constipation had prevailed. At the time when the legs began to swell, the first severe rigor came on, lasting an hour. The swollen parts were pale, and retained the impress of the fingers; the right leg was less swollen than the left (39–41 ctms.). On the 23d day, it was first noticed that the patient's mind was not at all times clear. Painting the legs with collodion caused her much pain, produced no diminution in the swelling, and caused excoriations and itching at the bare places where it had cracked. On the 24th she had repeated chills. Miliaria crystallina appeared upon the whole abdomen. The pain in the legs remitted slightly while she was in a warm bath. Miliary vesicles, varying in size from the head of a pin to a hemp-seed, formed upon the thorax, abdomen, and the inner side of both thighs. The patient perspired freely after the baths. On the 26th day she first began to cough and expectorate catarrhal sputa. The whole left leg was very painful; a brownish-black bedsore formed over the sacrum, surrounded by a few vesicles filled with a thick serum. On the 27th day, mortification appeared in several spots on the left lower extremity; the patient was delirious, and passed

the feces and urine in the bed. On the 28th, the left shoulder was painful, but neither reddened nor swollen; nothing abnormal could be found at the other joints. The countenance was sallow and of a yellowish-gray color; the lips slightly cyanotic. At the left anterior part of the thorax, there was a distinct crepitation and finely vesicular crackling, especially in the 2d intercostal space, where the tone was somewhat deadened and at times a creaking sound audible. Cough seldom, and but little expectoration. At 2.15 P. M. she died.

The autopsy took place 30 hours post-mortem (Prof. Ackermann). Great rigor mortis. The color of the skin a light yellowish, but not icteric. A few drops of milk could be forced from the nipples on great pressure. Miliary vesicles were visible here and there on the abdominal integument, labia minora, and introitus vaginæ were somewhat œdematous. The whole left leg was larger than the right, and covered with a coat of collodion from the lower third of the thigh downwards. There was a red and partially excoriated spot, about twice the size of the palm of the hand, in the popliteal space; higher up on the posterior surface of the lower part of the thigh were the remains of several bullæ. On the outer and anterior surface of the lower part of the leg there was a reddened excoriation over an inch in diameter.

In the upper segment of the vena cruralis sinistra a partly firm and partly soft, friable coagulum was found extending into the vena iliaca; in its firmer portions it was not adherent to the walls, but in the softer was loosely attached. This thrombus extended downwards to about 4 inches below Poupart's ligament. The part of the vein below this was filled with a rather thin, pale-red colored, puriform fluid, which proved on microscopic examination to be composed of greatly shrunken red, and not very numerous white blood corpuscles, as well as quite a quantity of detritus. The thrombus in the upper segment of the crural vein extended with an almost perfect similarity of texture into the lateral branches, and into the vena saphena major. At the point where the latter was given off, the thrombus exhibited quite a marked swelling, and a similar one was found in the clot within the vena saphena magna, at that spot in the upper segment where a small vein opened. The vena saphena magna throughout the lower half of its course in the thigh was filled with a thick, dirty, whitish-yellow, somewhat viscous, puriform (purulent) fluid. Throughout the rest of its course in the leg, it was mostly filled with thin fluid, and loosely coagulated blood; only in one spot at about the middle of the leg was there any clot; this was about 2 ctms. long, chiefly of a dirty-whitish color, and friable. The blood, which on the whole escaped in but

moderate quantity from the incised veins, was seen even by the naked eye to have swimming upon it innumerable drops, which had the exact appearance of fluid fat; most of them were about the size of a grain of sand, though some were as large or even larger than the head of a pin. The microscopic examination of the blood proved that these drops were fat, and demonstrated, moreover, that the red blood corpuscles were almost without exception greatly shrunken.

The vena poplitæa and the lower segment of the vena cruralis appeared somewhat dilated, and their inner coats very cloudy. From these segments of the veins a moderate quantity of a pale yellow-colored (purulent) fluid escaped, besides quite an amount of fluid blood, which, like that found in the veins previously opened, was covered with innumerable large and small drops of fat. From several smaller venous branches also, which run from the saphena to the skin and the muscles, a viscous, cloudy, yellowish (purulent) fluid was discharged when they were incised. The subcutaneous and intermuscular connective tissue was moderately œdematous throughout the whole thigh and leg. All the muscles of the leg were colored light-brown. A yellowish puriform fluid oozed here and there from the dilated veins, on section of the muscles. The inguinal glands were slightly swollen on the left side, and appeared on section to be moderately reddened.

Thoracic Cavity.—When this was opened a cavity was discovered, formed by the left upper segment of the external wall of the parietal portion of the pericardium, and the inner segment of the adjacent part of the pulmonary pleura; it was encapsulated by the adhesions of the surrounding connective tissue, and contained about 20 cb. ctms. of a slightly reddened, purulent fluid. The situation of this cavity corresponded to the anterior ends of the first three ribs and their cartilages. The portion of the lung lying in front of it was quite firmly adherent to the costal pleura, whereas the rest of the lung was entirely free. In the left pleural cavity there were about ℥iij of a dirty, light-red, opaque, thinnish fluid. The right lung, except for a few thread-like adhesions, was also perfectly free. In the right pleural cavity there were about 100 cb. ctms. of a similar opaque fluid. The left was moderately contracted, pale in its anterior portions, and in the posterior of a purplish color, with innumerable small ecchymoses; in the upper parts it was moderately emphysematous. The pleura showed on its anterior surface a fresh, vascular thickening of the connective tissue, rather larger than a silver dollar, which extended around the anterior border of the lung to its inner surface, where it was of about the same size. In the pulmonary tissue, beneath this surface, lay a wedge-shaped deposit, which, with its base

of about 5 ctms. diameter, corresponded to the altered spot in the pleural investiture, while its point projected about 5 ctms. into the pulmonary tissue. It was filled with a light grayish-brown rather viscous fluid, and its cavity, intersected by many transverse septa, was lined with a membrane of connective tissue, which was perforated by many comb-like prominences. The upper lobe was œdematous, and there was a moderate atelectasis in the tissue of its inferior posterior part. On section of the lower lobe, which was rather congested, a number of severed bronchi were seen filled with a purulent fluid. In a branch of the arteria pulmonalis of the 3d size, in the neighbourhood of the above-mentioned deposit, was an old, shrivelled, fibrinous clot adhering to the inner coat, beneath which the latter appeared distinctly eroded. In the immediate vicinity of the deposit the pulmonary tissue was of firmer consistency, devoid of air, and of a pale-reddish color. The bronchial mucous membrane was much injected.

The pleural investiture of the right lung was smooth and glossy. The surface of the right lung similar to that of the left. The lower lobe was solid, brownish-red, and devoid of air. In the largest of the branches of the pulmonary artery, which are distributed to the lower lobe, was a black and white marbled clot commencing above the point of bifurcation, non-adherent, and projecting 7 ctms. into the two next ramifications; it was in great measure of quite a firm, slightly shrivelled consistence, and contained in its interior many cavities which were partially separated by a light mesh work, and were filled with a dark-red viscous mass. The inner coat of the pulmonary artery showed no changes where the thrombus lay. Toward the base of the lung there was a wedge-shaped mass, with an outline sharply defined from the surrounding tissues, appearing on section of a dirty grayish-yellow color, and upon pressure discharging a thick purulent fluid. The upper lobe was very œdematous, and the middle one moderately so; both were perfectly devoid of air.

There were about six drachms of a thick fluid in the pericardium. In the pulmonary veins and in the left auricle was a large, greatly ramifying clot, principally of fibrine. In the right ventricle there was a moderate amount of fluid blood, containing many drops of fat, and a very large coagulum. The endocardium on both sides showed a diffuse milky dulness, in the ventricles as well as in the auricles. The edge of the mitral valve was thickened and slightly granular. The substance of the heart was of a pale-brownish color, and quite flabby.

In the *œsophagus* there was a considerable quantity of a pale purplish colored dry substance (aphthæ).

In the *aorta* was a long thin fibrinous clot. The mucous membrane of the *trachea* was greatly injected.

Abdominal Cavity.—Liver 27 ctms. broad, 25 high, and 4½ thick. Its peritoneal covering showed a diffuse milky opacity in spots. The organ was soft, somewhat œdematous, of a light brownish-gray color, having here and there a distinct nutmeg-like marking. The individual hepatic cells were somewhat enlarged, of roundish shape, and a few only of an ill-defined polygonal form; they were so full of thick granular matter, that the nuclei were in many instances invisible, and in the others were very indistinct. The gall-bladder was moderately distended with a dark greenish-yellow, slightly viscous bile.

Spleen, 14½ ctms. long, 10.5 wide, 3 thick, very flabby; from the surface of a section a thin pap-like chocolate-colored pulp exuded.

Kidneys. Left one was 14 ctms. long, 7½ wide, 2½ thick, and friable; capsule easily pulled off. On its surface were reticular and tree-shaped injections; the same on the mucous membrane of the renal pelvis. Papillæ hyperemic; cortical layer slightly cloudy. Right kidney similar. The epithelial cells of the cortical substance of both kidneys were not enlarged, their contents were much discolored, and the nuclei distinct.

The *vena iliaca dextra* contained, in addition to quite a quantity of blackish-red fluid blood, a long recent clot composed partly of fibrine and partly of blood; it was nowhere adherent, was perfectly smooth on its surface, and extended into the venæ cruralis and saphena.

The *vena iliaca sinistra* contained a recent blackish-red clot. The older one described above as in the vena cruralis extended about 2.5 ctms. into the corresponding vena iliaca.

The *bladder* contained quite an amount of clay-colored, cloudy urine; its mucous membrane was greatly injected. The urethra had numerous thick varicose veins.

The *vaginal walls* were smooth and brownish-red.

The *uterus* was 10 ctms. long; the cervix nearly 4.5; in its interior was a moderate quantity of a thickish bloody fluid. The inner surface of the uterus exhibited in the cervical canal and at the placental site a greenish-black, and in spots reddish color. The placental site, which was larger than a silver dollar, was on the left posterior wall of the organ, and, upon section, disclosed no clots in its veins.

In the *vena hypogastrica sinistra*, at its point of origin, was a clot extending about 1.5–2 ctms. into its two branches, and adhering loosely to the inner coat in spots; in its larger segments it was partly of a firm and partly of a soft consistence; appeared more or less shrivelled on its surface; was connected

with another larger thrombus, and was softened to a great extent in its centre.

In the *rectum* there was a transverse cicatrix of an ulcer, 1 ctm. long, and situated 12 ctms. above the anus.

There were 12 grms. of a viscous yellow-tinted pus in the left *shoulder-joint.* The immediate vicinity of the articular cartilage was slightly hyperemic.

No. 24. *Septico-pyæmia metastatica. Very many metastases in the liver, spleen, and kidneys. The affection originates in a putrescent, circumscribed peritoneal exudation, resulting from a diffuse peritonitis. Duration of the septico-pyæmia* 17 *days. Death* 44 *days post-partum.*

Marie Heyden, 26 years old, after a long labor, was delivered of a dead child (the fourth) by means of version (the left hand was introduced into the right side of the uterus, and the foot brought down). The child had a round contusion, half an inch in diameter, over the left occipital bone, attributable to the contracted pelvis of the mother. The woman was attacked with peritonitis immediately after delivery, which was so far relieved by ice, etc. for two weeks, that, on October 6, she was almost entirely free from fever. Temp. A. M. 99.5°; P. M. 100.8° F. A firm, tender band of exudation, to the right of the uterus, was all that remained. On October 16 she first left her bed, and was feeling quite well; on the 18th she had a temperature of A. M. 98.7°, and P. M. 100.8°.

On October 20, therefore, full four weeks after delivery, septico-pyæmia, with the following course, developed from the remains of the exudation:—

		Temp.	Pulse.	Resp.	
Oct. 20.	A. M.	99.9°	60	20	
	P. M.	101.3	74	20	Nausea, faintness, greater sanguineous discharge from the genitals.
" 21.	A. M.	98.7	70	20	No chill as yet; subjective condition good. Much sanguineous discharge.
	P. M.	101.5	80	22	
" 22.	A. M.	99.3	80	24	
	P. M.	102.9	86	26	
" 23.	A. M.	100.2	80	21	
	P. M.	102.6	86	26	
" 24.	A. M.	99.4	76	24	
	P. M.	102.6	78	25	
" 25.	A. M.	105.6	120	32	A chill at 2.30 and 6.30 A. M.; very profuse sweating. A cutting pain in the abdomen. Spleen 8 : 11 ctms.
	M.	105.2	120	30	
	P. M.	104.1	116	28	Discharge offensive.
" 26.	A. M.	100.2	108	26	Evening before much nausea.
	P. M.	104	108	28	Exudation appears to be somewhat larger (size of a hen's egg).
" 27. 4	A. M.	104.2	112	30	Third chill, lasting ten minutes. No cough. Respiration free. No traces of metastasis anywhere.

			Temp.	Pulse.	Resp.	
Oct. 27.	8	P. M.	104.6°	104	26	
	11	A. M.	104.9	96	25	Loss of appetite.
	5	P. M.	105.3	92	25	Very profuse perspiration.
" 28.		A. M.	102.6	29	24	Dicrotic and irregular pulse; repeated vomiting after castor oil.
		P. M.	103.6	100	28	Vomiting again. Pain throughout the whole abdominal region.
" 29.		A. M.	103.2	102	21	Posterior surface of tongue was somewhat coated with yellow. Gastric and hepatic regions very tender upon pressure.
		P. M.	104.3	106	26	
" 30.		A. M.	103.4	116	30	
		P. M.	104.3	118	32	
" 31.		A. M.	103.1	122	31	Icterus appearing.
		P. M.	103.3	132	32	By evening the whole surface of the body was very icteric; very marked reaction on testing the urine for biliary coloring matters. Miliaria crystallina.
Nov. 1.		A. M.	103.4	116	26	Spleen 8 : 11 ctms. Liver measured
		P. M.	103.8	124	34	in the mammary line 13.5 ctms.; in the parasternal line 9.5; in the axillary line 16.5. Greatest breadth 31.5 ctms. Œdema about both ankles. Urine contained about $\frac{1}{8}$ of its volume of albumen.
" 2.		A. M.	101.3	120	32	Pain in the right calf.
		P. M.	102.6	130	36	
" 3.		A. M.	101.2	118	32	
		P. M.	102.3	132	35	Left leg was moved with difficulty. Left thigh was œdematous; several hard painful venous cords could be felt in it as well as in the left calf. Nothing abnormal could be discovered in the lungs.
" 4.		A. M.	101.5	126	40	
		P. M.	100.2	114	30	
" 5.		A. M.	109.2	180	52	Death at 7 A. M. At the moment of death the vaginal temp. was 110.1; an hour later 110.5; and still $1\frac{1}{2}$ hour later (9.30 P.M.) 109.8° F.

Autopsy, 25 hours post-mortem, made by Prof. Ackermann.

The body was of medium size, and tolerably well nourished. Integument moderately icteric, chiefly so in the face and over the anterior surface of the upper half of the body. Over the entire posterior half of the body were quite extensive, pale, cadaveric spots; rigor mortis was feeble; both conjunctivæ quite icteric. Mammary glands were large, flabby and upon pressure discharged a small quantity of thick, icteric milk. There was a small number of quite large miliary vesicles in the hypochondriac and præcordial regions; abdomen moderately distended. Very many, but principally narrow, cicatrices of pregnancy; linea alba somewhat pigmented. External

genital organs quite œdematous, especially the right labium major. The mucous membrane of the vaginal entrance about the posterior commissure somewhat discolored (cadaveric change). Both legs slightly œdematous; the left only below the knee; the right as high as the middle of the thigh. The back of the left hand, and the vicinity of the wrist on the same side, were slightly œdematous.

On opening the *thorax*, both lungs were seen to be considerably retracted. Left lung had feeble adhesions posteriorly; in the left pleural cavity there was about an ounce of turbid serum, slightly tinged with blood.

Right lung had no adhesions; in its pleural cavity was the same quantity of serum as on the left side.

Within the *pericardium* was about 50 cb. ctms. of a rather clear, though still slightly turbid fluid, somewhat tinged with yellow.

In the left side of the *heart* were only traces of very thin fluid blood; the right side, especially the right auricle, was filled with a considerable quantity of clots chiefly fibrinous.

In the *pulmonary artery* was quite a large clot likewise fibrinous, resembling the other coagula and extending into both branches of the vessel.

Heart flabby, of normal size, pericardium here and there slightly opaque. Right ventricle enveloped in a little fat especially along its borders. The substance of the organ was of a pale-gray or reddish-yellow color. The endocardium of the right side, principally in the auricle, was somewhat discolored by imbibition, as was the tricuspid valve and the pulmonary artery, which looked a little icteric. Endocardium of left side was also stained by imbibition; the mitral valve was thickened along its edge in the usual way, and likewise showed traces of imbibition; the endocardium near the origin of the aorta was slightly thickened, as was the aorta itself in its first segments, especially at a longitudinal striated spot, as were the bases of the semilunar valves. An examination of the muscular tissues of the organ with the microscope disclosed some opacity, an absence of the transverse striæ and quite a collection of molecules of fat in some of the primitive fasciæ.

Left lung was moderately emphysematous at the anterior border of the upper lobe; the whole posterior segment of the upper lobe was œdematous, and its anterior segment in parts dry but anemic throughout. In the posterior segment of the lower lobe was a non-crepitant, very œdematous spot, about the size of a goose's egg, of a brown color, and with a smooth surface. A slightly turbid thin fluid exuded from the surface of a section through this spot. The lower lobe was otherwise

crepitant, and only differed from the posterior segment of the upper lobe in containing more blood. The pulmonary artery was empty, and slightly icteric. There was a small quantity of viscous mucus, tinged with bile, and containing very little air in the larger bronchi. Their mucous membrane was somewhat reddened. The *right lung* was a little œdematous along the anterior borders of the upper and middle lobes, and in its posterior and lower segments showed a great number of very confluent spots, which were beneath the level of the surrounding surfaces. There was a small number of ecchymoses where the upper and lower lobes were in contact. The entire posterior segment of the upper lobe was rather œdematous; the dark spots, which protruded above its surface, extended about one-quarter inch down into the tissue of the lung, and contained little if any air. The middle lobe was slightly œdematous; the lower lobe was of a brownish color throughout almost its whole extent, was completely devoid of air, and the surface of a cut was smooth and very moist. The pulmonary artery was empty, and a little icteric.

Abdominal Cavity.—The *parietal peritoneum* was dark gray almost throughout, and in several spots contained a black pigment, as did the omentum, the appendices epiploicæ and many parts of the serous covering of the intestines and of the mesentery. The ascending colon, with its mesentery and those portions of the intestines which were adjacent to the uterus, was adherent to the lower segments of the parietal peritoneum and to the anterior wall of the uterus. There were very extensive and strong adhesions between the cæcum and neighbouring parts, especially the parietal peritoneum; these places appeared not only very much pigmented, but also permeated by a great number of injected venous ramifications. In the same region there were also adhesions to the anterior border of the right lobe of the liver.

The *spleen*, the upper end of which was adherent to the extreme edge of the left lobe of the liver, was 17.5 ctms. long, 12 broad, and 5 thick at the maximum. Its peritoneal covering showed many pseudo-membranes, especially in its upper segment, though its surface was otherwise smooth and of a light purplish color. Through this six or eight very confluent, sharply defined spots were visible in the lower, somewhat less voluminous half, which corresponded to pale reddish-colored, wedge-shaped places in the organ. The upper, more bulky half of the organ had in its posterior segment a single cavity, about 3 inches long and 1 broad, filled with a puriform matter; this was distinctly visible at several points on the surface of the organ, had various small lateral prolongations, and was formed by the softening of several wedge-shaped masses. The

wall of this cavity consisted of quite a firm membrane, which divided the cavity very sharply from the adjacent parenchyma, and appeared to be quite extensively vascularized. A section of the organ was of a dirty brownish-violet color; its substance soft, and the pulp the consistence of a thin gruel. A small number of whitish-yellow specks projected from the cut surface, and seemed to be sections of a long, narrow cavity, otherwise resembling the larger one, but having the appearance of a vessel from which smaller vascular branches were given off. The contents of these cavities were shown by the microscope to be granular and pus corpuscles.

The *left kidney* was 14 ctms. long, 8 broad, and 3 thick. The parenchyma was flaccid; in the pelvis was a puriform icteric fluid, which under the microscope was seen to contain opaque epithelial cells, and adherent epithelial casts of the canaliculi with an abundance of granular pigment. The capsule was pulled off with some difficulty, and some of the parenchyma remained adherent to it. The surface was covered with veins running together like a net. On the posterior surface appeared the reddened base of a cone, which projected ¾ inch into the interior; it contained several pus-colored spots the size of hemp-seeds, and owing to its rather pale color stood out from the neighbouring tissue. One spot, situated near the confines of the mass, appeared to be of a slightly hemorrhagic nature. There was a similar, broader mass at the apex of the kidney. The kidney as a whole contained but little blood, and the cortical substance was only defined from the medullary in the vicinity of the infarctus at the apex. The papillæ were of a pale striated character, and were permeated by several opaque stripes of fat.

The *right kidney* was 14 ctms. long, 6½ broad, and 3 thick. The surrounding adipose tissue was slightly œdematous. The capsule was not so adherent as that of the left kidney. The surface of this kidney was similar to that of the left. On the posterior surface of the organ was a large mass, distinguishable from the surrounding tissues by its paler appearance, and containing one pus-colored spot about the size of a millet-seed. The cortical substance was defined from the medullary by a seam of injected vessels. The papillæ looked pale, striated, and somewhat retracted.

The *gall-bladder* was quite full. The *duodenum* contained some bile. The ductus choledochus was likewise colored with bile quite up to its intestinal orifice; here, however, for the distance of about one ctm. it was slightly swollen and not stained with bile.

Liver was 30 ctms. long, the right lobe 29, and the left 16 deep; the right lobe 6 thick at its maximum, and the left 4

ctms. Beneath the surface of the organ, which was, for the most part, glistening, appeared a large number of masses, chiefly of yellow color, of various sizes up to that of a bean, collected here and there in groups, slightly elevated above the surrounding level, and almost all having a more or less marked hyperemic areola. On the inferior surface, along the anterior border, similar masses also occurred, and even more numerously. On the superior surface they were found in great numbers in the middle and lateral segments of the right lobe. The cut surface of the liver was so injected as slightly to resemble a nutmeg ; toward the posterior border there was a very icteric portion, more than 8 ctms. long (the size of an apple), from which projected innumerable round whitish-yellow masses. These contained slightly icteric pus, and one of these accumulations, upon being followed up, conducted into a large branch of the portal vein which was filled with a similar mass. In this branch were coagula, here and there firm and adherent to the wall of the vessel, in part very white and in part mixed with blood. Through the inner coat of the vein appeared fine points, and the deep vascular layer was reddened in spots. A precisely similar condition existed in a number of the minuter ramifications of the vena porta.

The mucous membrane of the base of the *stomach* was quite extensively ecchymosed in spots.

The mucous membrane of the lower segment of the *bladder*, chiefly around the neck, was permeated by quite an extensively injected network of veins, and that of the urethra by equally hyperemic longitudinally-running veins.

The sinus covering the *uterus* and its annexa was greatly pigmented and penetrated by many distinctly pigmented delicate filaments of connective tissue.

The *right ovary* was very rough, owing to the contractions of many cicatrices.

The *left ovary* was longer than the right; in it was a round, yellow-colored induration of connective tissue, the size of a pea.

Anteriorly and to the right of the uterus, between it and the bladder, was the pus-stained cavity of an abscess, encysted and traversed by false membranes, and in part limited by the peritoneal investiture of the uterus. No morbid changes could be discerned along the borders of the uterus.

In the lower part of the posterior vaginal wall was a radiating cicatrix the size of a silver three-cent piece. The orifice of the uterus was 3½ ctms. wide. Both lips were considerably swollen. On the right side of the posterior lip was a fissure running antero-posteriorly, and a smaller parallel one on the left side. The cavity of the uterus, including the cervical

canal, was 11 ctms. long. In the posterior lip of the os was the cavity of an abscess the size of a pea, which opened upon the inner side of the posterior wall of the cervical canal. The inner surface of the uterus was pale and traversed by many closely intertwining vascular branches. The thickness of the wall was fully a third of an inch.

In the right *vena profunda femoris* was a small quite friable old fibrinous clot. The right vena cruralis was filled with quite an amount of fluid blood, in which a great many small fat-drops were floating. There were several small stripes of fatty degeneration in the thoracic aorta between the origins of the intercostal arteries.

The roof of the skull was of rather unusual thickness. On the inner surface of the frontal bone was an osteophytic deposit corresponding to the highest surfaces of the convolutions. The dura mater was slightly thickened throughout, and rather vascular; in the longitudinal sinus was an icteric fibrinous coagulum. The veins of the pia mater were quite full. In the transverse sinus on the left side was a fibrinous clot similar to that in the longitudinal. On the cut surface of the medullary substance there was a considerable number of hemorrhagic points. The pia mater was readily detached. The cerebral substance was firm and slightly œdematous. In the lateral ventricles there was a slight quantity of pale-reddish serum.

No. 25. Endometritis placentaris. Thrombosis of the left pampiniform plexus. Phlegmasia alba dolens. Metastases in the lungs. Recovery.

Mrs. T., 39 years of age, who had always been in good health, was delivered, at the full term of her first pregnancy, of a dead mature child, after a long labor and many attempts to apply the forceps. Only a moderate hemorrhage ensued, although the placenta had to be artificially detached owing to its adherence to the uterine wall.

During the first 3 days of childbed she felt quite well, according to her account; she then had a severe chill, and the lochia became very offensive. After 4–5 days the chill recurred, and from that time she had one every other day until the 11th; then the chills came every day, the left iliac region became tender, and on the 11th–12th day swelled up, as did the left leg, which was very painful. About the 17th day the patient had a stitch in her back beneath the left scapula, and thereupon coughing with bloody expectoration, and, with an increase of these, frequent nausea and vomiting. The appetite remained poor, and the bowels constipated; great frontal head-

ache, ringing in the ears, muscæ volitantes gradually set in, together with sleeplessness and extreme exhaustion.

I first saw the patient 3 weeks after delivery, when quinine in small doses, morphine, and the compound infusion of senna had been administered internally without effect.

The woman was large, of powerful build, and a brunette; the subcutaneous layer of fat was small, and the integument closely adherent. Cheeks and conjunctivæ pale, and the lips moderately red. Her appearance was distressing, respiration difficult, speech slow and interrupted. The thorax was well arched, the cardiac dulness normal, the apex-beat in the 5th intercostal space, and nothing abnormal except a faint systolic souffle. On the right of the back below the scapula was slight dulness, the same stitch on inspiration, uncertain respiration, and abundant fine-vesicular crepitation. The hepatic dulness was normal. The spleen was enlarged (13 ctms. long), and distinctly to be felt below the ribs. The abdomen was distended. The lochia was still sanguineous, highly offensive, and contained small clots of blood. The fundus uteri still stood 1½″ above the symphysis, was broad and hard; to the left of it was a hard spot painful upon pressure; on the left iliac bone there was a distinctly palpable, hard, tender cord, almost an inch wide and passing beneath Poupart's ligament. The whole left leg was greatly swollen, pale, tense, immovable, and tender; the tumefaction was not great at the joints. A firm, painful cord could likewise be felt in the poplitial space. There were no vesicles or other discolorations on any part of the skin. The mind was quite clear, the pupils normally dilated and reacting well. The alæ of the nose participated somewhat in respiration, although there was no cyanosis. The tongue was moist and red along its borders, but covered with a gray coat in the middle. Appetite was poor, thirst great. Pulse 86, resp. 28, temp. in the axilla 99.7° F.

The chief complaints were of headache, cough, pain in the leg, very exhausting chills, which had taken place 7–8 times (!) on the preceding days, and finally of great prostration.

Treatment.—

℞. Quiniæ hydrochl. 0.9 grm.
Morphiæ hydrochl. 0.03 grm.
Extracti glycyrrhizæ, q. s.
ut fiant pil. No. xii.
To be taken at intervals of 2 hours.

In addition every evening: ℞. Morph. acet. 0.03 grm., acid drinks and red wine in small quantities. Injections of a solution of chlorine water into the vagina; the leg to be swathed.

I gave a very unfavorable prognosis, yet the patient improved so steadily by means of the constant adherence to this course

of treatment (later quinine gr. j pro dosi, 4–6 times a day), that within 7 weeks she left her bed, and the leg was entirely free from swelling.

II. Puerperal Thrombosis of the Lower Extremities. Phlegmasia Alba Dolens; Phlebitis Cruralis in Puerperio.

As regards the changes which take place in a thigh affected with the so-called phlegmasia alba dolens, quite as many different views have always prevailed, as in the case of the so-called puerperal fever. Mauriceau, who in 1712 first described this malady as an affection peculiar to women in childbed, considered it a *metastasis of the lochia*. Puzos, Levret, Deleurye, Sachtleben, and others explained it as a *metastasis of milk towards the legs*. David Davies, Dance, Robert Lee, and Ramsbotham recognized it as a *phlebitis* (inflammation of the walls of the veins, with secondary closure of their lumina). Duncan, John Davies, Burns, Krüger, Albers, and others ascribed it to an *affection of the nerves and veins* of that part. Andral, Moore, Elias von Siebold, Casper, Hufeland, Sebregondi, and others asserted, on the other hand, that it was a *lymphangitis with inflammation of the cellular tissue*. Bühler, Hull, Treviranus, Albers, and Dugès went so far as to believe that the *veins*, *lymphatics*, *cellular tissue*, and *all other parts of the thigh* were inflamed during this disease; while Ducan, Ritgen, and Fricke gave as their opinion, that the cellular tissue only was affected. Finally, a number of authors have lately arrived at the opinion that phlegmasia alba has various forms, and, therefore, divide it into *an inflammation:* 1, of the *lymphatics* of the thigh; 2, of the nerves; 3, of the corresponding cellular tissue: the latter idea was adopted by Busch, Pfeiffer, Albers, Davis, and Casper. Finally, in 1861, Fox attempted, in a very exhaustive treatise, to prove anew, that the veins and lymphatics were closed in phlegmasia alba dolens, and that the reflux of the blood and lymph was arrested, and that thus arose the tense, white, non-œdematous swelling. It is maintained by him, that so long as the veins alone are plugged, œdema only can ensue, and that the implication of the lym-

phatics must, therefore, be the chief affection. This is the same misapprehension, which we have already discussed and refuted under the so-called metro-lymphangitis. The affection of the connective tissue is the primary lesion, and the lymphatics are far from being always implicated; and when they are, it is, generally speaking, only a secondary development.

This affection may be divided into two varieties, viz:—

First. Phlegmasia alba dolens *with* thrombosis of the veins: here the venous thrombosis is primary, and is conjoined with an antecedent periphlebitis with consequent phlegmonous affection of the extremity, attributable to the purulent decomposition of the thrombosis.

Second. Phlegmasia alba dolens *without* thrombosis of the veins: Phlegmon of the thigh with primary affection of the skin, of the subcutaneous and inter-muscular cellular tissue, in which the walls of the vessels (veins as well as lymphatics) may take part; yet sometimes secondary thrombi form within them, although the walls are then not always implicated.

Recurring then to the first variety, the venous thrombi in the thighs may occur either primarily or secondarily. Thromboses from dilatation are very frequently developed primarily, even during pregnancy, by the pressure of the distended uterus upon the iliac vessels, and their formation at this time, or within a certain period after confinement, may completely occlude the vessels involved. Such thrombi may form in the venæ saphenæ, the venæ tibiales and peronæales. They may be developed secondarily, after thrombosis of the vena hypogastrica, in the vena cruralis near the ligamentum Poupartii, or still lower down: also, after thrombosis of the vena spermatica interna, whenever the coagulum in the latter has grown into the vena cava, and narrowed, or fully occluded, this vessel. They are, therefore, not uncommonly the results of a placental thrombosis, and thrombosis in the plexus pampiniformis. If the vena cruralis and iliaca externa are occluded, the passage of the venous blood is effected by means of the vena epigastrica, or the circumflexa ilium and ileolumbalis; or by the veins of the glutæi. The congestive hyperemia will surely in such cases be for some time so considerable, that not only the plasma of the blood will exude, and produce œdematous swelling of the leg, but also,

as Conheim has demonstrated in frogs by tying the vena femoralis, the red blood corpuscles are forced out into the parenchyma through the stomata of the epithelium forming the walls of the capillaries.

In the case of Wilhelmina Lösch (No. 23) appended to the chapter on metrophlebitis, the muscles of the diseased extremities were subjected to miscroscopic examination by E. Martini (medical student). The muscles examined were the recti abdominales, the pyramidales, the sartorius, tibialis posticus, the flexor digitalis communis, and flexor digiti hallucis. In all these muscles the transverse striation was indistinct and obliterated, an appearance not to be attributed to a nearer approximation of the striæ to each other; in like manner, the primitive bundles exhibited no particular brilliancy. At the points of the transverse striation, there was, for the most part, in the rectus of both sides, as well as in the pyramidalis and sartorius, a distinct longitudinal striation, the muscular fibres splitting up into fibrillæ, which had an undulated form. The majority of the fibres were dark and granular (fatty?), a great portion atrophic, so that the transverse diameter of the primitive bundles was reduced to a half or a third of the normal measure, especially that of the rectus and pyramidalis. The nuclei of this muscular tissue were well developed, and lay in long rows behind each other in the granular substance. They were not remarkably large, however, were roundish or oval in form, and contained numerous nucleoli. In the muscular tissue of the leg, there were found, in addition to the prominent dilatation of the capillaries of the muscular tissue, the well-known brown pigment, deposited at some points in the form of small, round, and oval accumulations, and at others in larger masses. The muscular tissue was, on the whole, easily manipulated, and not particularly friable. A portion of the granular substance was partly soluble in concentrated acetic acid, and could, therefore, be regarded as albuminoid matter, whereas another portion had the appearance of fat.

The thrombus may pass through the same changes as have been above described: it may become organized, in which case, after the development of the collateral circulation, the vessel becomes a firm band of connective tissue. The thrombus may,

furthermore, by irritation of the wall, give rise to periphlebitis, with accompanying suppuration, and a diffuse phlegmon of that extremity: it may, finally, pass directly or indirectly (owing to changes in the diseased wall) into a stage of purulent softening, and by becoming disintegrated, may lead to septicemia or embolism. It is only under these circumstances that during a phlegmasia alba dolens all those metastatic affections of the lungs, heart, spleen, liver, brain, and extremities occur, which have been already described under pyemia resulting from uterine thrombosis (*vide* Cases No. 23, 24, 25, 26).

The second form of phlegmasia alba dolens begins *without* thrombosis; it is a phlegmon of the thigh which, originating in the abdominal wall or genitals, extends to the perineum, nates, and the thigh; it may be either unilateral or bilateral. Meanwhile, the extremities swell, the skin appears pale or slightly reddened, tense and thickened; the subcutaneous cellular tissue is infiltrated and œdematous. When the swelling is great, vesicles, filled with a pale serum, form upon the skin, burst and discharge their contents. This affection of the connective tissue extends to the inter-muscular tissues, and the sheaths of the vessels, in various parts of which, subsequent to the appearance of the swelling, abscesses form, while at the same time the inguinal glands become swollen. These are the cases in which the lymphatics as well as the veins are thickened, and in which secondary thrombi may form. A considerable inflammation of the adventitia may exist, however, as shown by Lee, although it is not necessarily transmitted to the inner surface of the veins, nor does this involve any change in the contents of the vessels. The layers of exudation which have formed, either pass rapidly into suppuration, burrow between all the layers of the muscles, expose the vessels and perforate the skin; or, on the other hand, there may ensue sloughing and decomposition of the skin, the muscles, and the sheaths of the cellular tissue, with subsequent septicemia and death. (Case reported by Erichsen, *l. c.*, p. 29.)

Symptoms.—Thrombosis of the femoral veins may be developed even during pregnancy, in which case the patient generally feels pain at the spot where the thrombus has formed, and a numbness in the feet, the toes, or the instep; when the

affected vessels lie superficially, the skin covering them becomes reddened, swollen, and very tender to the touch, while the woman is often feverish, languid, and extremely prostrated. The thrombi may form in the first days of childbed, often primarily without any especial precursory symptom; this occurs, however, on the whole but seldom, and only as a complication of other affections, or when the thrombosis originated during pregnancy. A *stadium prodromorum* which is often overlooked, consists of various gastric disturbances, such as oppression, a feeling of pressure at the epigastrium with loss of appetite, a thickly gray-coated tongue, a bitter taste, eructations, and obstinate constipation. Sometimes the swelling of the legs does not appear until repeated chills have recurred, and after a thrombosis of the plexus pampiniformis of the vena spermatica interna, or of the hypogastrica, has already existed for some time. The phlegmasia alba dolens which follows thrombosis begins, as a rule, in the second week of childbed, after the woman has perceived a certain feeling of weight, or lameness, in the leg; or pain may have been previously experienced whenever the limb has occupied an uncomfortable position. This pain is confined chiefly to the calves, then, with or without a severe chill, the leg begins to swell, in case of primary thrombi, chiefly about the ankle; this swelling extends to the knee, and finally up to the groin. In the secondary variety, on the other hand, the tumefaction advances quite rapidly from above downwards, and the œdema spreads even to the lateral parts of the abdominal integument. The whole extremity increases greatly in circumference, becomes pale, or of a pale-reddish hue, tense, and is moved with difficulty; the patient complaining of numbness and lancinating pains in the limb. As the swelling and tension increase, vesicles often form upon the skin: these break, and the epidermis becomes distended, leaving behind suppurating spots; or again, certain spots turn dark-red, and perforation follows with evacuation of pus externally. When the tumefaction on one side has reached its highest point, the other leg often begins to swell, and here the same appearances are successively developed as in the former limb; in the latter, on the other hand, the symptoms abate, although they may persist for a consider-

able time. If, during the tumefaction of one or both legs, chills repeatedly occur, as a rule metastatic deposits of the most varied character follow.

In uncomplicated thrombosis of the veins, with phlegmasia alba dolens, the fever is at first of a regular remittent type, which becomes subsequently regularly remittent, and later intermittent, until finally the temperature slowly sinks to the normal point long before the swelling of the leg has disappeared. But if metastases appear, the type is that of a continued fever, although at times marked by great remissions. So long as no secondary affections of other organs are developed, the pulse and respiration are wont to exhibit a moderate augmentation, the former ranging from 92 to 116 beats, and the latter from 20 to 30 times in a minute. When the diuresis has decreased to a considerable extent, the urine has a high specific gravity, is rich in urea, contains on the other hand very little chloride of sodium (*vide* No. 27), and often traces of albumen. The lochia is either unchanged, or else rather more scanty than usual, provided the affection has occurred early in childbed: during a chill it frequently becomes again bloody. The bowels are constipated, and only in putrid affection is diarrhœa present.

The results of this form of phlegmasia may be: (1) *Complete resolution:* this is met with in 48 out of 70 cases, or 68 per cent. (2) The formation of an *abscess*, tedious suppuration and eventually recovery: this is of rare occurrence, but still has been described by many authors, such as Struve, Hosack, Simmons, White, von Siebold. Suppuration occurred in case No. 26, reported below. (3) *Death* from gangrene of the affected extremity, from septicemia, and especially septico-pyemia: Davies, Boër, Burns, and others. Recovery with entire absorption of the tumor may be completed in from three to six weeks. Death generally takes place between the ninth day and the sixth week; at times even later; it very rarely occurs earlier, and then only when the disease is complicated with other affections. (4) According to Mauriceau, Boër, Casper, and Gittermann, more or less *paralysis* may at times remain behind in the affected limb. (5) Finally, it should be mentioned that some authors, such as Chevalier,

Fricke, and others, have observed the tumor persist for years, being transformed, in short, into a sort of elephantiasis of the leg.

In the second form of phlegmasia, which commences with an affection of the skin, and of the subcutaneous cellular tissue of one or both lower extremities, the characteristic symptoms are very acute pain, a livid discoloration, a high, continued fever, the formation of vesicles, a gangrenous disintegration of the skin, or the formation of a superficial abscess. After evacuation of the pus from the subcutaneous connective tissue, and the interstices of the muscles, the sloughs of the connective tissue are cut off, and the wound gradually heals; if, on the other hand, the disease is very extensive, involving the deeper tissues, death results from gangrene, or septicemia. "Those extensive and dreadful foul deposits of the phlegmonous erysipelas of childbed are developed," says Erichsen,—"which transform the still living individual almost into a foul cadaver, offering the richest booty to the ichoremic processes."

The *diagnosis* of phlegmasia alba dolens is not difficult. The swollen leg, at the points first affected, is shiny, generally firm, elastic, and at times does not even receive the imprint of the finger; other parts of the affected limb are, on the other hand, swollen and clearly œdematous, for instance, in the groin, the ankle-joint, and the abdominal walls, at the beginning of the tumefaction. Before the swelling has commenced, the inflamed or thrombotic veins may often be felt in the calf, or the bend of the knee; if the lesions are situated just beneath the skin, the latter is, as a rule, reddened, swollen, and painful. When a leg greatly swollen is brought first under observation, it is in many cases difficult to determine whether or not a venous thrombosis is present. The development of the tumor is, however, in the former class of cases generally slower, and is accompanied at the outset with less pain and redness. At times it may be possible, at this early stage, to feel distinctly a vascular cord, such as the iliaca externa and cruralis, filled with thrombi, and sometimes we may even discover the thromboses existing in the plexus utero-vaginalis, and the vena hypogastrica. But if these points cannot be made out, still the irregular, but marked, remissions and frequent, intense chills,

in addition to a certain firmness and elasticity of the swelling in affections of the deeper crural veins, will point with probability to a venous thrombosis. It is also to be borne in mind, that this is far more common than the second form, the true phlegmon of the thigh.

With reference to the causes of the disease in question, R. Lee observed its occurrence 60 times in 100 cases, in lying-in women, and 40 times in women who had not passed through a preceding confinement. A great preponderance of the sufferers had been delivered for the first or second time. In many instances it was noticed that the woman had just undergone protracted labor. In 47 cases the affection appeared within the first three weeks of childbed. The seat of the trouble was in 33 cases on the left side, and in 23 on the right. That varices occur more frequently in the left thigh than in the right has always been observed, and attributed to the pressure to which the vena iliaca sinistra may be subjected by the arteria iliaca dextra, as it passes over it toward the right; and lower down also to the pressure of the arteria hypogastrica. The great predominance of the first occipital position in delivery cannot be devoid of significance in determining the more constant occurrence of venous thromboses of the left thigh; a point to which attention has been called by Velpeau.

The presence of large varicose veins always induces a certain predisposition to thrombosis. If, now, a contusion of these varices is caused by a blow, a kick, or pressure, or if an increase of the thrombi already present takes place, in consequence of the great loss of blood, periphlebitis, with its sequelæ, may ensue. In addition, pelvic exudations often exercise a pressure upon the large veins, which may induce the formation of clots. How often the phlegmasia occurs as secondary to thrombosis of the vena hypogastrica or spermatica interna, cannot, as yet, be accurately stated, since the cases of phlegmasia which have appeared in literature are, for the most part, too inexactly reported for the determination of the relation between secondary and primary femoral thromboses. That the trouble often passes from one thigh into the other has been abundantly proved by the cases of Böhr, Sankey, Davis, Puzos, Treviranus, Struve, and others. A

particularly interesting instance of this kind has been communicated by Baart de la Faille, in which the left vena saphena was the source of the thrombus, which extended through the cruralis iliaca communis, and into the vena cava as high as the first lumbar vertebra, obstructing also the vena iliaca communis dextra. The vena azygos and hemiazygos were in this case very greatly distended. The affection of the right limb appeared twelve days after it had attacked the left limb. The supplementary affection of the previously healthy extremity may naturally be the result of an actual morbid process; yet it is not improbable that its more frequent origin is attributable to the protrusion of a clot from the vena iliaca communis into the vena cava inferior, thus blocking, narrowing, or even completely occluding the orifice of the other vena iliaca communis.

For the rest, *colds*, *errors of diet*, *mental shocks*, *too early and violent efforts*, *and weaning of the child* may be mentioned as the occasional causes of phlegmasia, all of which exercise a certain influence, inasmuch as they obstruct the circulation and in particular *retard the venous circulation*. The cause of the greater relative frequence of venous thromboses in puerperal women is attributable less to the condition of their blood—the so-called leucocythosis—than to the retardation of the flow of venous blood, due to the pressure and dilatation of the veins in pregnancy. The same changes which we have described in the lower extremities, because of their more frequent occurrence in those parts, are also seen in the upper extremities, and are due to the same causes.

The second variety of phlegmasia, which is of much less frequent occurrence, is observed as an accompaniment of puerperal ulcers, affections of the external genitals, and of diphtheritic endometritis. It often extends from the pelvis, the groin, or the nates, downwards, but may, in rare cases, be developed primarily from unknown causes (severe effects of cold) in very fat, as well as in weak individuals.

Finally, with reference to the frequency of phlegmasia alba dolens as a whole, the malady has been observed by

Hugenberger	14	times among	8036	puerperæ.
White	4	" "	8000	"
Bland	5	" "	1897	"
Wyer	5	" "	989	"
D'Outrepont	3	" "	518	"
Busch . . . . . 1)	5	" "	2056	"
2)	1	" "	4124	"
Author	7	" "	1900	"
	44	times among	27,520	= 1:625.

It is, therefore, on the whole, very rare, and the calculation made by Sankey, that it appears once in 200 cases, is much too high. To be sure, it may at times occur in the form of an epidemic, as in the case of thrombosis placentaris, or it may even follow in the wake of certain epidemics. Leyden, for instance, observed it 5 times in 83 cases of disease; but its general occurrence should, by no means, be reckoned on this ratio. Other authors, who have also had a personal experience in extensive epidemics, have met it very rarely. Thus Elias von Siebold met with the disease but 5 times in 26 years. Velpeau also saw it only 5 times in the course of a long practice, and Treviranus in but one primipara in 30 years.

Prognosis.—The phlegmon of the thigh without venous thrombosis is always a pretty serious matter, particularly in individuals who are already reduced, death taking place very frequently, and with extreme rapidity. In a favorable case tedious suppuration, great debility, and even contractions from cicatrization may remain behind.

The phlegmasia alba which follows venous thrombosis, must also be regarded as a troublesome and dangerous affection. It is, however, far less injurious than thrombosis of the uterus, or its plexus, and terminates fatally in only 33 per cent. of those attacked. If it were possible to draw a dividing line in the recorded cases, separating thrombosis of the vena cruralis induced by an antecedent thrombosis of the vena hypogastrica, from thrombosis occurring primarily in the crural veins, perhaps we should be able to give a better prognosis for the latter class. For it seems to me scarcely questionable, that the danger of the purulent or putrid softening of the clots continually decreases in proportion to their distance from

the inner surface of the uterus. It is worthy of notice, that in the experience of many authors (Macneveu, Struve, Carlander), the phlegmasia has occurred in one and the same woman after several successive confinements. The more frequent the occurrence of chills, the greater the swelling of the affected limb, and the earlier the vesicles form upon the skin, so much the more unfavorable the prognosis. It is favorable when the chills are few, and when, with a gradual fall of the temperature, the swelling begins to subside. It is still possible, however, for metastases and sudden death to supervene. The duration of the phlegmasia, which is apt to complicate metrophlebitis, is often limited to a few days. The earlier the metastases appear, the sooner death ensues; yet recovery may sometimes take place even after secondary diseases of many other organs.

Treatment.—The prophylactic and internal treatment of phlegmasia alba is naturally the same as that of thrombosis of the uterine veins. We can, therefore, restrict ourselves to the treatment of the diseased limb. In the first place, a good position is indispensable; the leg must be raised a little higher than the thigh, and the knee be somewhat flexed; the foot and the calf must be so supported laterally, by pillows, as to prevent their rotating outwards by their own weight. As long as the leg is greatly swollen, tense, and painful, relief may be afforded by water, or lead-water, compresses; upon the integument in the neighbourhood of Poupart's ligament, a piece of unguentum hydrargyri the size of a bean should be rubbed three times a day. If the pain is very acute, tincture of opium should be added to the lead-water (grms. 30:500 aqua plumbi). If vesicles form, they should be opened by fine punctures and the serum evacuated. If the pain and swelling subside, the whole extremity may be painted with tincture of iodine, or Lugol's solution, and then covered with wet compresses; the attempt should next be made to promote the reduction of the swelling by careful bandaging of the leg; these bandages must, however, be removed should the pain be thereby increased.

Böer recommended for the relief of this affection, the application of a blister the width of two fingers, around the

whole thigh just above the knee, like a garter, and claims to have obtained good results therefrom. His experience of this treatment was corroborated by that of Albers, Eldik, and Wedemberg. Meissner and Casper found it in several cases entirely ineffectual. Its application causes great pain, and the large raw surface heals very slowly. Others have recommended that blisters should be applied to the calf; many have, however, completely renounced this agent, inasmuch as its results are in reality but slight, and it has of late been seldom resorted to.

The above-mentioned envelopment of the limb in cold and moisture was first recommended, in 1794, by Sachtleben; Reichenau even applied ice-cold compresses in one case with good effect. Latour, who first recommended the application of collodion for puerperal peritonitis, has also treated one case of phlegmasia alba puerperalis with remarkable success by painting the affected extremity with a coat of a mixture of castor oil and collodion (*L'Union Médicale*, 7, 1861). I tried this plan in one case (No. 23), the result being a partial arrest of the swelling, but no diminution in the pain, and no increase in mobility. Finally, the following inunctions and swathings have been employed at various periods, no one of which, however, can be said to have been universally employed: liquor ammoniaci caustici, grms. 4; ol. lini, grms. 30 (Meissner); oleum terebinthinæ (Bord); inunctions of alcohol (Hosack); balsam and oil of camphor; linimentum saponato-camphoratum; linim. phosphoratum with opium; tinctura cantharidum, etc.; swathings of cotton batting sprinkled with camphor, or fumigated with juniper berries.

In the case of robust persons, venesection was formerly a favorite remedy for the relief of the acute pain and the great swelling. If the pain appeared to be located in any one spot, a large number of leeches (20 to 40) were applied. The former treatment is at present scarcely ever resorted to, while the latter is employed only at the beginning of the trouble, with the view of affording some relief to the passive congestion, a small number of leeches being used.

Finally, the following medicaments have been given internally with more or less success: acidum hydrochloratum; digi-

talis with or without opium; laxatives and drastics, such as ol. ricini, sal amarum, tartarus boraxatus, tartarisatus, vitriolatus; and especially calomel either alone or combined with hyoscyamus, camphor, aconite, digitalis, or opium. The patient should naturally leave her bed only when she has been for some time free from fever, and the swelling of the leg has almost entirely disappeared. Elastic stockings or well-fitting bandages are to be applied before the patient is allowed to stand.

The treatment of the puerperal phlegmon of the thigh, beginning without thrombosis, should consist in the prompt resort to several long, deep incisions through the affected skin, with the view of relieving the swelling and evacuating at the earliest possible moment the pus already formed. Warm poultices or aromatic compresses should next be applied with chamomile tea, an infusion of arnica, Hb. serpylli, etc. The suppurating places are to be cleansed three or four times a day by injections of tepid water, and when the suppuration becomes very offensive hypermanganate of potash, decoctum quercus, vinum camphoratum, or tinctura myrrhæ, etc., are to be added to the lotions with which the wounds are syringed. The same mixtures may be applied by means of pledgets of charpie. The early administration of acids, quinine, and tonics, is, as a rule, desirable in these cases.

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RECORD OF CASES.

No. 26. Thrombosis venæ hypogastricæ et iliacæ sinistræ. Phlegmasia alba dolens. Numerous metastases in both kidneys, the right lung, the left eye, and in various joints and muscles. Death on the 39th day.

Dorothea Wickede, 29 years of age, healthy when a child, had menstruated irregularly since her 16th year; during the intermenstrual periods had often suffered from cardialgia and even hæmatemesis. She was easily delivered of children in 1858, 1861, 1863, the first and third times in this institution. She continued in good health through all her childbeds.

Her fourth confinement began on May 13, 1864; the pains were, thoughout the day, irregular, rare, and did not become more powerful until 2.30 A. M. on May 14th. The 1st period lasted until 7 A. M.; the membranes ruptured at the proper time; 1st occipital presentation; the 2d period lasted ¾ hour. The vaginal temperature at 5 A. M. was 99.5°, at 6.30 A. M., 99.7° F.; the anterior lip of the os was somewhat swollen. The child—a girl and living—weighed 10⅓ lb. The diameters of the head were 3″, 3½″, 4½″, 5″, 4½″. About a quarter of an hour after the birth of the child, the placenta was expelled with a considerable flow of blood by pressure upon the fundus uteri. The temperature at 8 A. M., immediately after delivery, was 100° F.

CHILDBED.

		Temp.	Pulse.	Resp.	
1st day.	P. M.	100.8°	60	22	Condition good.
2d "	A. M.	100.	64	22	
	P. M.	100.4	64	20	
3d "	A. M.	105.6	124	32	Slight chill. Pain to the left of the uterus. Eight leeches.
	P. M.	105.1	124	36	
4th "	A. M.	105.6	120	40	Frequent micturition. Slight tympanites. Pain increased. Eight leeches. Digitalis. Ol. ricini.
	P. M.	104.4	116	40	
5th "	A. M.	104.7	120	40	Loose stools. Insomnia. Morphine.
	P. M.	106.2	128	44	
6th "	A. M.	105.1	132	44	The soft parts on the inside of the left thigh, in the vicinity of several varicose veins, were swollen and tender. Typanites. Exudation to the left of the uterus.
	P. M.	104.9	128	40	
7th "	A. M.	105.4	120	45	
	P. M.	105.2	129	44	9–11 loose dejections. Tumefaction of the whole left lower extremity, which was pale red, tense, and very tender.
8th "	A. M.	106.1	132	60	Thirteen dejections during the night.
	P. M.	106.1	126	44	Suppression of urine.

		Temp.	Pulse.	Resp.	
9th day.	A. M.	105.2°	134	44	Pain in the left elbow and right shoulder-joints; both places red and tender upon pressure. Mind somewhat affected. Chemosis conjunctivæ sinistræ; cloud before the eye.
	P. M.	104.5	130	28	
10th "	A. M.	105.1	132	44	Swelling of the soft parts just over the left elbow and right shoulder.
	P. M.	104.7	128	42	
11th "	A. M.	104.5	132	36	Purulent vesicles in the left groin.
	P. M.	104.	132	44	
12th "	A. M.	105.1	142	40	Bed-sore forming.
	P. M.	103.8	136	48	
13th "	A. M.	104.4	140	36	Hypopyon sinistrum; vesicles with different colored contents on the left thigh.
	P. M.	103.8	132	36	
14th "	A. M.	104.7	144	32	
	P. M.	104.1	142	38	
15th "	A. M.	105.6	142	41	Œdema extending from the left hip to the ribs. Hypopyon disappeared; the anterior wall of the capsule of the crystalline lens is opaque; the eye is a little painful. No sensitiveness to light. Decoc. quiniæ wine. Compresses wet in lead-water.
	P. M.	104.	128	40	
16th "	A. M.	104.7	144	32	
	P. M.	105.4	140	48	
17th "	A. M.	103.6	132	32	Swelling of left elbow and right shoulder almost vanished.
	P. M.	102.9	130	36	
18th "	A. M.	102.2	132	32	Sputa bloody and frothy; scarcely any irritation causing cough; fine vesicular crepitation at lower part of back on both sides. No dulness.
	P. M.	104.	144	40	
19th "	A. M.	101.8	124	24	
	P. M.	102.2	126	26	
20th "	A. M.	102.	140	28	A glimmer of vision in left eye, the connective tissue of the eyelid is no longer swollen. Eye not at all tender.
	P. M.	102.9	136	36	
21st "	A. M.	102.9	144	30	A sudden acute pain in right knee in the night; redness of the integument; swelling of the joint; distinct fluctuation.
	P. M.	101.1	120	32	
22d "	A. M.	102.9	152	30	
	P. M.	103.3	132	30	
23d "	A. M.	102.9	142	28	
	P. M.	102.6	128	27	
24th "	A. M.	102.2	140	28	
	P. M.	102.6	128	36	
25th "	A. M.	101.1	140	32	Fresh tumefaction of the soft parts over the left elbow.
	P. M.	102.6	128	32	
26th "	A. M.	101.1	136	28	Perforation of an abscess at about the middle of the inner surface of the left thigh. Funnel-shaped opening.
	P. M.	102.2	140	27	

		Temp.	Pulse.	Resp.	
27th day.	A. M.	101.1°	128	28	Fresh hypopyon of left eye.
	P. M.	103.8	130	34	
28th "	A. M.	101.5	138	32	
	P. M.	102.7	132	28	
29th "	A. M.	101.1	146	30	
	P. M.	102.9	136	36	
30th "	A. M.	101.5	140	36	Bed-sores on both heels. Tumefaction of the entire left extremity persists unchanged.
	P. M.	103.4	136	32	
31st "	A. M.	100.6	140	40	
	P. M.	102.9	132	41	
32d "	A. M.	102.	140	28	
	P. M.	104.1	140	26	
33d "	A. M.	101.2	160	32	Swelling of right knee varying. Œdema of the right lower leg.
	P. M.	104.7	152	32	
34th "	A. M.	101.5	148	36	
	P. M.	103.8	148	32	
35th "	A. M.	101.5	152	28	
	P. M.	102.9	152	29	
36th "	A. M.	101.5	150	30	Abscess beneath the gluteus maximus on the outside of the left iliac bone.
	P. M.	102.	140	29	
37th "	A. M.	102.9	136	28	Discharge of pus from an abscess, as large as a fist, in the left upper arm.
	P. M.	102.9	136	32	
38th "	A. M.	102.2	156	26	
	P. M.	102.9	144	34	
39th "	A. M.	102.	160	26	Death at 9 A. M.

Autopsy (23 *hours post-mortem*).—Half an ounce of reddish-yellow serum in the right knee-joint; the interarticular cartilages were covered with a fibrino-purulent membrane; the condyles of the femur were softened, and the cartilage was superficially exfoliated in some places. The tumor above the external condyle of the left humerus, which was still the size of an egg, discharged, on being opened, three or four ounces of greenish-yellow pus. On cutting through the integument of the lower arm a diffuse extravasation of pus was seen in the subcutaneous and intermuscular cellular tissues of the flexors and supinators. The muscles themselves were of a pale-red color, and so very soft that, on holding the tendon of the supinator, the belly of the muscle tore asunder. The veins of the same extremity were perfectly sound. On incising the skin over the gluteals of the left side six or eight ounces of a dirty-yellow pus escaped from the intermuscular cellular tissue. The bellies of the muscles were perforated in many spots, disintegrated, and of a pale-grayish color. After removing the glutæus maximus an extensive gelatinous œdema of the cellular tissue appeared upon the glutæus medius. The periosteum of the left iliac bone was normal. *Abdominal cavity.*—Very little, light-yellow exudation. Uterus still rose an inch above

the symphysis. A long and partially firm thrombus was found in the left iliac and crural veins, the extremity of which reached rather beyond the opening of the iliac vein into the vena cava. The inner coat of the vena cava and right hypogastric was normal. The clot extended to just below Poupart's ligament. The saphena magna was not implicated. The thrombus was grayish-brown, and its extremity quite firmly adherent to the inner coat of the vein; lower down it was soft, friable, and degenerated for the most part into a puriform mush, here the inner coat of the vein was universally of a grayish-black color and covered with a diphtheritic deposit. The lower end of the clot projected about 1½ inches below Poupart's ligament. In the hypogastric vein also there was puriform mush. The uterus was 10 ctms. long, 6 broad at the fundus, and the walls of the body were 2½ thick. The placental site was anterior to the meatus of the right tube, of a brownish-red color, with firm protruding clots. Several small venous stems posterior to the placental site were seen upon section to be filled with puriform matter. The peritoneum was thickened at that spot, of a slate-colored gray. On both lateral walls at the base of the broad ligaments the subperitoneal tissue was œdematous. In the right ovary there was a collection of pus as large as a pea; the left ovary was normal. The spleen was 17 ctms. long, and very flabby. The liver was 29 ctms. high, 28 broad, was very flabby, its surface smooth, and its parenchyma anemic. Right kidney was 10 ctms. long, and had a wedge-shaped abscess in one of the papillæ; in others there were smaller clots. The left kidney was 17 ctms. long, and contained narrow wedge-shaped collections of pus. *Lungs.* Œdema of the upper lobes; left lower lobe with fresh hemorrhagic ecchymoses; about an ounce of light-reddish serum in both pleural cavities. Right lung very hyperemic; at about the middle of the lower lobe, just above the sharp border, there was an abscess as large as a walnut, the inner wall of which was grayish-yellow and rough. The parenchyma of the lung in the vicinity was brownish-red, hepatized, and sank on being placed in water. The pulmonary and costal layers of the pleura were slightly adherent to each other over the abscess, and there was a small hemorrhagic effusion between them. Heart was small; its muscular tissues were brownish-red; valves and ventricles normal and free from clots, as was also the pulmonary artery. The left eye was removed and examined; suppuration of the crystalline lens and exudations between the choroid and retina were found.

This case is worthy of note, first, because of the early occurrence of thrombosis and of metastatic affections; the patient had been perfectly well during pregnancy, and also during de-

livery, as was evident from the range of the temperature. Secondly, because, in spite of the numerous metastases and profuse suppuration, there was only a slight initial chill, and the patient afterwards experienced only a trifling chilliness now and then, and at no time any severe rigor; and thirdly, because, notwithstanding the numerous metastases and a 14 days' duration of a continued fever, marked remissions (on the 21st and 25th) occurred, even on the 31st day amounting to a reduction of the temperature to 100.6° F.

No. 27. Thrombosis of the vena hypogastrica and cruralis; phlegmasia alba dolens on the 20th day of childbed. Recovery in 8 weeks.

Mrs. Dorothea Niemann, 30 years of age, had always been healthy, except for an attack of measles when a child. She had menstruated regularly since her 15th year. Six years ago she was easily delivered of a child in occipital presentation, and remained healthy throughout the childbed. Had been for the second time pregnant since the end of February, 1865, and had suffered much during this period from convulsive affections. Both feet were said to have been swollen at times, and red spots to have appeared on the left lower leg. At 10 A. M. on November 17th, a girl was born in the first occipital presentation, after about two hours of very severe and tempestuous pains. The placenta was expelled by pressure shortly after. The hemorrhage was trifling.

Patient had chills immediately subsequent to delivery. She became very feverish 54 hours post partum, and in the succeeding night had a severe rigor. After that time she felt feverish and thirsty almost every evening. Sleep was disturbed. Those appearances, however, abated gradually, and Mrs. N. was able to leave her bed on the 11th day after the delivery. She was then feeling quite well, but was conscious of a certain numbness in the left foot, and of slight pain in it on walking. She nursed her child.

On December 7th (20th day) the pain became more acute, and at the same time an ever-increasing swelling of the whole left leg set in, after the patient had had a severe rigor of more than an hour's duration. An increase in the discharge of blood from the genitals took place, and at times a sensation of nausea and headache was experienced. On December 9th she entered the gynæcological ward. The child was weaned.

The patient was of medium size, well nourished, and a brunette. The color of her skin was normal, panniculus adiposus and the muscular development were abundant. The

mucous membranes, so far as visible, were of proper redness. Nothing abnormal about the thorax.

The abdomen was lax and not distended. Many striæ and sudamina. The fundus uteri projected a little above the symphysis. Only the region over the left iliac bone was painful on pressure; here above the middle of Poupart's ligament, a long, round, rather nodular cord was felt, which passed beneath that ligament down upon the thigh. The left leg was greatly swollen, especially up to the lower third of the lower leg. The circumference of the left thigh (20 ctms. above the patella) was 52 ctms., whereas that of the right was only 45; those of the lower legs were

1. 10 ctms. below the patella, left 36, right 32 ctms.
2. At the middle of the calf, left 36.75, right 32.75 ctms.
3. Just above the malleolus interna, left 28, right 24.5 ctms.

The extremity was painful, the integument pale. A sensation of numbness and difficulty of motion was felt in the leg. Heart normal. Liver extended from the lower border of the sixth rib to 3 ctms. beyond the ribs in a line with the nipple. Spleen 9 × 12 ctms. Tongue moist, coated gray; appetite small; thirst slight; constipation.

		Temp.	Pulse.	Resp.		Amount of urine. Cb.ctms.	Sp. gr.	Ur. per ct.	NaCl. per ct.
22d day.	P. M.	103.4°	136	20		282	1023		
Lead-water compresses. Inunctions with ung. hydrg. acid. muriat.									
23d day.	A. M.	102.7	120	14		292	1031		
	P. M.	102.9	132	23					
24th "	A. M.	102.6	116	20		340	1031	4.976	.94
	M.	102.9	118	16					
	P. M.	103.8	132	19		268	1030.5	4.764	1.1
No dejection.									
25th day.	A. M.	101.9	114	20	1 dej.	320	1036	4.68	.86
	P. M.	103.2	140	20		228	1033	5.232	.64
Discharge no longer sanguineous.									
26th day.	A. M.	101.4	124	21	1 dej.	290	1032	5.27	.73
Swelling in the left lower extremity greater.									
	P. M.	101.1	126	16		266	1029	4.84	.71
27th day.	A .M.	100.9	106	14		250	1031	4.34	.78
Great œdema of the left foot.									
	M.	102.	112	16					
	P. M.	102.2	114	16	1 dej.	215	1027	4.848	.88
28th day.	A. M.	101.6	120	18		365			
	M.	102.	116	17					
	P. M.	101.7	104	20	1 dej.	304	1029		

Circumference of the left leg at the above-mentioned points, 53, 38.5, 39, 27.5 ctms.

		Temp.	Pulse.	Resp.		Amount of urine. Cb.ctms.	Sp. gr.	Ur. per ct.	NaCl. per ct.
29th day.	A. M.	101.5°	112	18	1 dej.	286	1029		

Pain in the right calf; œdema of right foot.

	M.	102.2	112	16					
	P. M.	102.1	114	16		278	1026		

The integument covering the left ilium is very œdematous even up to the ribs.

30th day.	A. M.	101.1	112	14		335	1029		

The right lower leg was swollen nearly up to the knee and painful, the skin was tense and pale-red. Painted with tincture of iodine. Iodide of potassium internally instead of muriatic acid.

	M.	99.7	92	16					
	P. M.	99.9	94	16		194	1029	4.021	.7
31st day.	A. M.	100.6	108	16	2 dej.	325	1028	4.34	.52
	M.	100.2	104	16					
	P. M.	101.5	120	15		232	1027	4.216	.48

Circumference of the lower extremities at the above-mentioned points was—right lower leg 36.5, 38.5, 30.5 ctms.—left 40.5, 41.25, 29.25 ctms. Patient was rather jaundiced last evening, especially in the face and the conjunctivæ. Urine was found, on being tested, to contain iodine, but was free from albumen.

32d day.	A. M.	100.4	106	13	1 dej.	222	1027	.....	.3
	M.	100.2	104	13					
	P. M.	100.9	120	16					
33d "	A. M.	99.7	16	18		262	1029	.....	.36
	M.	100.	114	16					
	P. M.	100.6	112	15		250	1027	5.217	.33

Slightly chilled during change of bedclothes.

34th day.	A. M.	99.4	106	14	1 dej.	294	1025	4.902	.28
	M.	100.	108	15		270	1024	4.084	.38
	P. M.	100.2	114	16	1 dej.				
35th "	A. M.	99.3	102	16		290	1015	3.291	.3
	M.	99.7	96	18					
	P. M.	99.8	104	15		395	1019	3.478	.51

Pot. iod. omitted—acid given again.

Right thigh likewise more swollen, its circumference below the groin was 69.5 ctms. (left 70.5); right thigh, 20 ctms. above the patella, measured 59, left 50.5 ctms.

36th day.	A. M.	99.	108	18	1 dej.	635	1016	2.13	.52

Muriatic acid.

	M.	99.2	98	18					
	P. M.	99.4	108	18	1 dej.	305	1017	1.826	.7

Some chilliness in the evening.

		Temp.	Pulse.	Resp.		Amount of urine. Cb. ctms.	Sp. gr.	Ur. per ct.	NaCl. per ct.
37th day.	A. M.	98.8°	108	16	1 dej.	595	1015	2.173	.75
Rubber bandages applied.									
	M.	99.4	106	17					
	P. M.	100.8	116	22		214	1022	2.782	.75
Ol. ricini.									
38th day.	A. M.	99.4	108	17	1 dej.	470	1015	2.434	.9
	M.	99.3	108	18					
	P. M.	101.	118	20	3 dej.	595	1016	2.241	.98
39th "	A. M.	99.1	108	19		550	1015	5.152	.94
	M.	99.5	95	20					
	P. M.	100.1	104	22		1030	1011	1.565	1.01
40th "	A. M.	99.3	100	18		1285	1007	1.478	.8
	M.	99.	6	17					
	P. M.	99.7	104	20	1 dej.	900	1012	1.695	.84
41st "	A. M.	99.1	96	20		1725	1010	1.283	.82
	M.	99.1	92	14					
	P. M.	99.5	98	18		965	1011	1.565	1.1
42d "	A. M.	99.	84	13		2135	1007	1.131	.84
	M.	99.5	84	14					
	P. M.	99.7	97	16	2 dej.	750	1014	1.651	1.16

From this time forward the patient remained perfectly free from fever, and the swelling of both extremities decreased rapidly. On the 49th day the entire left limb had fully returned to its natural size, as had the right a few days later. On the 53d day the patient left her bed, thoroughly bandaged, and was discharged shortly after. She gradually made a perfect convalescence at home. But very slight traces of the cord on the left ilium could be felt on the 50th day, but a similar one could be readily felt in the left vaginal cul-de-sac. The involution of the uterus was perfectly normal, and discharge no longer present.

From this case it is seen that the greatly diminished chlorides of the urine again increased on the administration of muriatic acid; and that, moreover, the excretion of urine remained small for a long time in spite of the iodide of potassium, and the fall of the temperature, but that the speedy reduction of the swelling in the limbs was attended by an increase in this excretion.

The fever was at first of the continued type and then of the remittent, persisted for eight days after the occurrence of the phlegmasia, and passing through the successive degrees of subfebrile temperature, notwithstanding the affection of the right leg which supervened on the 29th day, sank to the normal temperature long before the tumefaction of the limbs had begun to subside. The chills were only severe at the outset. The commencement of the thrombosis in the hypogastric vein

probably dates from the 2d or 3d day; that in the crural vein from the 20th day.

Case No. 25, p. 281, belongs to this category. Three additional cases, precisely similar to the one above reported, have been observed in this institution since 1866, and the women restored to health; they were admitted when already suffering from the phlegmasia.

Phlegmasia without thrombosis of the veins.

1. (Reported by Busch, *New Zeitschrift*, Bd. v. p. 226.) "A 32 year old primipara of cachectic appearance, whose delivery had been tedious though normal, was the subject of a slight attack of peritonitis on the first day of childbed; she improved under the application of leeches, and the administration of an emulsion with the wine of antimony, so that she began to leave her bed on the 13th day. On the 17th day the patient awoke in a fever with the most acute pain in the right thigh, which was soon succeeded by very considerable pallor and very tense swelling of the entire limb. The application of leeches and the use internally of an emulsion of acetate of potash and wine of antimony abated the attacks somewhat in the course of the day, yet toward evening a very considerable exacerbation set in; this lasted throughout the night, and in order to afford relief leeches were repeatedly applied. The pain abated somewhat in the morning, and at about 8 o'clock the patient took breakfast; a fresh attack of high fever with very great exacerbation of the pain occurred immediately after, whereupon the swelling of the thigh at once assumed very great dimensions, and at 11 A. M., 27 hours after the first appearance of the phlegmasia, the patient died despite the remedies employed.

"At the autopsy the entire surface of the right thigh was seen to be discolored and covered with blisters; upon incisions being made, a discolored fluid oozed out, the whole cellular tissue was dissected off, the muscles looked pale, discolored like boiled beef. The peritoneum was slightly inflamed in spots on the right side. There was *no inflammation or suppuration in the venous trunks of the thigh.* The spleen was enlarged; other organs were healthy.

"The affection, therefore, consisted in an inflammation of the cellular tissue resulting in gangrene."

2. The very instructive condition, which Erichsen found in an extremity thus affected, was as follows: "the right thigh to below the knee is swollen, the fat subcutaneous cellular tissue is infiltrated with a sanious serum. The muscles on the outside of the thigh soft and infiltrated with livid sanies

which oozes from the incisions in the fasciæ. The intermuscular cellular tissue is destroyed even down to the deeper layers of muscles. On the anterior and outer surface of the body, the phlegmonous process extends higher, yet the gangrene decreases in intensity as it approaches the groin. The subcutaneous infiltration is limpid, the disintegration of the intermuscular cellular tissue is less extensive, but the muscles are soft and livid. Just below the groin the phlegmon is almost entirely confined to the subcutaneous cellular tissue and that lying under the fasciæ; it passes, however, over the ilio-pubic ramus into the deep layers of the pelvic cellular tissue, which, along the inner wall of the right half of the pelvis, is likewise discolored and infiltrated with serous sanies. The femoral vessels, as well as the branches of the common iliac vein, are intact; lying transversely astride of the latter is a narrow bunch, 3½ inches long, of swollen lymphatic glands, the swollen congested capsules of which contain several suppurating follicles. The cellular tissue of the ligamenta lata is not implicated.

CHAPTER VI.

INFECTIOUS PUERPERAL DISEASES; THEIR VARIETIES AND NOMENCLATURE.

It was formerly customary, when the nomenclature proposed by Virchow was generally employed, to describe puerperal ichorrhemia under the above head. Since that time, however, our views respecting the infectious puerperal diseases have been changed in many respects, becoming clearer in certain particulars. Thus it happens that several of the older names, which had been almost given up, have been reinstated, while the more recent terms have in turn been abandoned. For an elaborate exhaustive summary, embracing the conclusions to be deduced from the latest advances in this field, I would heartily recommend the article by C. Hueter: "Die septikämischen und pyämischen Fieber" (Pitha-Billroth's Chirurgie, Band I., Abtheilung II., Heft 1), in which are collated the most important and most fully substantiated facts. It is in view of these facts that we are compelled to adopt a nomenclature different from that which has hitherto prevailed.

It should be observed, first of all, that the assiduous researches of Panum, Billroth, C. O. Weber, Hemmer, Schweninger, and Bergmann (Dorpat) have added materially to our knowledge of the nature and causes of septicemia. Hemmer, and after him Schweninger, arrived at the conclusion that the putrid poison is an albumenoid body in a stage of transposition; that it is fixed, soluble in water, insoluble in absolute alcohol, and that it exercises an action upon the albumenoid matters in the plasma of the blood. According to Bergmann, it is a fibrinous poison, formed by the decomposition of albuminous bodies, not volatile, but diffusible, and not in itself an albumenoid body. Its deleterious action is not to be ascribed to its molecular constituents, but fluids (solutions) form its media of transference, and it passes from non-albumi-

nous and slightly albuminous fluids into alcoholic solutions. Hufschmidt made injections of putrid fluids into the subcutaneous tissue and veins of dogs and horses, and observed that the experiment was invariably attended by an elevation of the temperature to 105.8° and over, this change occurring in 1 to 2 hours.

All authors agree that the action of the substance designated by Bergmann as *sepsin*, is extremely virulent, even in very small quantities. Of the most important diseases and organic changes which have been thereby produced, the following may be mentioned: Foul local exudations were formed near the place of injection; ecchymoses occurred in the heart beneath the endocardium; from the fact that abscesses in the lungs—infarcts or foul deposits—were not formed in animals infected with putrid matter, it was inferred that this morbid material can pass freely through the lungs. The pleura exhibited ecchymoses only, and no signs of pleurisy. Purulent lymphangitis could not be demonstrated, but, on the other hand, the stomach and intestines were found to be constantly changed in appearance, exhibiting, for instance, an injected mucous membrane, a swelling of Peyer's patches, and serous infiltration of the intestinal wall. Finally, the spleen was constantly found to be the seat of infarcts, although no emboli were present.

The sepsin of Bergmann has, however, as yet been produced only from decomposing yeast. Fischer, Zulzer, and Sonnenschein did not succeed in obtaining it from decomposing animal matter. The above taken in connection with the fact that the lesions, found in puerperal women in cases of septicemia, by no means correspond with those observed in cases of animals which have died from the effects of septic poison, indicate the necessity of being on our guard, and render doubtful, in many cases at least, the notion that the virus is a chemical one.

Another more important advance which we owe to exact experiments, concerns the changes which may take place in thrombi of the vessels, and the action of the pus in producing the decomposition of the clot. According to Virchow, the softening of one such clot commenced in the centre, by the de-

composition of the fibrine and the formation of round, cellular elements, which were considered by him to be white corpuscles; this process was therefore described as a puriform liquefaction. In view, however, of the contractility and migrative powers of pus and connective tissue corpuscles, demonstrated by Recklinghausen; of the apertures in the walls of vessels and the escape of white blood corpuscles, as discovered by Cohnheim; and the entrance into the thrombus of stained pus and connective tissue corpuscles from the parts around the walls of the vessel, first shown by Bubnof,—we are compelled to regard this liquefaction, in part at least, as purulent, while the process itself may be correctly termed a suppuration of the thrombus. It has now been satisfactorily proved by Billroth and C. O. Weber, by means of a series of injections of fresh pus into the subcutaneous tissue, and into the veins of rabbits and dogs—which in every instance was followed by an elevation of temperature to 106.7° F.—that fresh serum, either alone or with the pus corpuscles contained in it, when introduced into the blood, possesses eminently pyrogenic and phlogogenic properties; it has furthermore been demonstrated by C. O. Weber, that the blood of purulently infected animals produces fever in other animals. Finally, Waldeyer has established the fact that clots become the seat of a purulent and ichorous softening as soon as pus and ichor are brought in contact with the walls of the veins, but that in spots where there is neither pus nor ichor in the vicinity of the thrombus, no softening nor disintegration is to be observed. In view of the above contributions to our knowledge, we are no longer justified in avoiding or rejecting the term *pyemia*, but should rather restore it to its former position in the pathology of puerperal diseases, as being a strictly legitimate designation.

The name ichorrhemia is, on the other hand, no longer needed, because septicemia, which is the poisoning of the blood with a putrid poison, is a more exact term; yet ichorrhemia has been accepted by several authors, Schroeder and Von Gruenewaldt, for instance, as identical with septicemia, and differing from it only in degree; the word ichor, on the other hand, is not a suitable name for the pyrogenic substance of pus, since all pus, not only the abnormal and foul but also

the fresh—pus bonum et laudible—contains these same substances and exhibits the above-mentioned action.

The most important advances, however, made during the last three years, for which we are indebted to the investigations of Buhl, Oertel, Cohn, Nassilhoff, Klebs, Tiegel, Waldeyer, Recklinghausen, and Hueter, all contribute to prove that many diseases, and especially those of a pyemic character, are induced by the introduction within the organism of certain minute objects known as monads (microsporon septicum, Klebs), microtorren, or bacteria; that is to say, that these parasites may either penetrate the pus corpuscles, and with them enter into the circulation, or they may force their way directly into the blood, and be thus transferred to distant organs (lungs, kidneys, etc.), where they excité an inflammatory process.

It is affirmed that septicemia is produced by infection by means of chemical, putrid poisons, whereas the diphtheritic affections are said to be attributable to the presence of bacteria (Hueter).

If now, bearing in mind the above distinctions, we wish to recapitulate the severe forms of fever, which are briefly designated as puerperal fever, they would be characterized as follows:—

1. *Septicæmia simplex*, an infection of the blood by a putrid poison developed in the foul deposit secreted within the genitals; thus, for instance, in case of a thrombus of the vulva and vagina, sloughing of the retained portions of the placenta and membranes, gangrene of the uterus, etc. [For examples, *vide* Cases No. 7, 12, 14, 15, 28.]

2. *Pyæmia simplex;* a blood-poisoning attributable to absorption of pus, without metastatic deposits, as occurs in parametritis, peritonitis, etc. [*Vide* Nos. 16, 18, 19, 29, 49.]

3. *Pyæmia*, sive *septico-pyæmia metastatica*. Suppuration, or putrid degeneration of thrombi within the genital organs, or in their vicinity (vena hypogastrica, cruralis; metrophlebitis; phlegmasia alba dolens), with metastatic abscesses in the lungs, liver, spleen, kidneys, and other organs. [No. 23 affords a most typical illustration of this variety; see also Nos. 24, 25, 26, 27.]

4. *Diphtheritis* (mycosis) *simplex genitalium*, and

5. *Diphtheritis metastatica*, *mycosis metastatica*, inflammations induced by monads and bacteria penetrating the organs of generation and the circulatory system (parametritis, metritis, peritonitis, pleuritis, etc.). [See Nos. 20, 21, 22, 30, 31, 33, 34, 35.]

The following affections are enumerated by Spiegelberg as representing the severe forms of puerperal diseases:—

1. Endocolpitis et endometritis.
   a. Superficial.
   b. Ulcerative (diphtheritic).
2. Pelvi-peritonitis et peritonitis diffusa traumatica.
3. Metritis et parametritis.
   a. Exudative.
   b. Lymphatic (pyemia and lymphangitis).
4. Phlebothrombosis et phlebitis, uterina et parauterina, pyæmia embolica.
5. Septicæmia simplex (putrid absorption).

RECORD OF CASES.

No. 28. Gangrene of the cervix uteri after a difficult version, and an extremely troublesome rotation of the child. Moderate peritonitis, septicemia. Death 79 hours post-partum.

W. H., a primipara, 23 years old, with a contracted pelvis (conjugate 3¼ inches), was delivered, after a natural course of pregnancy and 28 hours' duration of the labor, of a dead girl, weighing 11½ pounds, by version, owing to prolapse of the umbilical cord. The extreme efforts of two physicians, who relieved each other, were required to extract the child. The rotation of the child was aggravated by a stricture of the uterus. The flooding immediately after delivery was only moderate; the temperature at 10.15 A. M. was 101.5° F.; the abdomen was distended, and a little painful. At 5 P. M. she had a temperature of 101.7°, pulse 106, and felt rather better, as the abdominal pain had abated. She had passed her urine twice spontaneously, and only complained of pain in her shoulder. The following night she slept some hours after tincture of opium, and had in the morning a pulse of 118, a respiration of 42, and a temperature of 102°. The abdomen was then more distended, the uterus stood 2–3 fingers' width above the navel, and was painful on the left side; the discharge was extremely offensive. Evening, pulse

132, resp. 32, temp. 103.5°; abdomen as before; no dulness anywhere. The anterior uterine wall was tender. Tongue had a white coat; eructations; mind clear. The second night she also slept quite well, and in the morning had temp. 103.7° F., pulse 132, resp. 40; pain moderate; distension unchanged; a slight dulness on both sides of the uterus. 5 P. M., pulse 144, resp. 40, temp. 103.5°. Nausea; pain moderate; ice-bags on the abdomen. Next morning the temperature was only 103.1°, resp. 36, pulse 142. Had vomited bile several times; at 8 A. M. involuntary dejection. Lochia very offensive; skin cool; patient very drowsy; pupils contract but little; uterus lying remarkably deep; the exudation had not noticeably increased. 9.30 A. M., pulse 136, resp. 38, temp. 103.4°. 11.45 A. M., pulse 136, resp. 38, temp. 102.2°; repeated involuntary discharge of urine and feces; delirium commencing; extremities cool; eupathia soon afterwards. 5.45 P. M. (just before death), pulse 144, resp. 42, temp. 103.8°; mind was perfectly clear; patient felt that she must die, and was prepared; vomiting still tormented her. At 6.30 P. M. death occurred.

The autopsy disclosed grangrene of the cervix uteri; the veins, as well as the lymphatics of the cervix, contained a fluid, sanio-purulent mass without clots; the peritoneum was only in a measure implicated (pelveo-peritonitis); the exudation was brownish-red, with a few flakes; liver and spleen swollen, hyperemic, and friable, as were the kidneys. The intestines seemed to be distended; their walls were infiltrated with serum; a reddish serum in the pericardium, as well as in the pleural cavities.

CHAPTER VII.

ETIOLOGY OF THE SO-CALLED PUERPERAL FEVER.

Historical Sketch of the Theories Hitherto Prevailing as to the Nature and Causes of the Malignant Puerperal Affections.

The history of the severe puerperal diseases which have been designated by the term childbed fever, is almost as old as the history of medicine, for even Hippocrates in his works on the prevalent popular diseases reported eight cases, concerning the nosological interpretation of which there can be no doubt. The term puerperal fever did not originate, as many believe, with Strother, but was first used—as was made evident by Eisenmann in 1837—by Morton, and afterwards by Willis, and was only translated into English by Strother in 1718. Eisenmann was the first who attempted to bring together the various theories about childbed fever; his work (1837) has been followed, almost word for word in many passages, by Dr. Silberschmidt (1859) in his prize essay.

Eisenmann recognized eight different theories, naming the first of them, "The Theory of the Lochial Derangements," the supporters of which were Hippocrates, Galen, Avicenna, Eucharius Rhodion, Victor Trincavellus, Mercatus, Roderic a Castro, Sennert, Riverius, Sylvius, Mauriceau, Sydenham, Michaelis, Boerhave, Stahl, Strother, de la Motte, Fried. Hoffmann, Barton, Smellie, Tissot, Astruc, Fauvarq, Johnson, Gorter, Heister, and others. These writers held to the opinion that the lochia could be suppressed by inflammation or spasm of the uterine vessels, that by these means poisonous elements were retained in the blood, which produced fresh disease of the uterus and afterwards of all the organs; and that finally a putrid fever was developed.

Another class of authors declared childbed fever to be a lacteal metastasis; it is said that Mercurialis first suggested

this notion, and that, although Willis (1662) mentioned a "lacteal putrid fever" in puerperal women, Puzos was in reality the first (1753) to lend substantial support to the theory; after him it was defended by Levret, Astruc, Sauvages, van Swieten, Deleurye, Baldinger, Le Roy, Lieuteaud, Schmucker, Plenk, Henkel, Krantz, Selle, Hufeland, Sachtleben, Brandis, Boër, Renard, Fischer, Hecker, Sr., Wenzel, Ed. Martin, and others. Since it was assumed, as is stated by Eisenmann (*l. c.*, p. 165), that there could be a determination of the retained milk to all the organs, there might, therefore, be induced, lacteal apoplexy, lacteal ophthalmia, lacteal pneumonia, and pleurisy, lacteal peritonitis, lacteal mania, melancholia, and neuroses of every description.

Borden, the predecessor of Broussais, insisted that he had found a quantity of real cheese and sour milk beneath the epidermis of a woman in childbed; a certain Rommel went so far as to assert (Ephemerid. Natur. Decad. II. ann. 8, observ. 167, p. 451) that he had made butter out of milk that had been discharged from the intestine!! Selle relates that, in the case of a woman who had died from childbed fever, having subjected the milk taken from the abdomen to Hermbstädt for analysis, he received the following report: "The liquid sent me for examination is normal milk surcharged with a volatile alkali. The latter was very easily set free by the addition of a fixed alkali; on the other hand, a separation of the constituents of the milk was readily effected by the addition of acids, the butter and casein being in this manner readily isolated." To this statement the following criticism is appended by Eisenmann: "In that twilight of chemistry it may well have happened to the good Hermbstädt, to mistake coagulated albumen and fibrine for casein."

This "milk paradox," to make use of a word from the same author, has lasted for a long time, although we no longer hear that "the corpses of those who had died of puerperal fever smelled of sour milk;" still as late as 1852, we have seen the statement made that the exudation in phlegmasia alba dolens is derived from the suppressed milk and lochia, and is deposited on the sheaths of the lymphatics and in the cellular tissue. After such statements on the part of physicians, can we won-

der if, in our day, many of the laity still always entertain a great dread of the determination of the milk to the head or to other parts of the body?

The so-called *physiological theory of Autenrieth*, which originated at the commencement of this century, is merely a disguised acceptance of the theory of lochial and lacteal metastasis; for it affirms that during pregnancy, the determination of the fluids is directed chiefly inwards, and particularly to the uterus; after delivery it resumes its flow outwards, by way of the secretions of the sweat and milk glands and the lochia; if, however, the initiation of these peripheric functions is disturbed, this flow is directed toward another focus in the head, or the breast, or, as is most frequently the case, in the abdomen. The advocates of this view were Schmidtmüller, Carus, Joerg, D'Outrepont, and others.

According to the so-called *gastric-bilious* theory, which arose later and was first taught by Trincavellus, and subsequently in England by Millar, Manning, Butler, Cooper, and Denman, and in Germany by Stoll and his followers, those affections were supposed to owe their essential origin to a collection of biliary and mucous *elements* in the *primæ viæ*. This accumulation was ascribed to the retardation of the circulation in the intestines, a concomitant of pregnancy.

Meanwhile, a number of observers arrived at the conclusion that *inflammation* was the chief factor in the so-called childbed fever; thus arose the phlogistic theory, which branched into three sub-divisions, according to the parts of the body in which the principal inflammation was supposed to be located; in accordance with these views, the principal causes of the affection were supposed to be:—

(*a*) *Metritis.*—Plater 1602, Moschion, Denman, Tissot, Funken, Nægele, Lightfoot, Neumann, Windisch, Lunz, and others, or *metritis* with *synchronous affection of the neighbouring organs*, Raimann, Nægele Sr., and others. It should be especially mentioned, that as early as 1787–88 Clarke claims to have found a purulent fluid in the veins of the uterus during an epidemic of puerperal fever. From that time various forms of metritis, such as metritis simplex, metritis with phlebitis, and later also with lymphangitis, have been

asserted by Boivin, Nonat, R. Lee, Lunz, and others, to be only varieties of the so-called puerperal fever. Finally the opinion was reached that the trouble in question was nothing more or less than metrolymphangitis. Meckel asserted that it always originated in the *cervix uteri*, because in all malignant cases small ulcers were observed, with a whitish-yellow base infiltrated with pus, and invested with fibrino-plastic membranes; these had been transformed, subsequent to parturition, from fissures into these malignant forms, through the action of foul lochiæ. The inflammation of the lymphatics arises from these ulcers, being most acute at the angles of the tubes, and passing thence over the anterior and posterior surfaces of the body of the uterus. Meckel stated explicitly in 1854, that metritis, puerperal ulcers of the uterus, and lymphangitis were generally to be found in cases of puerperal fever of all ages and countries, and formed the essential causes of the affection, peritonitis, articular inflammation, and phlebitis occurring merely as accidental and unimportant concomitants.

(*b*) Still other authors have advanced the opinion that *inflammation of the intestines and omentum* forms the origin of childbed fever, inasmuch as these parts are liable to be the seat of passive congestions, and even partial paralysis (Halme, 1770), owing to the pressure of the pregnant uterus; while, at other times, they become hyperemic and inflamed immediately after birth, owing to the extreme congestion attending the process of labor (Denham). The advocates of this *theory of enteritis* were Leake, de la Roche, Metford, Zeller, Harless, and at first Eisenmann. A distinction was made between enteritis serosa and mucosa, according as the affection of the peritoneum or intestinal mucous membrane appeared to predominate. But Eisenmann soon after admitted that he no longer considered the affections of the omentum and intestine to constitute the disease proper, regarding them as of secondary importance, and maintaining that the disease originated uniformly in the uterus itself (1837).

(*c*) In 1779, the views of W. Hunter were published by Johnstone, in which peritonitis was held to be the true source of the mischief in all puerperal fevers. Burns, Armstrong, John Davy, Peter Frank, Wenzel, Horn, Harless,

Siebold, Capuron, Graf, Murat, Gascogne, Baudelocque, and many others supported this theory. Schönlein also maintained that childbed fever was a peritoneal inflammation, modified by epidemic and endemic influences and very often complicated by metritis septica and metrophlebitis. He recognized the erethic, synochial, erysipelatous, and typhus forms of the malady.

Related to the phlogistic theory is that named by Eisenmann the *erysipelatous*, propounded first by Ponteau in 1756, and accepted by De la Roche, Home, and Bayrhoffer. De la Roche believed that a "roseate" inflammation of the intestines was the foundation of these fevers; Gordon (1795) regarded erysipelas of the peritoneum as the *origo mali*, while Ozanam held that an erysipelatous inflammation of the whole uterine system and its appendages was the cause of these appearances. West and also Gordon were led to adopt this opinion from the circumstance that the "rose rash" prevailed at the same time as epidemics of puerperal fever, breaking out in the same localities and in non-puerperal women, and because, moreover, the nurses of such lying-in women not infrequently had erysipelas on their hands and arms. It should be observed, however, that the disease described by Englishmen under the name of erysipelas is employed, as Hirsch has satisfactorily explained, in a much wider sense, the term being applied by them to all phlegmonous processes of the integument. Ingleby, Storrs, and others, had likewise observed the frequent prevalence of erysipelas in the vicinity of lying-in women who were seriously ill. Ackerly and Lee called attention to the simultaneous occurrence of erysipelas neonatorum in lying-in establishments at times when puerperal fever epidemics were raging. The above circumstances have led English physicians, even in the most recent times, to insist upon the identity of puerperal fever and erysipelas, as will be seen by reference to the writings of Moore, Ramsbotham, Nunnely, Fox and others. Many Americans, such as Hodge, Wilson, Kneeland, Leasure, Wallace, and Dutcher, have accepted this theory, while the last of these authors claim to have established the reciprocal contagiousness of the two diseases. Sennert, Riverius, Willis, and Whyte have designated puerperal fever, a putrid or

typhoid fever: So likewise by Horn and Fritze, and even Cruveilhier, the term "puerperal typhoid" was employed in 1831, in alluding to the affection, while it was regarded in the same light by Balling (1836), and also by Bartels (1838), Ottaviani, Fischer, and Böttcher. Other writers, such as Johnson, afterwards Aiken, and Whyte, and finally Simpson, endeavored to identify childbed fever with the hospital fever, or hospital typhoid. Puerperal fever has also been compared to the intermittent fevers, while Punch and Cederschjoeld, as well as Wedel, have affirmed that it was an intermittent fever of varied type.

The hypotheses of the various authors thus far quoted, were all based upon the opinion that the so-called puerperal fever was essentially a distinct and specific disease. In opposition to these views, the theory began gradually to be developed that these affections were of a very varied character: that lying-in women were, in general, more exposed to diseases than others, these diseases being modified, however, by childbed. A *resumé* of these views was published by Eisenmann and Silberschmidt, under the heading "The theory of the changeable character of the Disease," while Stohl's assertion, "Nulla febris est, quæ non aliquando cadat in puerperam," was adopted as the basis of this theory. Kieser, Amelung, Rost, Schu, Waddy, Meissner, embraced the above view. Schu, Helm, Müller, Trousseau, and Brouilland, opposed strongly the idea, that the so-called puerperal fever was attended by any characteristic phenomenon whatever, regarding as especially significant the circumstance that all these diseases occurred also in the case of pregnant and non-puerperal women, new-born children, and even men; it was admitted, however, that there existed some specific morbific agent, the nature of which was unknown, to which the origin of these affections could be referred.

At this point, we will now leave for a while the theories about the character of the so-called puerperal fever, and pass to the consideration of the hypotheses as to its causes. The writers who accepted suppression of the lochia, or the milk, as the primary origin of childbed fever, ascribed also the results to certain definite causes (colds, fright, errors of diet, inflammation, etc.), though the specific character which the disease

was supposed to assume, was referred, not to the above causes, but to some influence existing antecedent to the disease. The advocates of the typhoid theory—beginning with Whyte (1770)—were forced to admit the contagiousness of these affections. Even Whyte had learned from his experience, that they occurred chiefly in lying-in establishments; it was his belief that the disease was produced either by the development of the morbid material within the organism itself, or else by its introduction through the medium of the air loaded with putrid elements. Walch, in 1788, saw a lying-in woman infected from a patient suffering from putrid fever. Douglas (1822) recognized a third form, "the epidemic, or contagious, childbed fever," while Cruveilhier alleged that the trouble arose from miasma engendered by overcrowding the lying-in hospitals, and was, therefore, essentially hospital fever, since the condition of a lying-in woman is precisely analogous to that of one exhibiting a wounded surface. Balling believed that the most frequent cause was the genus epidemicus, and a specific contagion (1836).

Eisenmann was the first to state distinctly (in 1837) that the theory of Cruveilhier contained a presumption that the wounded surfaces formed the constant, or at least a frequent, starting point of the disease in lying-in women. It was his opinion that the diseases were communicated by infection from without, which was implanted, for the most part, in the denuded inner surface of the uterus, spreading thence to the other organs, and, in exceptional cases only, transmitted from the uterus to the other structures. At all events, he maintained, this affection of the wounded surface of the uterus was one of the most characteristic phenomena of childbed fever. These denuded surfaces of the uterus, it was thought, might become diseased through miasmata or contagion, in two ways, viz.: by the direct action of these agents upon the organ; or the miasmata and contagious materials may penetrate the circulation by way of the respiratory apparatus, while in the irritated and lacerated uterus only is encountered an organ susceptible to their action. In many, if not in most, of these cases, the infection or contagion was supposed to have taken place through both these channels at once.

According to Eisenmann, Helm made the first approach toward ascertaining the source of these miasmata. By the latter, the opinion was expressed that puerperal fever was often developed from a specific miasma, formed from the secretions of lying-in women, which by the process of condensation was transformed into an element of contagion—a puerperal mephitis—manifesting its properties whenever it came in contact with organs susceptible to this specific disease. (The theory of Hecker, propounded twenty-five years later, and which will be referred to below, corresponded pretty closely to this hypothesis of Helm.)

Scanzoni, Litzmann, and others coincided in this view of Eisenmann and Helm, according to which puerperal fever was of a miasmatic contagious origin; whereas Kiwisch (1840) accepted only the idea of a miasma, which at first produced merely an alteration in the blood; by this means a diseased action was first set up in the uterus, which, starting from that organ as a focus, radiated according to certain fixed laws. Regard for the "experience of other physicians and the laws of humanity" led Kiwisch at a later date (1851) to admit the possibility of a contagious origin of the malady. (*Klinische Vorträge*, Prag, 1851, 1, 585.)

In the survey of the hypotheses concerning the causes of this disease, we have again arrived at a new view as to its nature, viz.: the *hæmatic* theory, the advocates of which are to be found among those accepting the idea of the lochial and lacteal metastases. According to this view, the source of severe puerperal affections lay in a primary specific change of the blood. This alteration of the blood was supposed to be induced by the action of a miasma—a certain unknown substance—and by its action upon the nerve centres gave rise to local maladies and even caused death. (Litzmann, Scanzoni, Bamberger, Veit [formerly], Kirchgässer, Depaul, Paul Dubois.) Other authors, such as Ferguson and Scanzoni, accepted different kinds of alteration of the blood as causes, namely:—

First, the *hyperinoses* of lying-in women, the abnormal increase of fibrine in the blood, which may readily take place; this excess of fibrine may either be eliminated by exudation, or, by being retained within the organism, it may give

rise to other anomalies of the blood, such as anemia and chlorosis. *Second*, *pyemia*, which is to be recognized only by the tendency manifested towards exudation, suppuration, or the various inflammatory accumulations. *Third*, the *dissolution of the blood* (disintegration of the blood, which may originate by infection from any sloughing mass) as a consequence of which metastases, phlegmonous erysipalas, etc., may result.

Finally, in the year 1847, Semmelweiss first came forward with the assertion that *cadaveric poison* was the proximate cause of childbed fever; and, by the year 1861, in which his well-known paper upon "The Etiology, Conception, and Prophylaxis, etc." appeared, he had gradually developed the following theory as to the nature and causes of those epidemic diseases. Every case of childbed fever should be regarded as an absorbtive fever, originating from the absorption of decomposed organic matter of animal origin. The latter may be introduced into the system by infection from without, or by the absorption of its own decomposing elements—that is, by *self-infection*. Thus the so-called puerperal fever may be produced by dead bodies of every age and race, when in a state of decomposition; and, furthermore, by patients of every age and race in whom the external progress of the disease is accompanied by the decomposition of organic matter; and, finally, by all physiological organic animal structures which have reached a certain degree of decomposition.

This short sketch of the theories which have thus far been propounded to explain the nature and causes of the so-called puerperal fever, will serve to convey a pretty clear idea of the great diversity of views which have prevailed upon the subject; and will also indicate how much attention has been given to the question for centuries. It will furthermore enable us to determine what hypotheses are new, and what old ones have been resuscitated. When the very significant term *puerperal fever* is applied now-a-days to the most severe diseases of childbed, the phlegmonous and diphtheritic affections of the genitals are thereby chiefly intended, from which a variety of the malady mentioned in the previous chapter is subsequently developed.

The important fact should be borne constantly in mind,

that the above-named processes do not possess any specific character; nor are they by any means restricted to pregnant, parturient, or lying-in women. Even Trousseau, Schu, Helm, and others, concurred in the above proposition, and demonstrated the correctness of it by examples. The same fact has also been recently more fully established by numerous observations, for proof of which statement the reader is referred especially to the communications of Buhl (*Monatsschrift*, xxiii. p. 303 *et seq.*). In the case of two girls, who died on the eighth day after the performance of episiorraphy, there were found by him sloughing of the vagina, lymphangiectasis, peritonitis purulenta, and pleuritis duplex. In another case, where death occurred on the seventh day after amputation of the *portio vaginalis* by means of the écraseur (for epithelial cancer), there was discovered diphtheria of the wounded surface, pus in the lymphatics of the uterus and tubes, diffuse purulent peritonitis, and double pleurisy, but nowhere any further trace of the cancerous mass. In a woman who six weeks after delivery had been treated with the actual cautery for cancroid of the vaginal portion, the same morbid appearance was likewise detected.

In respect to *analogous diseases of new-born children*, which have been properly ascribed to puerperal infection, Buhl's work (*Klinik der Geburtskunde*, by Hecker and Buhl, i. p. 255) contains numerous examples of this class. See also the autopsies of children under Cases Nos. 30 and 34. Orth (*Archiv der Heilkunde*, 1872, xiii. 265–272) observed, in the case of a new-born child that had died of pyemia, a fibrinoid-looking deposit in the left lung, and in the substance of the pleura a large number of micrococci. He formed the opinion, that, inasmuch as the mother had experienced a severe fever previous to delivery, and was subsequently attacked with acute peritonitis, the above formations must have taken place while the child was still *in utero*. Finally, it is well known, that the phlegmonous and phlebitic processes frequently occur in men also, and are throughout analogous to these puerperal affections. Between the latter, whether mild or severe in their character, and the diseases which so frequently supervene

in case of wounds (septicemia and pyemia), no essential points of distinction can be made out.

It has been established, almost beyond question, by the researches of modern times, that these affections invariably originate in the genital organs themselves, the constitutional disease being uniformly traceable to this locality as a starting point. "In these cases the primary development may proceed quite as readily from the inner surface of the uterus, or from superficial wounds, as from the deep connective tissue about the uterus and vagina" (Virchow, *loc. cit.*). The presence of denuded surfaces is not essential, however, for the explanation of this process. As phlegmon may be developed in the extremities when the skin is perfectly intact, so likewise the analogous lesions of the uterus and vagina may arise without any antecedent wound. It is by no means my intention to affirm that every affection of this character, occurring prior to delivery, is to be explained in accordance with the last-mentioned theory, upon the ground that "no wounds are to be found before delivery" (Virchow), for the researches of Lieven have acquainted us with the fact that the occurrence of erosions and ulcerations in the vaginal portion of the uterus is extremely common, being found in about 80 per cent. of all pregnant women (*Würzburger*, *Zeitschrift*, Bd. v., Heft 2, 3); and the question naturally arises, why might not an infection take place by means of these wounds quite as readily during pregnancy as during delivery?

A local affection once established is soon converted into a general one either by the process creeping along the course of the connective tissue, or by spreading through the agency of the fluids (lymph, blood), by the transportation of poisonous fluids into all the organs of the body; or by foreign bodies being introduced into the circulation and deposited in various organs, at which points disease is subsequently induced. Various combinations of these different methods of the dissemination of the original process are not unfrequently encountered, as was mentioned in the appropriate chapters.

If, however, we wish to introduce any degree of clearness into the etiology of the process described, we must first draw a clear distinction between the first cases of an epidemic and

the so-called "puerperal fever epidemics." These are to be regarded from an etiological point of view as different affairs. Of the sporadic cases of the septic puerperal disease in question, it is universally known that it occurs *everywhere*, in hospitals as well as in private practice, in case of both poor and rich, in individuals of the most opposite constitutions, and at every age of life. The following have been demonstrated to comprise some of the causes of the affections:—

(A) In the first place, *wounds* and *contusions* of the external and internal genital organs may be succeeded by such inflammations. The latter are, therefore, especially liable to occur after tedious deliveries, accomplished either with or without artificial interference, particularly if the lacerations have been so severe as to be speedily followed by gangrene of entire parts. Although this fact will hardly be called in question, I will, nevertheless, in order to afford convincing evidence of its correctness, communicate a case in which every other cause could with certainty be excluded. (*Vide* Case No. 29, 2.)

(B) *The decomposition* of retained portions of the membranes and placenta within the uterus may also unquestionably evoke all the forms of septic puerperal affections that have been mentioned. The greatest number of proofs of this have been adduced by Hegar (*Pathologie und Therapie der Placentarretention*, Berlin, 1862, pp. 103–115). He states explicitly on page 111: "The local reaction of the sloughing process exhibits itself in the inflammatory processes of the uterus and its neighbouring organs. We find, therefore, the appearances of endometritis, colpitis, peritonitis, suppurative inflammation of the veins and lymphatics of the uterus and the adjacent venous trunks, phlegmasia alba dolens. Furthermore, inflammation, gangrene, the formation of abscesses in the lungs, enlargement and softening of the spleen, endocarditis, meningitis, diseases of the gastric mucous membrane, etc., occur." And to this statement every one, of even limited experience in this matter, whether in private or in hospital practice, must assent. Hegar, at the same time, called attention to the fact, that remnants of the placenta might be discharged in a sloughing condition without the supervention of important symptoms; but that when inflammation of the uterus was present, and when

there was an imperfect contraction of the organ, and congested and apoplectic fragments of the placenta were retained within it, a putrid decomposition of the latter was developed with the other effects above described. Two examples of the prejudicial influence exerted by retained portions of the membranes are adduced in Chapter IV. (II.) under Endometritis, on pp. 175 and 177.

(C) Primary inflammations of the vagina and uterus, or gonorrhœa of the genital organs, may become exacerbated in lying-in women to such an extent as to amount to an acute parenchymatous inflammation; and all the more readily, since a premature rupture of the membranes may be produced by these affections, and also by protracted labor; while a greater irritation of the internal and inflamed genital organs may be induced by the presence of the child especially in the case of primiparæ. Under the influence of catarrhal secretions, the existing lesions of the mucous membrane are transformed into ulcers, which, owing to the continued inflammation, and other sources of irritation (retention—dribbling of the urine: œdema of the vulva—the stagnation of the offensive lochia on the ulcerated spots), may assume an indolent discolored appearance, becoming subsequently the starting point of phlegmonous diseases. Under this category as well as under (B), the affection may be explained as a sequence of the so-called self-infection. It is by no means always necessary to assume an infection of the wounded parts, inasmuch as the phenomenon may be attributable to the exacerbation of the antecedent catarrhal inflammation so as to form a phlegmonous irritation, the result of chemical and mechanical irritation. Whether the action of cold or debility (cachexia) induces a peculiar predisposition, as is asserted by Virchow, in accounting for certain cases of phlegmon which have been developed where the skin was intact, is a question for future investigation.

(D) Finally, it is an established fact, that the most serious puerperal diseases may be caused, in private practice as well as in hospitals, by the infection of wounded portions of the genital organs with cadaveric matter, or with the secretions of sloughing, or phagedenic, wounds. In referring here to the often quoted papers by Hirsch and Veit (*l. c.*, p. 281), in which

a phlegmonous erysipelas (Hutchinson), gangrenous inflammation of the scrotum, gangrene of the thigh (Holmes), a phagedenic bubo, an incarcerated gangrenous hernia, and a decomposed human ovum (Veit) are stated to have been the causes of the first cases observed in these epidemics, I only wish to remind physicians, how few of them there are, who have not had occasion, at least once in their lives, to study the injurious action of such cadaveric and sloughing matter in their own bodies.[1] (*Vide* Roser, in Wunderlich's *Archiv. Jahrg.* vii. p. 252.)

In my own person a very marked lymphangitis of the whole right arm, with chills and high fever, has in repeated instances resulted from a small wound inflicted during the autopsy of a perfectly fresh cadaver. After an autopsy made in September, 1864, although at the time I could detect no trace whatever of any lesion of the epidermis, there were subsequently developed upon the left forearm, five separate, very painful and suppurating pustules, the traces of which I was able to exhibit to my colleagues during a discussion of the question, which took place later in the same year at Giessen. It is of course unreasonable to suppose that such deleterious influences should be produced by all corpses or in case of all wounds; and it is likewise certain that not every individual is equally susceptible to the action of this morbid material, that the action of the virus is not equally potent in the case of all those infected. Many persons enjoy an absolute immunity from all infection, although brought into repeated contact with the virus. It will not be difficult to appreciate that lying-in women are liable to such infections, if we but consider the almost invariable existence of numerous small lesions of the genital organs (*vide*

[1] I chanced myself to meet with a very sad case of septicemia terminating fatally, in the case of a physician, and need only refer to one of the mos dreadful of the many instances mentioned in literature, since it is of especial interest to us here. Dr. Pett of Clapton assisted, Dec. 28, 1822 (Froriep's *Notizen*, Bd. iv. No. 86, 1823) at the autopsy of a woman who had died of puerperal peritonitis. On the same evening he had pain in the middle finger of the right hand, where a wound was discovered. Although the wound was thoroughly cauterized, phlegmasia of the entire arm supervened on the following night, and death ensued four days after the infection, with unequivocal symptoms of septicemia.

introduction, p. 28), the extreme vascularity of the vulva, vagina, and cervix uteri, which is present during, and immediately after, parturition; and finally the peculiar condition of the circulation at this time.

If now we proceed to examine the four different causes adduced to explain the origin of the sporadic cases of the septic puerperal diseases, we shall readily perceive the truth of the statement that these cases are of universal occurrence, because these causes are everywhere prevalent. For where shall we find the process of parturition so easy that no wounds or contusions of the genital organs are inflicted, with an occasional fatal result? What physician, what individual, has not met with cases in which, after abortions or delivery at full term, portions of the placenta have been retained, giving rise to severe protracted fever? Finally, how could any country physician, engaged in midwifery practice, escape the treatment of gangrenous wounds, or even avoid the autopsies which he is at times called upon to make?

It may be urged, however, with regard to the prevalence of these cases, that the occurrence of the more severe puerperal diseases is extremely rare in private practice. This I am quite willing to admit, although it has been demonstrated by Hirsch that numerous epidemics have been known to take place in private dwellings. In explanation of this circumstance, the following important points have been dwelt upon in paragraphs A, B, C, D; that the trouble is attributable not alone to the sloughing of retained portions of placenta, etc., but also to the condition of the uterus and the general state of the woman in labor: that contusions alone do not always suffice to account for the results, the principal predisposing cause being gangrene of the various parts. Furthermore, the predisposition to diseases and to infection varies greatly in different lying-in women. It is to be considered, also, that, inasmuch as it is not customary in private practice to subject the woman to frequent examinations during labor, the danger of infection is thereby diminished, and finally the physician is not accustomed in private practice to go directly from autopsies or sloughing wounds to a case of confinement; at all events,

danger from this source is much less than is unfortunately the case with regard to hospital patients.

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RECORD OF CASES.

No. 29. A sporadic case of (so-called puerperal fever), metritis phlegmonodes, parametritis, peritonitis with rapidly fatal result, in private practice.

In the summer of 1859, I was the assistant of Prof. Schoeller in Berlin, during which time 125 deliveries came under my observation in the lying-in ward of the Charité. Only one of the women, who was brought moribund into the institution, died soon after a delivery, which was completed by means of cephalotripsy; that was in April, 1869. All those delivered later remained healthy; not one of them was affected with true diphtheritic ulcers. I had at that time nothing to do with autopsies, but was occupied for most of the day in the obstetric department.

On August 11, 1859, during the autumn vacation, I returned to my native town of Gummersbach, where I arrived on Aug. 12th at mid-day. A few hours later the opportunity of applying the forceps presented itself to me in the private practice of my father.

1. Mrs. Hoffmann in the Rospe, pregnant for the seventh time, had a pelvis contracted from rachitis, and had been already delivered many times by the forceps. The child was easily extracted alive, and the mother passed through a perfectly normal childbed.

Three days later, at mid-day of Aug. 15th, I was called to another woman in labor.

2. Mrs. Wille, dwelling in Gummersbach itself, a brunette of medium size, had, when a child, suffered from rachitis, and had already given birth to 3 children, always with difficulty, the last time twins were born, when version had been necessary. On Aug. 15, 1859, at 6 A. M., the 4th labor began. In the afternoon, I found the woman very restless and excitable, screaming during the pains, tossing about; the child was in the 2d occipital presentation; head lying transversely, high, but firmly held in the entrance to the pelvis. The os uteri was not quite so large as a silver dollar; the waters had already escaped. Fetal heart sounds strong and plainly audible on the right side of the abdomen. Abdomen greatly distended. According to the husband's account, the woman had been in good health during the pregnancy, and had invariably shown a ravenous appetite.

As the pains, although they had become very powerful, did not effect any descent of the head, and as the os was fully dilated by 8 P. M., we were driven to the conclusion that there was a narrow pelvis, although the promontory could not be

reached, owing to the position of the head. At 10 P. M. the forceps were applied to the firmly impacted head, because of the woman's exhaustion, and an asphyxiated male child, weighing about $10\frac{3}{8}$ lbs., extracted after many very powerful tractions; he was soon revived. He exhibited a considerable depression in the right frontal bone, produced by the promontory of the sacrum. The placenta came away easily soon after; the uterus remained well contracted; the escape of blood was small. At 11 P. M., immediately after delivery, the woman felt perfectly well. She was not chloroformized.

Aug. 16th, 12 M. Great pain in the left inguinal region. Pulse 88. Abdomen soft. Cataplasma emollientia. Catheterization for retention. Very great pain in the evening; ten leeches and one injection. Diagnosis, diffuse peritonitis.

Aug. 17th, A. M. Tympanites, eructation, vomiting, great distress. Pulse 94. Venesection ℥viij (1859); morph. gr. $\frac{1}{12}$, calomel gr. ij, every two hours. Linimentum volatile with tinct. opii to be rubbed upon the abdomen. M. Pulse 108. 5 P. M. Pulse 150 (!). Lochia more profuse, great sweating, lacteal secretion quite abundant, child nursing. Abdominal pain moderate; tympanites; mind clear. 9 P. M. Euphoria. 11 P. M. Sudden increase of the dyspnœa, great restlessness. Death 48 hours after delivery.

Autopsy, on Aug. 19th, 10 A. M. A moderate quantity of bloody serum in the cavity of the abdomen; the parietal and visceral layers of the peritoneum were greatly injected; quite an amount of fibrino-purulent deposit on several organs, most marked about the right half of the entrance to the pelvis. The uterus was as large as a man's fist, covered with the same membranes, but otherwise healthy, except for a subperitoneal gelatinous œdema on its sides. The muscular tissue was firm and pale; placental site on the anterior wall. The inner surface revealed no traces of diphtheritic ulcers. Os uteri intact, as was the vagina, the mucous membrane of which showed several ecchymoses. Conjugate at entrance of pelvis $2\frac{3}{4}$ inches. (The diameters of the boy's head were $3\frac{5}{8}''$ for the transverse, $4\frac{5}{8}''$ for the straight, and $5\frac{3}{4}''$ for the diagonal.)

I recall perfectly having seen the yellow gelatinous œdema on the lateral walls of the uterus at this autopsy; without attributing to it any significance, I took it for one of the appearances common to peritonitis, whereas I now, on the contrary, regard the latter as the consequence of the parametritis which had been unquestionably present.

My father, and the midwife likewise, examined the woman while she was in labor. No one of us had had anything to do, at about the time of the delivery, with foul wounds, autopsies, or other sick women in childbed.

Gummersbach has but 1200 inhabitants, and a very good site. My father was at that time the only physician, and had, to my certain knowledge, no very sick patients, for I visited all the patients with him. The dwelling of Mrs. W. consisted of two small, perfectly dry and quite light rooms.

In this case, therefore, there was absolutely no reason for supposing that there was any infection or contagion; much less could a miasmatic origin be suspected. It is, on the whole, most probable, from the early escape of the waters, the long irritation of the cervix, the extraordinary efforts made by the uterus to drive the large child into the contracted pelvis, that a metritis with parametritis was set up, and that this caused the peritonitis.

I had performed the autopsy myself; whether I washed my hands with chlorine water after it, I can no longer remember; at all events, I had cleansed them frequently and thoroughly, until all odor had left them. The theory of Semmelweis was then unknown to me.

3. On the evening of Aug. 22d, four days later, I was summoned to Mrs. Lademacher—a primipara—in Vollmerhausen near Gummersbach, and delivered her of a living child with the forceps, after waiting five hours. Mother and child remained perfectly well.

4. On Aug. 24th, 1859, at 7 A. M., Mrs. Lademacher of Kurzesiefen, in labor with her 4th child, sent for my immediate assistance; she had a pelvis contracted from rachitis (conjugate 3 in.); the child's face was presenting. The fetal heart-sounds were no longer audible at the time of my arrival; great tumefaction of the child's face—chin to the left; forceps; extraction easy; child dead. The woman had a vesico-vaginal fistula, which was afterwards cured by Prof. G. Simon. (Case No. 2, p. 81.)

5. On the same day I was called to Mrs. Winter in Obernhagen (7 miles from Gummersbach), and delivered her on Aug. 25th, 1859, by version and extraction, because of the oblique position of the child, prolapse of the cord, and a narrow pelvis; the child was asphyxiated and could not be revived. The patient recovered rapidly after the delivery, in spite of its long duration, and had no affection in childbed.

6 and 7. Mrs. K., of Calsbach, was delivered with the forceps on Sept. 15, and Mrs. Noeckel, of Rebbelroth, on Sept. 18; they also remained healthy.

Conclusions. Whereas 1, 3, 5, 6, and 7 were delivered at short intervals from each other, and passed through perfectly normal childbeds, No. 2 was attacked during delivery with one of the most rapid and acute forms of puerperal phlegmon and died. In Nos. 1 and 2, no infection could have been

communicated by me. In Nos. 3–7 that was possible, since I had made the autopsy of No. 2. That these, nevertheless, remained healthy is explicable from the fact that between the deliveries of Nos. 2 and 3, full 3½ days had elapsed, in which I had, of course, often changed my clothes, and, in addition to bathing in the river, had washed my hands very frequently.

This case is consequently a proof that in private practice and remote from lying-in establishments, without infection and without miasma, the most severe forms of the septic diseases may occur sporadically in childbed.

We are now prepared to consider the etiological relations of puerperal fever epidemics. The principal theories on this point now prevalent on the European continent, have been summed up in the well-known resolutions proposed by the committee of the Bohemian parliament. In this case, a committee was appointed to decide whether the contagious origin and dissemination of the epidemics of puerperal fever are facts well established, or whether their occurrence is to be regarded only as within the range of probability, or mere possibility. The conclusions arrived at diverged in four directions.

The first of these theories—advocated by Hecker and Schwarz—asserts "that puerperal fever, like hospital gangrene, arises from poisonous effluvia." This is the theory of puerperal miasma, which has been explained by Hecker in another place, as follows (*Klinik*, ii. p. 211): "The larger the number of persons delivered (in an institution), the more opportunity is afforded for the emanations from these persons to be developed into a substance, which Hecker believes to possess chemical properties. This substance, like many chemical bodies, may become extremely attenuated, and thus spread through the different rooms of the house, adhering also to the walls and furniture, and under some circumstances becoming so active, that the infection bursts forth like a flash, carrying off a number of lying-in women. This outbreak is succeeded by a period of relative quiet, in which perhaps the miasma itself is destroyed."

The second theory, originally urged so strongly by Semmelweis, found a representative in Lange. According to this view,

puerperal fever originates in a disease of the blood, caused by infection by means of decomposed animal matter; it is rarely engendered by self-infection (endogenous), but most frequently is implanted from without (exogenous). The contagiousness of puerperal fever "by the transmission of its specific products is to be denied; on the other hand, the possibility of its introduction by means of animal or cadaveric poison is to be admitted."

Rokitansky, Oppolzer, and Skoda declared that the contagious origin and dissemination of the malady was unquestionable. Finally, Virchow announced that the puerperal disease might arise independently of contagion, when there existed an individual predisposition to diffuse and malignant kinds of inflammation; but that it was only at a certain height of the epidemic, when the contagious element had acquired a certain intensity, that it became sufficiently active to impart its infectious properties. In the case of individuals not predisposed to the contagion, the poison may prove inactive.

It would not be appropriate at this place to enter into a comparison of the four above-mentioned theories. I will, therefore, content myself with a statement of the phenomena known to attend epidemics of puerperal fever. These phenomena are as follows:—

(1) They occur with much greater relative frequency in lying-in establishments (*vide* introduction, pp. 38, 39); outside these institutions they prevail less frequently; and most rarely in private houses. Of 216 epidemics of this kind observed by Hirsch, their locality is summed up as follows: in lying-in establishments alone, or in lying-in wards of hospitals, 129; in the lying-in wards, and also among the general population, 41; in cities and districts, but not in hospitals, 34; disseminated throughout separate small and large provinces, 12.

(2) The occurrence of these epidemics is not influenced by the *situation of the ground;* they prevail with equal frequency in elevated and in low places; in dry and in moist localities; on the sea-coast as well as in the interior. (*Vide* Hirsch, *l. c.*, p. 394.)

(3) The epidemics begin and rage most often in winter, and next in point of frequency in spring, autumn, and summer,

uninfluenced by any great change in the temperature, or in the humidity of the air, or by a particularly low temperature, in short, unaffected, so far as we can determine, by any peculiarity of the weather.

(4) It has often been observed that in large cities containing many lying-in establishments, a very good sanitary condition might exist in one institution, whereas an extensive epidemic might be raging in the others, this happening not only when these establishments were situated at a wide distance from each other, but even when they were located under the same roof, as will be seen by the reports for Vienna by Arneth and Semmelweis; and for London, Dublin, Paris, and St. Petersburg, by Hugenberger, Hirsch, and others. With respect to Berlin, my own experience affords corroborative evidence of the correctness of this statement. Since, in the winter of both the years 1862–3 and 1863–4, the sanitary condition in the lying-in establishment of the university was far more satisfactory than in the lying-in wards of the Charité. (*Vide* reports of Haselberg, and those of Böcker and Pohl, *Monatsschrift*, Bd. xxv. Suppl.–Heft p. 389 et seq.)

(5) It has been, furthermore, repeatedly shown by numerous writers—among whom may be named Clarke, Ingleby, Wegeler, Hugenberger—that at the very time of the prevalence of fearful epidemics in lying-in establishments, the sanitary condition of the general populace has been excellent.

(6) Many have also observed that a prolonged sojourn in a lying-in establishment previous to delivery, by no means predisposes women to unusually severe attacks. (*Vide* Braun, *l. c.*, p. 475; Hecker, i. 221, 222; Veit, *l. c.*, pp. 186, 187; Weger, *l. c.*, Königsberg.)

(7) It is equally certain that all circumstances tending to complicate or render the delivery more difficult, or necessitating artificial interference, increase also the predisposition to disease. For instance, abnormal pains, premature escape of the liquor amnii, hemorrhage, etc. (Busch, Hugenberger, *l. c.*, pp. 25–27; Braun, *l. c.*, pp. 460 and 463; Hecker, *l. c.*); whereas, on the other hand, the constitution of the woman has absolutely no influence upon the disease, the strong being as liable

to attack as the feeble. (Quadrat, *l. c.*, p. 342; Braun, *l. c.*, p. 463; Hugenberger, *l. c.*, p. 24; Veit, *l. c.*, p. 105.)

(8) Another fact worthy of mention is that women admitted to large lying-in establishments after delivery (after street deliveries), have been shown to exhibit relatively the most favorable condition as regards predisposition to disease, although at times they have lain in the midst of puerperal women already ill. For evidence on this point, we are especially indebted to Hugenberger, *l. c.*, p. 27, and to Späth (*Wiener Med. Jahrbücher*, 1863, Heft i. pp. 10–27).

(9) It has been likewise demonstrated that the crowding of lying-in institutions is by no means invariably dangerous to the health of the patients. In small establishments, however, the tendency to disease is on the whole increased by aggregation; as has been clearly shown by Veit, *l. c.*, pp. 200–205.

Hervieux demonstrated that the agency of crowded lying-in hospitals in giving rise to epidemics has been much overestimated. We learn from the Reports relating to the years 1839–48, that of 35,431 women, 3 per cent. only died, while during the years 1855–64, of 20,510 women, the mortality was 9.31 per cent.

(10) It has furthermore been shown that the epidemics of puerperal fever outside of lying-in establishments have occurred, in by far the greatest number of cases, in the practice of some one physician or midwife, and they have generally been confined, therefore, to small districts, even in the large cities. Proofs of this fact have been afforded by Gooch (1829), Simpson, Peddie, Hutchinson, Ingleby, Litzmann, Levergood, Clarke, Roberton (of a midwife), Campbell, Warrington, West, Holmes, Chiari, Storrs, Paley, Lee, Schulten (from a midwife), Hugenberger, Arneth, Punch, Armstrong, Wegscheider (from a midwife), Cederschjoeld, Blackmore, Elkington, Beatty (from two female medical students), Schneider (from a midwife), Speyer (ditto), A. Martin, Semmelweis, Veit, Stotberger, Empis, Kauffmann, and also by myself. The articles in which these authors have related their experience have all been referred to by Hirsch, and no further allusion to them need be made here. Starfeldt (Copenhagen), a vigorous advocate of the infectious theory in cases of childbed fever, expresses the

opinion that nurses form most frequently the media for the transmission of the contagion.

(11) It has been calculated by many, that primiparæ are far more apt to be attacked than multiparæ; Quadrat, for example, found that among 105 who were attacked with puerperal diseases, 69 had been delivered of their first child, 23 of the second, 9 of the third, 3 of the fourth, and 1 of the fifth; of these, 41 primiparæ and 23 multiparæ died. Veit (*l. c.*, p. 186) found that the proportion of the primiparæ to the multiparæ, among those affected, was as 17 to 10 (from the Vienna, Munich and Strasbourg Reports). G. Braun (*l. c.*, p. 31) found that the mortality of primiparæ as compared with that of multiparæ is in the proportion of 6.8 per cent. to 3.7 per cent. Hugenberger also has shown by numerous statistics, that quite young (15–18 years) primiparæ (28.57 per cent.), and also those above a certain age (27–45 years), are most frequently (25.26 per cent.) attacked.

No one of all these facts speaks in favor of the miasmatic origin of the process in question; Cases 1, 2, 3, and 4 (as has been clearly shown by Hirsch) offer a complete contradiction to the results of those observations made with reference to the occurrence and dissemination of that entire class of affections attributed to miasmatic influences (*l. c.*, p. 399). Moreover, none of these influences can be satisfactorily explained by the assumption of a miasma, apart from the fact that the word miasma is used to designate something "of an unknown magnitude in an etiological sense," whereas, in accordance with the theory of infection, on the other hand, all these appearances receive a ready elucidation, as will be seen when the subject is further discussed in the following pages.

(12) Another point is well established, namely: that the *inoculation of women in childbed or in labor with putrid matter, may give rise to sporadic as well as epidemic childbed fever.* Under this head may be first cited the fact that a woman in labor who is delivered of a *macerated fetus* is very often (29 per cent., Hugenberger) attacked with disease attributable to self-infection; this has been confirmed by Kiwisch, Braun, Hugenberger, and others. Weger (Königsberg) found that a woman delivered of a macerated fetus made, as a rule, a good

recovery. All the authors quoted by Hirsch, in paragraph 10, who have adduced evidence that epidemics in the private dwellings have been restricted to the practice of a single physician or midwife, furnish, likewise, proof that the affection was conveyed by the same individual from one lying-in woman to another. Very many of the observations of these writers, in the opinion of Hirsch, carry almost the weight of experimental observations. Veit has recently furnished new proofs of the correctness of this statement, at the same time giving us an idea as to what matters have been discharged in each case, from the sources of infection (*l. c.*, p. 174 *et seq.*). Not to overlook any of the questions bearing upon this subject, I will here relate the results of my own experience, acquired at Rostock, for it is very rarely that one is able to demonstrate so precisely the source of infection, and at the same time to perceive how great dimensions the disease may assume even in small institutions, when the contagion is transferred from one individual to another (compare p. 347 *et seq.*).

In view of these facts, and of my own experience, I have come to the conclusion that puerperal fever originates as an endemic in lying-in establishments, by means of a direct transfer of the infectious (purulent, putrid, or diphtheritic) matter from one puerperal woman to another; that the beginning of such endemics may be sometimes referred to a case of spontaneous origin, but frequently also to infection with some one of these morbid matters.

If we now inquire concerning the media of communication for these infectious matters, my own experience in lying-in establishments enables me to fully corroborate the observations of many other authors, in pronouncing these media to be the fingers of the examiners, the instruments that are employed for injections, and the implements and utensils (bedpans, sponges, sheets, pillows) used by nurses and patients. Inasmuch as the repeated and prolonged use of the utensils, as also the examinations and injections, generally dates from either just before, or during, or immediately after delivery, at which time infection may readily take place, it will be understood how most of the affections may be traced back to this time, and particularly to the time immediately preceding

delivery, all of which has been satisfactorily demonstrated by Braun, Späth, Hecker, and Veit. "The greatest danger lies in this, that an individual enters the institution only just before her delivery." (Veit, *l. c.*, p. 186.) This theory serves to explain Späth's assertion that "the *materies morbi* is contained within the institution, and in the lying-in ward itself," and also throws additional light upon paragraph No. 10, that the different cases of infection radiate chiefly from one person, and are confined to the practice of one physician. It, moreover, explains, without the need of comment, the facts contained under paragraphs 1 and 2, since it is manifest that more frequent examinations are made in lying-in establishments, which are chiefly used for instruction, than in private practice; and that in the former, it much more frequently happens that the instruments and other utensils which have been already infected, are brought in contact with women in labor. For these reasons, I regard the contagion as a fixed rather than a volatile body.

Hervieux has likewise arrived at the same conclusion, and cites as proof the fact that the days succeeding holidays, and the days when the attendants are absent from the establishment, are the most favorable for those confined, but that the excessive zeal of the internes is most prejudicial to the welfare of the patients.

On the other hand, I deem the communication of the disease through the medium of the air of a lying-in establishment, extremely rare, to say the least, and agree with Veit in considering this by no means the most frequent mode of contagion. As for the cases in which there exists the slightest probability of the contagion being transferred through the air, I am inclined to the opinion that the infection is to be attributed to the direct action of an atmosphere, impregnated with infectious elements, upon some portion of the mucous lining of the genital organs; and that it is not due to an absorption of the virus on the part of the lungs, and its subsequent deposit in the uterus. Air rendered very impure by the presence of generators of putrefaction (vibriones) may deposit these structures upon existing wounds of the genital organs. By the action of these bodies, the putrid poison may be engendered, and its

absorption into the system give rise to a septicemia. Such infections, however, generally acquire significance, in case of those persons only who have had a previous illness, and who manifest a special tendency to absorb these organisms of putrefaction, or whose system offers a particularly fertile field for the spread of incipient decomposition. When we reflect how very common it is for the air, in anatomical and pathological institutions, to become contaminated, and how many physicians and students subject themselves for days and nights to both physical and mental exertions in these apartments, and yet how insignificant are the symptoms which usually follow this exposure (pallor, debility, loss of appetite, a sense of oppression in the precordial region, tendency to sweating, chills from time to time, *Stromeyer*), whereas even the most minute portion of putrid poison introduced into a fresh wound may, and often does, produce the most severe constitutional manifestations (cadaveric infection); a pretty sure proof is thereby afforded that the respiratory and digestive organs are not much disposed to absorb a putrid poison. To this may be added the circumstance that the putrid poisons, as yet known, are decidedly non-volatile, and also are not commonly suspended in the air. Several of the above-adduced facts, particularly those contained in paragraphs 6, 8, and 9, are very clearly at variance with the idea that the air in lying-in establishments is very deleterious; otherwise those who continue for a long time the inmates would of necessity be most likely to contract the disease, while the list of those affected would be decidedly increased, especially in large institutions, at periods when the wards were overcrowded; as a rule, however, the reverse is the case. Inasmuch, however, as those, who, for a long time, have been inmates of institutions, usually contrive to avoid a long sojourn in the midwifery ward—and who has not had frequent occasion to observe the systematic concealment of the early stage of labor?—and from the circumstance, moreover, that this class of patients are subjected to but few examinations, and may altogether escape that source of danger, they are on this account likely to avoid these diseases (No. 6). In like manner those who enter the wards after delivery has been accomplished (No. 8), and those

with whom parturition is a rapid process, or who chance not to be under observation at the time of confinement (No. 9), are less liable to contract disease. However great importance may be attached to efficient ventilation, the occurrence of puerperal affections in large lying-in establishments can never be thereby prevented, nor can any effectual bar to the spread of this class of diseases be, by this means, interposed. (*Vide* G. Braun, *l. c.*, p. 34.)

The favorable results claimed to have been derived from the method of ventilation recently employed in Vienna are most assuredly not to be ascribed to this cause alone, for this apparatus was first introduced in 1864; whereas it is proved by Späth's report (*Med. Centralblatt*, 1864, p. 639) that a ratio of mortality of only 1.06 per cent. occurred in both of the Vienna lying-in clinics even in the year 1863; it is expressly stated that this favorable rate was secured by providing pure air in accordance with the usual method employed, viz.: by isolating, as far as possible, the sick from the well, and by the most careful attention to matters of cleanliness. In Hannover also, notwithstanding a most admirable system of ventilation, an epidemic has been known to occur, as was mentioned by Veit (*l. c.*, p. 192); I also have heard the same account upon the very spot. These two circumstances demonstrate satisfactorily that ventilation does not afford the only, nor the most important, means for warding off the disease. This view was brought forward and advocated by me at Giessen, in 1864, in opposition to Stamm, who maintained that ventilation should be considered as the most important prophylactic agent. One only of the above cited facts might perhaps appear to speak in favor of a more frequent transmission of the affection through the medium of the air—namely, No. 3, that epidemics begin and prevail most frequently in winter. To be sure, very weighty counter-evidence is contained in Nos. 4, 6, and 9; still it might be said, that, just as there is but slight chance that all puerperal women will fall ill, after being exposed to actual contact with infectious matters, so likewise, women admitted to the wards after delivery, may accidentally escape infection; yet all this does not disprove the fact that the greater crowding of the wards in winter and the imperfect

ventilation may induce a contamination of the air, with the effect of adding to the number of those affected. Still, this assumption can only be regarded as an hypothesis, whereas, according to the theory of infection, this phenomenon can be much more satisfactorily explained by the following facts: First, *the possibility and probability of a communication of the infectious matter is greater in winter than at any other season of the year*, inasmuch as a more frequent opportunity is commonly afforded to assist at autopsies; the greatest number of births generally takes place at this time, so that the intervals of time between the several deliveries are shorter; and more women in labor are examined in rapid succession, especially in small institutions. Furthermore, the zeal of the assistants and students is apt to be greater than at the end of the term, or during the spring and summer, when external nature tends to lure them from in-door duties. Finally, it is notorious that in mid-winter, especially when the water is cold, proper and repeated cleansing of the hands is neglected by the female, as well as the male, students of midwifery, much more than is the case in summer.

Again, in winter, idiopathic cases appear more frequently; just as erysipelas, phlegmon, bronchial or tracheal catarrh, rheumatism, etc., are then more common, so likewise are affections of the genital organs, such as endometritis, perimetritis and peritonitis, which may form the starting points of epidemics. Spiegelberg observed that women entering the hospital to be confined in extremely cold weather were especially liable to contract illness.

Finally, it is positively proved that more abortions, abnormal labor-pains, and, therefore, retarded deliveries, are met with, upon the average, in winter; all authors admit the pernicious influence of the last-mentioned phenomena.

From what has been said above, we are justified in assuming, with reference to the point of entrance of the infecting matter within the organism, that its absorption may take place at any part of the genital organs, either at some external point—and this occurs chiefly in case of a ruptured perineum (*vide* Hugenberger, *l. c.*, p. 24, Hecker, *Klinik*, ii. p. 213), or of other fissures of the mucous membrane lining of

the vaginal orifice—or it may take place through the vagina, the lips of the os uteri, or the cervical canal. Pregnant women may thus be infected long before the dilatation of the internal os. For this reason, the neck of the uterus is often the chief seat of the disease, as was shown by Meckel (see above); in corroboration of this point numerous cases (reported by Fischer, Leyden, and Erichsen) might be adduced from literature. A very simple explanation is thus afforded (No. 11) of the fact that primiparæ become infected much more frequently than multiparæ, inasmuch as the former are more liable to lesions of the genital organs, especially of the external pudenda. Furthermore, owing to the longer duration of the process of parturition, they are more exposed than multiparæ to the danger of infection. (Späth, Stamm,[1] and others.)

A similar explanation may be given of the unfavorable prognosis in cases of protracted labor and of hemorrhage (No. 7) from the fact that these conditions subject the woman to more frequent and protracted examinations, and particularly, because, under these circumstances, lesions are more liable to occur, and the denuded spots are brought into more prolonged contact with the hand of the accoucheur.

On all parts of the genital organs alluded to, abrasions may be developed during the later period of pregnancy, and they are extremely common on the external os, as was demonstrated by Lieven. As a rule, however, the more extensive lesions and excoriations are commonly formed during labor. For this reason, the time of confinement will always be the period during which infection is to be dreaded, and to which the

[1] It was remarked by Stamm, in Giessen: "Always provide a supply of fresh, pure air, and the disease will disappear, never to return" (*vide* official report of the Thirty-ninth Convention of Naturalists, by Wernher and Leuckart); whereas in his paper in the *Wiener Medicinal-Halle* (1864), Nos. 15–46, he attached importance first of all to the cleansing of the utensils employed; next, to the isolating of pregnant women carrying a dead and decomposing fetus; then to the arrangement of the lying-in establishments; and, finally (6), to the purification of the air, as affording the chief means of annihilating epidemics of puerperal fever. These contradictory statements as to the value of the different prophylactic measures, and their relation to each other, formed a prominent feature of his paper at Giessen, and were, therefore, freely criticized by me at that time.

trouble may with considerable certainty be referred, provided the first symptoms of disease appear within 12 to 48 hours after its completion.

Now, there are many authors who admit the possibility of the communication of the contagion by means of the clothes of the physicians or midwives, whether they believe in the idea of a mediate contagion (by the air) or of an immediate (by contact with the wounded surfaces). While we have strong proof that the contagion may be transmitted, even though rarely, by the latter process, the evidence thus far offered of the possibility of its occurrence by the former method, is very unsatisfactory.

If it were really to be admitted that the over-crowding of lying-in institutions tends to contaminate the air to such an extent as to give rise, *de novo*, to infection, yet it would hardly be conceded that the air of an entire apartment could be so infected by a single article (the infected coat of a physician, etc.) as to implant the disease in women in labor. Even if we were to admit the possibility of this mode of origin of measles, small-pox and cholera, as demonstrated, yet the phenomenon has never been observed in the case of erysipelatous and phlegmonous diseases, which in view of the frequence of these epidemics would surely have been early and repeatedly noticed.

In all cases where the accoucheur has touched a woman in labor with his fingers, or instruments, as well as with his clothing, and has subjected her to repeated examinations, we must, of necessity, rather impute the transmission of the infection to the hands or instruments; first, because the clothing is brought in contact with the denuded surfaces in the rarest instances only—and even then remains in contact with such a wound for a brief space of time—and finally, because the clothing is rarely so thoroughly impregnated with infectious matters as is often observed in case of the hands. If the objection be urged, that the disease may supervene, notwithstanding that the hands have been carefully cleansed and disinfected with chlorine water, or a solution of permanganate of potash, or diluted muriatic acid, the reply to this allegation is: that such washings, even if several times repeated, are far from being always thorough: that after numerous cleansings of

this description, the hands may still retain an odor, from which it may be concluded that some morbid matter is still adherent to the fingers. It should not on this account, however, be inferred that it is any the less important to wash the hands; this precaution should be uniformly taken, although we can pronounce the result of the same to be absolutely effective, only when it has been many times repeated, and all odor has disappeared. For this reason, it is of the greatest importance that accoucheurs of extensive practice, however careful in these ablutions, should never make autopsies, or, at least, should not attend a case of confinement for a number of days subsequent to such an examination, taking care even then to avail themselves scrupulously of the most effective means of disinfection.

If, finally, we should uudertake to point out the actual *materies morbi*, the real infecting agent, from the present standpoint of science, we should designate pus as the principal poisoning agent, including the putrid and diphtheritic varieties.

The nature of the putrid form of this poison has already been discussed in Chapter VI. According to the experiments of Pasteur and others, it is produced by the action of anæroboid vibriones during the decomposition of albuminous fluids, after their oxygen has been consumed by æroboid vibriones. There are commonly found in the genital organs of lying-in women, as was mentioned in the introduction, not only fluids but numerous particles of sloughing tissue, which may very readily undergo decomposition. Carl Mayrhofer was the first to examine thoroughly the vibriones which are supposed to give rise to the disease by exciting a putrid fermentation. He describes these organisms as cylindrical bodies, rounded at the extremity, with more or less deep constrictions 0.0008–0.002 millimetre broad, and exhibiting rapid oscillatory motions. They are said to multiply rapidly in alkaline fluids, but are destroyed when subjected to the action of acids. So long, therefore, as the mucus contained within the vagina has an acid reaction, the vibriones (or their germs), which find their way into the vagina, do not multiply, but are destroyed. Again, he distinguishes from these vibriones,

the rod-shaped organisms, which are often found in the acid mucus from the vagina, and which, according to his experience, have a different mode of development from the others. In his experiments with rabbits, into whose uteri he had previously introduced infusions of fermenting solutions and decomposing substances, he remarked at a later date (*l. c.*, p. 129) that occasionally, but by no means invariably, acute septic general affections were produced, which without doubt differed essentially from septic puerperal processes. He therefore concludes that these organisms play only a subordinate part in the production of disease. The result of these experiments is certainly remarkable, in that Mayrhofer himself expresses the conviction that "it is the finger of the accoucheur which generally conveys the vibriones from the orifice of the vagina into the uterus, or into various parts of the vagina, where the reaction of the secretion is more alkaline; for the vaginal walls at the introitus are generally in such close apposition that the air, upon entering the cavity, deposits all corpuscles held in suspension, upon the moist walls at this point, penetrating the superior portions of the vagina and the uterus, only after having been filtered. Although Haussmann afterwards found a great number of moving vibriones in the acid vaginal mucus in 20 per cent. of all the pregnant women examined by him, it is hardly necessary to point out, that this circumstance affords no very strong argument against the theory of Mayrhofer. We must at all events admit that there are different varieties of vibriones, some of which may exercise little or no influence, whereas others produce very deleterious effects. Coze and Feltz (*Gaz. Méd. de Strasbourg*, 1869, Nos. 1–4) observed the presence of numerous bacteria in the blood of puerperal fever patients; they inclined to the belief that in this case, as also in the other infectious processes, a kind of fermentation was induced in the blood by the action of these bacteria, to which the origin of this entire class of diseases could be referred. Furthermore, the putrid poison is in all probability not restricted to a single variety, but various poisons appear to develop successively, according to the stage of the decomposition. Two of these varieties are quite well known to us, namely, the crystalline salt described by Bergmann, which he

has named *sepsia*, and another alkaloid, discovered by Zülzer and Sonnenschein, in the form of needle-shaped crystals (microscopic), closely allied to atropine and hyoscyamine, the action of which upon animals is characterized by a dilatation of the pupils, an arrest of the peristaltic action of the intestines, and acceleration of the heart's action. It is to be hoped that the future progress of the science of chemistry will enable us to classify accurately and describe the various kinds of putrid poison.

Meanwhile, the results of the experiments of Davaine are especially interesting in this connection, from which it appears that the blood of certain animals (rabbits, guinea-pigs) when infected with the putrid blood of cattle, is absolutely more deleterious than the simple putrid blood. It was, furthermore, found that by the successive transfer of this blood to subsequent generations, it acquired an increased activity, until at last an incredibly small quantity was sufficient to produce death; this was shown to be the case down to the 24th and 25th generations, even when only a billionth or trillionth part of a drop was employed.

With the diphtheritic poison we have hitherto been far less familiar. We simply know, from the experiments of Klebs, Recklinghausen, Hueter and Waldeyer, which have recently been published, that the diphtheritic forms of inflammation are probably induced by the spherical bacteria.

For a more extended discussion of the subject of uterine diphtheria, I will refer the reader to p. 224, only remarking here that its transmission to lying-in women occurs but rarely, if at all, through the medium of the air alone; for the air, in the first place, does not always penetrate within the genital organs during the process of parturition; and secondly, experience has taught us that even in houses containing patients suffering from extensive diphtheria of the throat, analogous affections are produced in other individuals only when the latter have been for a long time inmates of such houses; the lesions then appear, as a rule, upon the soft palate, the tonsils, and the back part of the throat; that is, upon those parts which are invariably exposed to, and serve, as it were, as a filter for, the air loaded with poisonous germs. If then the contagion is

only transferred by such a prolonged, constant, and active exposure, should we not naturally infer from experience that quite as long and complete contact with the poison would be necessary, in order to insure the development of diphtheria upon the genital organs? Can any more probable source of infection be suggested than the frequent examination and dilatation of the genital organs, and the introduction of hands and instruments, which are most liable to occur in difficult labor, or in the case of a woman suffering from some antecedent illness?

E. Martin (Berlin) has recently come to regard the diphtheritic lesions upon the genital organs of puerperal women as the essential factor in puerperal fever. He believes that individuals suffering from acute gonorrhea are frequently attacked with puerperal fever. It was observed by Freund, that in 19 puerperal women dying of intestinal diphtheritis, in two instances the entire large intestine was affected, whereas, in the others, only the two extremities of the intestine were affected, and in a few instances diphtheria was found in the bladder, and more rarely upon the fauces. A microscopic examination showed that at these points, where to all appearance a purulent inflammation was going on, it was often impossible to detect any traces of pus corpuscles; but instead of these there were found amorphous, granular fatty collections, which manifested no reaction to chemical agents, and which gave rise to diphtheritis of the skin. He, therefore, believes in the possibility of this process being communicated by means of a contiguity of tissue, and it is evident that he has here had under observation objects which must be considered as bacteria.

The fact that the object, or person, serving as the medium of transfer for the contagious matter can rarely be discovered, should surely not be regarded as offering any serious objection to the above doctrine.

It is in rare cases only, and with extreme difficulty, that specific causes of infection can be detected in private houses. In lying-in establishments any attempt to inquire into, or elucidate, the sources of infection meets with still greater obstacles, because in such institutions it is necessary to examine a number of persons and objects that have been brought in

contact with the patients, and because, in many cases, it is no longer possible to determine to what exposure those individuals or objects have previously been subjected. Moreover, we are compelled to admit that many individuals, in order to escape reproach, fail to make an open, truthful confession. Veit remarks very appropriately, "the discovery is the less likely to prove successful, the more general the belief in the existence of a miasma, for this very belief seems to quiet the conscience." These obstacles enhance the significance of those cases, in which this mode of origin has been demonstrated with a probability approximating to a certainty. The greater the danger of overlooking the medium of infection, the more urgent is the duty of the directors of clinical institutions to guard rigorously women who are pregnant, in labor, or in childbed, from contact with suspected objects or persons, even if there exists but a probability that these objects or persons may form the media of contagion. However great the desire to stimulate and encourage the zeal of assistants and students for making observations and acquiring information, yet privileges should only be accorded to such an extent as is not prejudicial to the welfare of the inmates of the institution; if any one has the misfortune, after having exercised the most rigorous precautions, to infect others, he can hardly be made the subject of reproach, provided he freely acknowledges what has happened, and at once abstains from further examinations. A very great responsibility will be attached to all who do not adopt this course, but who, under-estimating, in their short-sighted incredulity, the significance of the above facts, continue to expose their fellow-creatures to great danger!

Still another important question relates to the length of time that one may carry these infectious matters about with him. For instance, it has been alleged that it is impossible to conceive of any one infecting a woman in labor, in consequence of having performed an autopsy, or handled foul wounds, two or three weeks previously. According to Schweninger, the putrid fluid loses its action after 7½ months. From the researches of Zülzer and Sonnenschein, it appears that after decomposition has advanced beyond a certain stage, no more poisonous pro-

ducts are developed. I do not know whether any experiments have been made with the view of determining the length of time, during which pus from phlegmonous wounds and diphtheritic ulcers, may retain its activity, yet it is by no means improbable, *a priori*, that by adhering to instruments and drying thereon, it may preserve the power of inoculation for as long a period as vaccine lymph; that is to say, for over a year. For further information upon this point, we must await the results of future investigations. Meanwhile, whenever an infection has been communicated by this means, it should be borne in mind, that the person first infected may serve as a new focus of infection for others; thus when a physician has, as we will suppose, successively infected five or six persons, the poison may perhaps have been directly communicated in cases 1 and 2, but only conveyed to the others after he had been recontaminated by these two.

Finally, in view of the foregoing facts, the question is naturally suggested, as to whether the so-called puerperal fever is a contagious disease. Semmelweis and Hirsch (*l. c.*, p. 432) answer in the negative, affirming that the term, contagious disease, is restricted to those affections in which any organism, charged with a specific virus, reproduces the same virus, so that when this morbific agent is eliminated and transmitted to another organism, it gives rise to the same specific disease; examples of this are afforded by the contagion of syphilis, smallpox, and scarlet fever. In childbed fever, as maintained by these authors, we have to do, not with a specific virus originating from one uniform source, but rather with a noxious element universally encountered wherever putrid decomposition occurs.

Virchow, on the other hand, says explicitly, that phlegmonous processes may not only acquire the property of infecting the same organism, but may also "by the development of a contagion," transmit disease to other individuals. It has indeed been shown by experience, that after an infection has taken place, there are usually developed in the patient, ulcers, or phlegmonous processes and exudations, the secretions of which (the putrid as well as the diphtheritic), when transmitted to other individuals, are capable of producing similar or

analogous processes. It should not be inferred, however, from the preceding, that the same disease may not at some other time originate in some other way. Those septic puerperal affections then, are also *contagious*, in so far as they engender a specific miasma, although the disease thus induced by the contagion is, as a rule, not perfectly identical with the primary malady.

At the close of this chapter, I must be allowed to enter a protest against the charge of having given a one-sided account of the views of Semmelweis. Those only who have read the foregoing chapters superficially and without close examination, will be likely to give expression to any such imputation, under which circumstances, any further defence upon my part would merely involve a fruitless expenditure of time and trouble.

A few words on the epidemic propagation of puerperal fever in lying-in establishments and its dissemination from these centres.

(A discourse delivered before the Rostock Medical Society, in May, 1864.)

On April 17, 1864, I accepted the superintendence of the Rostock Lying-in Establishment, and found the following persons on my first visit: Nos. 1 and 2 lying-in women (Preier and Boehlicke), both doing well; No. 3, Minna Thomsen, who had been delivered on Feb. 27, had had a pelvic exudation after delivery, which had been evacuated by a puncture above the left Poupart's ligament, and on April 17, was still suppurating profusely, the secretions were offensive, and the woman's temperature still 104° F. in the evening.

No. 30. (No. 4.) Anna Schroeder, 22 years old, had been delivered at 9.30 A.M. on April 15, and, when I first saw her on the morning of the 17th, had diphtheritic ulcers at the vaginal entrance, an extremely offensive discharge, enormous distension of the abdomen, a peritoneal exudation, great dyspnœa, pulse 124, resp. 68, temp. 102.2° F. Diarrhœa had just set in; patient had her senses and complained of acute abdominal pains. I saw the student K., who was on duty, introducing several fingers into the vagina thus affected with diphtheria, in order, as he said, to pass an injection-tube through the internal os, and thus make the injections into the uterus; I forbade this, and ordered the injections to be made only into the vagina, while the tube was cautiously pushed over the posterior commissure, without the hands coming in contact with the external genitals.

		Temp.	Pulse.	Resp.
April 17.	P. M.	103.3°	146	40
" 18.	A. M.	104	124	40
	P. M.	103.6	146	42

Peritoneal exudation had increased; four thin, profuse dejections; great pain.

April 19.	A. M.	104.1	144	41	Eructation. Some vomiting. Involuntary defecation.
	P. M.	104	144	40	
" 20.	A. M.	104.7	156	66	Beginning sopor; great dyspnœa. Patient from time to time freer, and then again very much distressed.
	P. M.	105.2	160	49	
" 21.	A. M.	105.6	160	52	
	P. M.	106.2	168	40	Death at 11.30 P. M. on 7th day.

The autopsy, performed by Prof. Ackermann 33 hours after death, gave the following results. In the peritoneal cavity, especially below and to the left side, there was about ℥ 25 of a brick-brown, rather consistent, turbid fluid containing a number of grayish-white flakes. *Liver* large, soft, its serous covering greatly injected and its parenchyma throughout anemic. *Spleen* 11 ctms. broad, 21 long, its parenchyma soft and mushy, its investiture injected. *Kidneys* hyperemic, but capsule easily detached. Left *ovary* very soft; the parenchyma, which has almost vanished, contained several cysts as large as peas. Right *ovary* quite as large as a pigeon's egg, covered with many fibrino-purulent pseudo-membranes, capsule much thickened; in the stroma an abscess the size of a pea. *Uterus* 15 ctms. long, 17.5 broad, 29 in circumference. Its peritoneal covering was greatly injected on both sides of the uterus, and its parenchyma pale and flabby. There was some œdema of the sub-peritoneal connective tissue on both sides of the organ. Lymphatics and veins perfectly normal. No abscesses in any part of the parenchyma. There was a small flat fissure, free from false membrane, on the right commissure of the lips of the os; os uteri and cervix free from ulcers. Inner surface of uterus just beneath the insertion of the placenta was very hyperemic. On the left side of the anterior wall there was a large ulcer, almost an inch square, with a grayish-yellow firmly adherent membrane, partly superficial and partly penetrating into the substance; in addition several small and flat clots; more to the right again large surfaces with the same membranes. Upper portion of the vagina healthy; two lateral incisions in the posterior commissure; these and the inner surface of the nymphæ have a discolored ulcerated look. Intestines greatly distended, their serous covering much injected; mucous membrane of the small intestine red in spots, solitary glands swollen; intestine otherwise normal. Mucous membrane of the bladder was greatly injected on the posterior wall about

the collum, as was also the urethra. The tissues adjoining the bladder and vagina are normal.

Thoracic Cavity.—There were about ℥vj of bloody fluid in each pleural cavity; the pleural investiture of the lower lobe of the left lung had many small ecchymoses; the lower part of the lung was atelectatic; in both upper lobes there was œdema. *Heart* was large, soft, and flabby. In the pericardium were ℥ij of fluid; substance of the muscles was brown. One large fibrinous clot in each ventricle.

The autopsy took place on the morning of April 23d. In the interim, Mrs. Schroeder's child, which had been weaned from the mother's breast on April 17th, had died on the 18th, and was examined also by Prof. Ackermann on April 20, 1864; it exhibited the most marked appearances of a puerperal affection.

In the left *pleural cavity* was about ℥j of a light-red fluid, with some grayish-white flakes; the right was empty; in the pericardium were ℥j–ij of a fluid of similar consistence. Under the visceral pericardium above the left ventricle were a few ecchymoses of equally large size. Both ventricles contained large coagula. The free border of the tricuspid valve was thickened. The left lung was covered with quite extensive thin and slightly adherent fibrinous membranes; the lower parts of the lung were almost entirely devoid of air. Bronchial mucous membrane is reddened in flakes and stripes. Beneath the pleural covering of the right lung, especially in the notches along the posterior border of the lower lobe, and much less extensively on the posterior border of the upper lobe, were yellowish-white markings, which were due to a thickening of the connective tissue, a part which embraced, like a network, a number of adjacent lobuli, and another part had run together to form spots, the greatest diameter of which amounted to 3 lines.

Abdominal Cavity.—The umbilical vein showed in its free portion a slightly œdematous, gelatinous infiltration of the circumjacent tissues; in the peritoneum was a small amount of serous fluid. The umbilical veins were otherwise empty and normal, except that in the right branch there was a gray colored clot ¼ ctm. long. Liver had a group of ecchymoses beneath its peritoneal covering; it was hyperemic throughout. *Spleen* was hyperemic, and of normal size. *Kidneys* hyperemic, right covered with many very distinct ecchymoses as large as millet-seeds. *Bladder:* just above the opening of the ureters, on both sides, there was an ecchymosis, the size of a millet-seed; the right ureter was very hyperemic at its orifice, and contained, as did the left one, a small clot of blood. *Stomach* and *small intestine* normal.

After this autopsy (April 20th), the same student sewed up the body, and had a small pustule soon after on the end of the middle finger of his left hand, which healed under repeated cauterizations in a few days.

No. 31. Mrs. Rose (No. 5), 23 years old, had been previously delivered, on the night of the 16th–17th of April, by the same student, of her second child, when Schroeder (No. 4) had already a great exudation and diphtheritic ulcers.

The first period of the delivery lasted rather longer than usual; a male child, weighing 9⅓ lbs., was expelled half an hour after rupture of the membranes. A quarter of an hour later (April 17th, 5 A. M.), the placenta was removed from the vagina by the same student with his fingers, he having frequently examined her during the delivery on the night of the 16th–17th April. The woman soon after had a short chill, and at 8 A. M. the abdomen was already distended, tense, and painful. At my first visit on April 17th, the temp. was 104° F. P. 106. R. 52! P. M. Temp. 103.6° F. P. 106. R. 36. The fissures in the mucous membrane at the posterior commissure were discolored. April 18th, A. M. Temp. 104.9°. P. 106. R. 36. Great distension of the abdomen, very acute pain, diphtheritic ulcers at the posterior commissure; mind affected; diarrhœa—in fact the most perfectly characteristic picture of diphtheritic colpitis, endometritis, and incipient peritonitis. The patient was cured by a local treatment of the ulcers with liquor ferri sesquichloridi, by injections into the vagina, and the administration of digitalis and muriatic acid internally (leeches were applied on the first day). The following temperatures will briefly demonstrate how long she was sick: April 18th, P. M. 104° F., 19th, 104.9, 105.1; 20th, 104.4, 104.6; 21st, 103.8, 104.3; 22d, 102.9, 104.9; 23d, 104.2, 104.4; 24th (8th day), 100.4, 101.6; 25th, 99.4, 99.4; 26th, 106.3, 105.1; 27th, 101.6, 104.3; 28th, 100.6, 104.3; 29th, 98.8, 98.8; 30th, 97.8, 98, etc. etc. The patient with her child was discharged perfectly well on May 17th.

As can be seen from the above figures, she was still quite sick on April 21st–24th, and required frequent cauterizations of the puerperal ulcers.

No. 32. (No. 6.) On the morning of April 25th a woman, named Breuel, announced that she was in labor; on examination the head was found to be already low down in the vagina. The student K., who was on duty, examined her once; when I arrived at 6 o'clock in the morning, I found the head just emerging from the vulva (it was her 4th child); soon after the birth of the child, I easily pressed the placenta, with only a trifling hemorrhage, from the genitals without the latter having been touched by any one. The patient No. 5 had a

room to herself in the 3d story. Breuel was placed alone in a large chamber on the 2d story. There were no puerperal ulcers at all in the latter, nor did she have any chill, but the uterus was rather tender on pressure during the first two days. The maximum temperature, which was recorded, was 101.3° F. On May 4th (9th day) she left her bed, and, soon after, the institution.

No. 33. The woman Allwardt, with her 2d child, 28 years old, had pains on April 27th, and was frequently examined in the course of the day and evening by student K.; the 1st period lasted about 14 hours, the 2d only ¾ hour; the temperature during delivery (8 P. M.) was 99.2° F., as taken by myself. 1st occipital presentation. The child—a girl—weighed 7⅓ pounds. The student stated that he removed the placenta by traction upon the cord at 11.30 P. M.

Childbed. April 28. A. M., temp. 100.4°, pulse 80, resp. 20.
P. M., " 103.8°, " 116, " 32.

Condition quite good, slept well, severe frontal headache, abdomen distended and painful, pupils greatly dilated, mind affected.

April 29. A. M., temp. 103.3°, pulse 120, resp. 32.
P. M., " 104.3°, " 120, " 30.

Ten leeches on the abdomen, cold compresses, infusion of digitalis, etc.; a considerable peritoneal exudation then formed with repeated chills on May 1st and 4th, a diptheritic ulcer appeared on the posterior commissure, and extended to the urethra (retention of urine). This patient was, however, also saved; the temperatures here also demonstrate how long and severely she was affected.

April 30th, 102.9 and 103.3°. May 1st, 101.3 and 104.1°; 2d, 101.3 and 103.3°; 3d, 103.1 and 102.2°; 4th, 101.5 and 103.3°; 5th, 101.5 and 102.9°; 6th, 101.1 and 101.5°; 7th, 100.9 and 101.1°; 8th, 99.7 and 100.8°; 9th, 100.2 and 100.4°, etc., etc. She could not be discharged *well* until June 5, 1864. Besides the student on duty, only I and the midwife of the institution had examined this woman while in labor, and she was isolated in a chamber on the lowest story.

No. 34. (No. 8.) The woman Schmuhl, who was pregnant for the 2d time, had pains on April 28th. The delivery lasted 5 hours; student K. examined her quite often, but, after the birth of the child, did not introduce his finger again into the vagina; the placenta was expelled by pressure. The temperature at 7.30 P. M.—during the delivery—was 99.3°, and at 10 P. M.—immediately after delivery—99.1°. *Childbed.* April 29th, A. M., temp. 99.5°, pulse 64, resp. 20; 5 P. M. temp.

100.4°, pulse 60, resp. 18, condition tolerable; in the following night (therefore about 26 hours after delivery) she had a very severe chill, attended by great abdominal pain. April 30th, A. M., temp. 103.9°, pulse 104, resp. 31; P. M., temp. 104.3°, pulse 120, resp. 32—very acute pain, and very offensive discharge; in the afternoon severe headache, singing in the ears, muscæ volitantes. After ol. ricini, had 5 thorough dejections. Here there was no ulcer discoverable in the vagina, but a very intense endometritis; the threatening peritonitis was cut short by repeated local bleedings, and the patient recovered. In this instance too the markings of temperature will indicate the intensity and duration of the disease. May 1st, A. M. 103.8°, P. M. 104°; 2d, A. M. 102.2°, P. M. 104.2°; 3d, A. M. 102.9°, P. M. 104°; 4th, A. M. 101.1°, P. M. 104.7°; 5th, A. M. 103.3°, P. M. 102.4°; 6th, A. M. 98.4° (crisis), P. M. 101.5°; 7th, A. M. 101.3°, P. M. 104.7° (recurrence); 8th, A. M. 100.7° P. M. 101.1°; 9th, A. M. 100°, P. M. 99.3°, etc. On July 5th the patient was discharged well. It should be mentioned that her child, a hearty boy, weighing 11⅔ pounds, suffered from umbilical phlebitis after May 6th, and died on the 9th at the age of 11 days. Ths autopsy showed peritonitis with profuse exudation, empyema and pericarditis. Liver large, with many ecchymoses, and coated with fibrino-purulent membranes. The umbilical vein was the size of a little finger, the tissues surrounding it œdematous; there was a viscous purulent fluid within it, which was quite firmly adherent to the inner coat; the latter was opaque, thickened, and had here and there dry, dirty-gray colored deposits, etc. In the right umbilical artery there was a flaccid coagulum; the inner coat of this vessel was of a dirty-gray color.

No. 35. (No. 9.) At 9 A. M. on April 29th, after Schmuhl (No. 8) had been delivered, when Allwardt (No. 7) was lying very sick, Rose (No. 5) entering upon her convalescence, and both Nos. 5 and 7 still had diphtheritic ulcers, assistance was sought of the Policlinic for Mrs. S., 40 years of age, who dwelt in the city. The assistant physician of the establishment, Dr. Brummerstädt, without my knowledge, dispatched student K. to the woman, who was reported to have already been a long time in labor. Finding that the head of the child had descended, he remained 10–11 hours with the woman, often examined her, then thinking the forceps to be indicated by the insufficient character of the pains, attempted to apply them, but, as he asserts, had not succeeded when Dr. Brummerstädt arrived; the latter at once extracted the child alive by three tractions. The placenta was expelled by pressure upon the fundus uteri, whereupon a very considerable hemorrhage

took place, and, by the advice of Dr. B., the student K. introduced his left hand into the uterus and rubbed its inner surface; the flooding then ceased. The delivery was concluded at midday on April 29th. At 5 P. M. of the same day the condition of the patient was passable; soon after, however, she was attacked with pain in the abdomen; at 3 A. M., April 30, she had a severe chill (temperatures, April 30th, A. M., 102.7°, P. 120, R. 32; P. M., 105.7°, P. 140, R. 40; May 1, A. M., 105.7°, P. 156, R. 44; P. M., 104.9°, P. 140, R. 40; May 2, 104.9°, P. 140, R. 40; P. M., 105.7°, P. 144, R. 44; May 3, A. M., death). In the afternoon of April 30 the temperature had already reached 105.7° F., the abdomen was enormously distended, the pain was very intense, and another chill had come on. In the afternoon of May 1, I saw the patient for the first time, and found a pronounced metroperitonitis, enormous diphtheritic ulcers at the vaginal entrance, considerable exudation, collapse already beginning; she died on the morning of May 3d, on the fourth day after delivery. An autopsy was not allowed. I distinctly maintain that this woman had no traumatic metroperitonitis, but an unmistakable diphtheritis of the uterus and vagina, the origin of which could certainly not be referred to the antecedent operations in themselves, because the proofs of my first proposition (*vide* below) all negative that hypothesis.

Student K. was now forbidden to explore any of the women who were pregnant or in labor.

Charlotte Dombrowsky (No. 10) was the next to be delivered, on April 30th; the birth ran an easy and natural course, she had no puerperal ulcers, or metritis, but was discharged well on May 27th, after having pulled through an attack of tertian fever on the fourth day of childbed, with the aid of quinine.

Sophie Dobbertin (No. 11), who was delivered of her fifth child on May 2d, also remained healthy, except for a bronchial catarrh, accompanied by fever, and was discharged on May 18th in the capacity of wet-nurse.

Sophie Lübbe (No. 12), delivered on May 9th, had an almost typically normal childbed, and was discharged in good health on May 24th.

Two conclusions may be at once deduced from these data, and easily supported by proofs. Namely, 1st, that infection was the cause of the disease in Nos. 5, 7, 8, and 9; and, 2d, that the student K. was the source of this infection.

The proofs of the first proposition are, first, the universally early appearance of the disease after delivery; and, secondly, its similarity in all four of the patients: No. 5 was taken sick after 6 hours, No. 7 after about 12, No. 8 after about 26, and No. 9 after a few hours, so that in all instances it was before

30 hours had elapsed after their deliveries, and, in the majority, it was even within 12 hours. All, with the exception of No. 8, had diphtheritic ulcers in the vagina, and No. 8 had an acute endometritis; in all there were severe chills, metroperitonitis, and high fever; one died, the others made slow recoveries.

Another point in favor of this view is the rapid succession of the diseases; one followed almost immediately after the other; No. 5 was delivered when No. 4 was very sick and had a multitude of diphtheritic ulcers; No. 7 after No. 5 had been attacked, No. 8 likewise, and No. 9 while Nos. 5 and 7 still had diphtheritic ulcers.

There is moreover proof that those affected were still healthy during the 1st and 2d periods of delivery, as was shown in Nos. 7 and 8 by the condition of the pulse and temperature.

Further the so-called miasmatic origin could be excluded with certainty: Nos. 5 and 7 were delivered in the well-ventilated lying-in ward, Nos. 6 and 8 in their chambers, each upon a mattress filled with new and fresh straw. Each of these lying-in women had a chamber to herself throughout; No. 5 in the 3d, No. 6 in the 2d, No. 8 in the 1st story, likewise, Nos. 10, 11, and 12. They each had a room containing at least 2500 cubic feet of air, fully ventilated, and in some instances unoccupied for a week. No miasma could possibly be suspected in the case of Mrs. S., who was delivered in the city. No diseases had at that time occurred among lying-in women in the city; none of my colleagues, to whom I submitted the reports of these cases with the tables of temperatures, knew of any thus affected. Finally, the rest of the puerperal women (Nos. 6, 10, 11, 12) remained, even in the establishment itself, entirely free from severe, specific, puerperal diseases. No epidemics of erysipelas or phlegmonous processes existed in the city, and only a few cases of smallpox had appeared.

Proofs of 2d proposition. That the student K. was the bearer of the infectious matters was established to a certainty—

First, from the possibility of demonstrating that all other persons and objects, which had come in contact with that woman, were not the transmitters of the matter; these were injection-tubes, thermometer, bed-pan, rubber-cloth; and for individuals, the midwife, the assistant physician, myself, and in one instance a student. The injection-tubes had all been purchased *new* by me, each lying-in woman had her own; the thermometer (which was introduced into the vagina) I had likewise recently procured, because previously Reaumur's scale had been in use, and I was in the habit of employing the thermometer of Celsius; each puerperal woman had her own

instrument. The bed-pans were scoured with the most scrupulous care, and one provided for each room. The rubber-cloths, that went under the sheets, were changed regularly, and the greatest attention paid to their cleanliness.

The midwife of the institution, a women over 70 years of age, had only made one or two examinations, and not of Nos. 5 and 7 only, but also Nos. 6, 10, and 11, which last were unaffected; in no case did she remove the placenta, and, only as an exception, did she make the injections. The assistant physician had examined Nos. 5 and 7 several times, but had, in addition, delivered many women in the city, a part of them with instruments, yet all remained healthy. I had examined all those women, while in labor, and had delivered No. 6, as well as Nos. 10, 11, and 12, yet none of them were attacked. Moreover, on April 28th, I had with great difficulty detached a very adherent placenta from the uterine wall; this woman also made a rapid recovery, and had no puerperal ulcer or any traces of peritonitis. The student referred to, had only examined Nos. 7 and 8, as the Easter vacation was hardly over, and had nothing to do with any of the others.

Thus the correctness of the above assertion becomes manifest from the fact that *every woman in labor, who had been constantly examined by the student K., was attacked early and severely, whereas those* (*Nos.* 6, 10, 11, *and* 12) *whom he had examined only once, or not at all, remained in good health.* The disease was most intense and rapid in the case in the city, where student K. had rubbed the inner surface of the uterus with his hand. The midwife K., who had attended this Mrs. S., had at that time no other sick lying-in woman in the city, as I learned from her, and from very precise information derived from other sources.

Finally the proof was easily forthcoming that this student K. had frequently touched diphtheritic ulcers, and matters that were already undergoing decomposition; for in the first place, during the Easter vacation, he had arranged with the greatest pains the whole collection of alcoholic preparations, dissected a number of them, etc.; he had, as I myself saw on April 17th, been introducing his finger, before the delivery of No. 5, to make injections, into a vagina which was affected with diphtheria. He had, in addition, for 4–6 hours on the afternoon of April 18th, practised very many operations on a cadaver (though perhaps not yet decomposing); and finally on April 23d, he had a pustule come upon the middle finger of his left hand after handling the parts of a cadaver. Can it still be doubted that he might have carried about the infectious matter upon his hands, and can his asseveration, that

he carefully washed his hands with chlorine-water, be accepted in disproof of this assumption?

When I was convinced that these cases had originated in this way, and had read this paper before the Medical Society, I communicated my observations to Veit by letter, and soon received this response from him: "that he had had the very same suspicions of the student K. in the winter of 1863–64." Probably No. 4 was also infected, but I was no longer able to prove it when I first saw her, already very sick, in the 3d day after delivery.

APPENDIX I.

THE CAUSES OF SUDDEN DEATH IN CHILDBED.

Fearful as is the occurrence of many puerperal affections, sad as it is to see strong, hearty, and happy women rapidly succumb to them, yet none of these events are so dreadful as a sudden death in childbed. Whoever has met with such a mishap, when he has seen a woman, who but a moment before was gay, joyous, and hoping soon to leave her bed, a corpse, will recognize the truth and aptness of Hervieux's description: "En un clin d'œil tous les calculs de la prudence sont déjoués; la vigilance la plus assidue, l'hygiène la mieux comprise, la thérapeutique avec ses ressources les plus variées et ses combinaisons les plus ingénieuses, tout cela vient se briser contre un écueil invisible." All that remains for a physician to do after such a depressing event, is to search for its cause. There are many possible causes, yet we shall touch but briefly upon the most common of them. Of these, embolism of the pulmonary artery is one of the most frequent; a clot then completely plugs the main trunk or one of its branches. Such emboli in lying-in women are derived from a thrombosis of the uterine veins, as well as of the pelvic and femoral vessels; the subsequent symptoms are generally as follows: sudden oppression, great anxiety, dyspnœa, and a gasping respiration; the temperature falls, and after an hour or more the patient dies.

Besides the instances in which death occurs suddenly after embolism of a large branch of the pulmonary artery, there are others in which the fatal termination has been preceded by several attacks of dyspnœa or asthma. Virchow advanced this view as early as 1846 (*Ges. Abhdlg.* p. 355), adducing a case of Cruveilhier in proof, in which death did not take place until the sixth day after the appearance of dyspnœa, oppression, cough, anxiety, extreme rapidity of the pulse, and nervousness, although percussion gave no information, and auscultation only revealed a few crepitant râles. Ritter has

quite recently published a case of peculiar interest, because the temperature was repeatedly taken for two days and a half. With a pulse of 102–144, and a respiration of 30–52, the temperature, which on the previous days had not been below 99.3°, became successively 98.2, 97.7, 9.91, and finally just before death 97.8°. The right main branch of the pulmonary artery was completely occluded by a pale-red, yellowish-white viscous mass, which extended into the larger branches as far as they could be followed. The source of the embolus (whether in the ovarian or crural veins) was not satisfactorily discovered. On percussion over the upper part of the right side, especially at the apex of the lung, and from the third intercostal space downwards, the tone was less resonant than over the left side. The respiratory murmur was clear vesicular throughout; the expiration was but faintly audible at the spots where the percussion was dull, but was nowhere else to be heard. The respiration was gasping, very rapid, and the patient at first lay as though in deep coma, subsequently the lips and tongue were very cyanotic. The patient died with an increase of the dyspnea and distress 66 hours after the occurrence of the embolism. Similar cases, with an early and sudden fatal result, are reported by Levy, Hecker, Mackinder, Charcot, Hervieux, Steele, Chantreuil, and others.

I have had one case in which embolism was the probable cause of death, though I was unfortunately unable to verify it by an autopsy.

No. 36. A 21 year old primipara was delivered of a living child after 12–14 hours of labor, the second period having lasted 1½–2 hours. She nursed the child at first, but began to have fever with œdema of the vulva owing to a puerperal ulcer, and was not able to leave her bed until the 11th or 12th day. As she was a very determined though delicate woman, she walked, on the first day after leaving her bed, as far as the meadow with the child upon her arm, in order to show her husband that she had again recovered her full strength. She was troubled, however, with fissures of the nipples, and soon had a painful nodule in the right breast, in consequence of which I ordered her to keep the bed, and to apply lead-water compresses continually, day and night. Complete resolution then took place. When there was scarcely any hardness still to be felt in the breast, the pulse 84, the appetite excellent, and the puerperal ulcer long since healed, she begged and received per-

mission to leave her bed. In spite of the very great foresight which I had enjoined, she walked two or three steps from the bed to the sofa with the assistance of her mother; the latter begged that she would lean upon her, which she, however, did not do, again because her husband was coming to see how strong she was; he came, and, on entering the room, found her pale and reeling; he sprang to her, but she sank back upon the sofa, made two convulsive movements, and had already expired when I reached the spot half an hour after, having been summoned as speedily as possible.

The cause of these sudden embolisms is, in the majority of instances, over-exertion (stooping, lifting, straining during defecation, rapid movements, boisterous laughter, etc.); this suffices to break off a piece of the primary softened thrombus, which, in a few moments, reaches the right side of the heart and the pulmonary artery.

A second less common cause of sudden death in childbed, is the entrance of air into the uterine veins. This is almost unavoidable at the examinations during delivery, on removal of the placenta from the vagina, or during the insertion of the hand into the uterus for the sake of detaching the placenta; at times the air, which is confined in the vagina or uterus, escapes with a loud noise and bubbling. If, however, the inner os remains firmly closed, the air cannot find an outlet from the uterus, and it is surely conceivable that, by the generation of gases (and air favors decomposition) it should be forced into the veins and thus into the circulation. On the other hand, I cannot accept the explanation of Cornac and Simpson, to which Olshausen adheres, that the air is driven into the uterine veins by the contraction of the organ itself, when the exit of air from its cavity is retarded or prevented. When the womb contracts, the vessels are thereby compressed and an obstacle thus opposed to the entrance of air; the internal os, on the other hand, is scarcely ever so firmly closed that the air could not escape during contractions of the body.

When only minute quantities of air enter the veins, the symptoms are insignificant: such as dyspnœa, and unconsciousness; if, however, considerable quantities of air are rapidly admitted into the veins of women in childbed, loss of consciousness and death soon follow either with or without convulsions.

Olshausen has found that five of the patients, in whose veins air was discovered post mortem, were lying-in women (one reported by Lionet, Simpson, Hervieux, and two by G. May); only in one was the air probably forced into the vessels by an intra-uterine injection; in the others no cause was discovered. Hervieux assumed that decomposition of the blood with generation of gases took place in consequence of metrorrhagia and violent emotions (!?). Olshausen, in addition, cites several cases in which the entrance of air was assumed without being corroborated by an autopsy (three by Bruler, one by Rein); he includes in this category, Scanzoni's case where death ensued upon injection to bring on premature labor.

As a third, often alleged, but rarely proven, and certainly uncommon, cause must be mentioned *syncope*, such as results from exertion after great hemorrhages, or all excessive losses of fluid. Hervieux has reported an instance of this description and pointed out its rarity, but the case described by him will not stand the test, inasmuch as the patient had been subjected to a mercurial course, been salivated, and "pus also found in the veins." As most fainting turns of this kind have been seen to follow a sudden rising, after the patient has been kept upon her back for a long time, it is not improbable that many deaths from embolism have been attributed to syncope.

Violent emotions and especially acute pain during delivery, have likewise been brought forward as causes of sudden death (Dubreuilh), and Baart de la Faille has recently collected 13 cases of collapse post partum, in which neither entrance of air nor emboli (whether in the pulmonary, cerebral, or coronary arteries) were probable, in which, however, the whole train of symptoms bore a striking resemblance to those of cardiac paralysis. Baart de la Faille asserts that a reflex action between the uterus and the vagus is rendered probable by pathological facts, even if it is not demonstrable anatomically. The assumption of cardiac paralysis to explain the sudden death among women in labor and childbed has much in its favor, and I do not hesitate to support it; I do not, however, accept the hypothesis of an irritation of the vagus, but attribute the paralysis of the heart to an affection of the sympathetic acting in a reflex manner. (*Vide* Inversio Uteri. Chap. II. p. 110.)

Great fatty degeneration of the heart, such as accompanies

high fever, is assuredly a more common cause of sudden death in childbed than this form of cardiac paralysis; Case No. 19 on page 221 may be adduced as an instance.

To this place belongs the extremely interesting account by Spiegelberg, of a woman, who died in his clinic, three days after confinement, of acute myocarditis, where a partial cardiac aneurism had formed in the left ventricle and opened into the pericardium. The insidious course of this disease was very striking, for not a single symptom had been manifest in this patient, who had always been in perfect health.

The cases of sudden death in childbed, which Hecker has recently described as a result of fatty degeneration, are still obscure, for there were œdema of the intestinal walls and extravasations of blood into the uterus, stomach, and intestines, in addition to the fatty degeneration of the hepatic cells, the swelling and beginning fatty degeneration of the kidneys and heart; Hecker very properly relegates the origin of these diseases to the end of pregnancy. Yet it is, to say the least, not impossible that this affection of the genitals, kidneys, liver, spleen, and intestines, may be regarded, not only as primary, but also as secondary, and consequent upon antecedent infection of the blood (septicemia or pyemia simplex).

In conclusion, apoplexy, of course, leads to a sudden death. Cases of this nature during childbed have been observed by Barnes, Schedel, Maynier, Garland, Hervieux, and others; yet death does not ordinarily ensue so rapidly from this affection as from the previously cited causes.

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SECTION II.

PUERPERAL DISEASES OF THE BREAST.

CHAPTER I.

DISEASES OF THE NIPPLES.

Of the various affections of the nipple to which lying-in women are subject, we shall consider only the various lesions and inflammatory processes occurring in that organ. These may be classed as:—

a. Erythema papillarum:—The skin becomes reddened, the redness vanishing rapidly upon pressure; there is no infiltration of the cutis; the nipple is tender.

b. Phlegmone:—The entire nipple is here greatly swollen, the swelling involving the areola; the skin is of a dark-red hue; a sensation of heat is experienced in the nipple, and considerable pain is induced by pressure of the clothing, or the touch of the hand.

c. Eczema, rhagades papillarum:—At the outset small, round vesicles are developed, of the size of a millet-seed; these gradually enlarge, become filled with transparent serum, and number from 3 or 4 to 8 upon a nipple, usually appearing simultaneously upon each side. If one of these vesicles bursts, the epidermis either becomes again adherent, or falls off, exposing the strongly injected chorion, which is covered with a moist liquid and often bleeds. More frequently an ulcer is formed at the seat of the erosion.

d. Fissuræ et ulcera papillarum:—The location of these is either at the apex of the nipple or at its base. In shape they vary extensively, being usually crescent-shaped and narrow when seated at the base, but when at the apex they are broader, deeper, and of an irregular outline. They may arise from the

forcible retraction of the nipples into the surrounding tissue; from broken eczematous vesicles; or they may result from the separation of crusts, produced by the process of contusion and maceration, or by ecchymoses.

e. Ecchymoses et hemorrhagiæ papillarum:—Small linear, or round extravasations of blood are found most commonly upon the upper surface of the nipples, corresponding to those points which have not been pressed by the infant's gums. If erosions exist, the vigorous suction of the infant may produce hemorrhage.

Bouchut has recently described a disease of the nipples, which he has called *galactophoritis:* An ulceration and obliteration of the excretory lacteal ducts. From the fissures or ulcerations at the base or apex of the nipples, ulcers are developed uniting several lacteal ducts, and forming an opening shaped like a crater, into the bottom of which they open. Successive ulcers may heal over, obliterating several lacteal ducts, until all the ducts gradually become impermeable, and atrophy of the breast results.

f. Under the head of *herpes areolæ papillæ*, a disease has been described, which is a chronic eczema accompanied by an extensive formation of crusts; this affection is usually very obstinate, does not extend beyond the areola, but covers it and the nipple uniformly with thick yellow crusts. Under ordinary circumstances, if the nipple be not further irritated, the brown or yellow scabs become gradually detached, and a sound epidermis comes to light; it frequently happens, however, that the crusts crack, giving exit to a fluid, which spreads over the sound portions of the areola, and causes a severe itching and burning sensation.

The most common *symptoms* of the above-described affections of the nipples are, first, pain, especially when the child is put to the breast, or when, after a short rest, the nipple is again and more powerfully seized; this pain lasts longer in proportion to the increased severity of the disease, and often shoots into the breast in the direction of the axilla, not unfrequently giving rise to fever, though this is by no means a constant symptom. Simple eczematous vesicles, erythema, and slight fissures usually run their course unaccompanied by any

great elevation of temperature; ulcers and ecchymoses, on the other hand, are not unfrequently attended by high fever. This fever assumes different types, according to the action of the irritation, being often most severe in the morning, if the child has drawn much milk from the diseased breast during the night; occasionally, it is most severe at mid-day, but oftenest in the evening; elevations occur to 104° F. and over. The notion has long existed, that sore nipples may occasion fever, and I have succeeded in demonstrating that this idea is a correct one,[1] having brought about a speedy subsidence of the fever when at its height by suddenly weaning the child, and thus removing the source of irritation which gave rise to the ulcers.

Von Gruenewaldt found that in lying-in women, temperatures of 100 to 104° F. are met with which are attributable only to the above-mentioned very painful fissures and excoriations of the nipples (*l. c.*, p. 15). It is, therefore, wholly unwarrantable to believe and assert, as many do, that "so small wounds" cannot possibly produce a fever. Indeed, this effect is not to be attributed solely to the existence of these wounds, but rather to the constant irritation of the sensory nerves by the child. I have already (*loc. cit.*, 1863) taken occasion to state explicitly that, in case of a simple formation of vesicles on the nipples, if these heal without a rapid desquamation of the epidermis, or without excoriation and ulceration, the temperature is not essentially elevated; this statement I have since verified by more recent examples (*Berliner Klin. Wochenschrift*). Scharlau (*loc. cit.*[2]) has also reported at a later date several well-authenticated cases from Martin's clinic, and Schröder has still more recently (*Monatsschrift*, xxvii. p. 116) added corroborative testimony.

While the pain and fever last the appetite fails, the night's

[1] Monatsschrift, xxii. p. 346.

[2] The statement (p. 191) in Scharlau's paper, that the formation of fissures is attended by an elevation of the temperature to above 107.6° F. is manifestly a typographical error, and should read 104° F.; for although I have seen very many cases of this description, the maximum temperature which I have observed has been 105.3° F., and in this a mastitis was already beginning, so that the fissures were not the only cause of fever.

rest is broken, the woman is excited and disturbed, and shrinks from the thought of again suckling the child. Delicate persons are rendered so extremely nervous by these painful, excoriated nipples, that they cry aloud when the raw spots are first seized, the pain being so severe as almost to cause convulsions; after a few days they often become exhausted and discouraged. In the majority of cases the fissures heal completely in 10–12 days: in some instances, nodules form in the breast and terminate in a glandular abscess. In other cases inflammation of the mammary gland may ensue in 8–14 days after the complete cicatrization of the sores; here, however, the cicatrization serves as the causative factor, the seat of the inflammation corresponding exactly to the seat of this process. Many women are heard to say, that, in spite of the cracks having healed, they have constantly felt pain shooting into the breast whenever the child has nursed, until the appearance of the nodules. Occasionally the greater portion of the nipple may be destroyed by obstinate ulcers, and thereby forever unfitted for suckling.

As regards the *causes* of fissures, it must first of all be observed, that the nipples are peculiarly liable to disease, from the fact that they are far too often neglected by women during pregnancy. Irrespective of the pressure exerted by ill-fitting garments, which interfere with the development of the nipples, a thick crust is often formed upon them from the drying of the colostrum which has oozed out.

Beneath this the epidermis is very tender and soft, so that it is extremely liable to become macerated and detached by the action of the saliva from the mouth of the child. In accordance with Bley's researches (cf. Verette, *l. c.*, p. 11), generally speaking, the saliva of new-born children, from the end of the first day for a period of several weeks, has an acid reaction, and is therefore peculiarly apt to produce erosions of the nipples. These crusts may be observed daily in obstetric wards, and they surely contribute not a little to the extremely common occurrence of fissures, in lying-in establishments. Thus in 1864, among 200 puerperal women, I found as many as 70 with cracks of the nipples, more or less severe (*Berliner Klin. Wochenschrift*, *l. c.*, p. 21), and 72 among 150 puerperal women

here in Rostock. They are quite as common in multiparæ as in primiparæ, for in 100 cases examined with reference to this point, 47 had had one child, 38 two, 9 three, and 6 four. Individuals with thin tender skins and imperfectly developed nipples, are peculiarly predisposed to fissures; these appear most frequently between the second and fourth days (in 81 cases—19 on the second day, 16 on the third, 23 on the fourth, 7 on the fifth, 9 on the sixth, 2 on the seventh, and 5 still later), and are usually found on both nipples; *e. g.* in 40 out of the last 70 cases. In many women they recur during every period of lactation in spite of all precautions.

As regards the theory advanced by Rossi, that *inflammation and ulceration of the child's mouth* is the most common cause of these excoriations, it is to be remarked, that these lesions of the mother appear much earlier than those of the child; furthermore, they are often unaccompanied by the least trace of disease in the child's mouth; and even when the affection of the mouth does exist, it is more likely to be the result rather than the source of the trouble upon the mother's nipple.

In the majority of cases, *violent nursing, pulling, nipping, and biting* on the part of the child will in reality be the chief causative factor, especially when the latter cannot readily seize the nipple, owing to its being too small or flat, or because the nipple cannot readily be grasped in the unfavorable position in which the child is held. Finally, a like result may ensue when the lacteal secretion is scanty, and the efforts at suction are very violent.

Bouchut calls attention also to the artificial elevation of the nipples by means of a cupping-glass; to the pressure of corsets; and (in the case of wet-nurses) to the custom of forcing the nipple into bottles, in order to collect the milk. In consequence of the pressure of the child's gums, small extravasations of blood are at times produced upon the parts compressed, or in the intervening tissues. Injuries of the nipples induced by pressure, a tear, blow, etc., are on the whole extremely rare. As respects the *prognosis*, it is worth noting, that, in the 100 cases of diseased nipples above referred to, incipient mastitis occurred in 18 instances; in 4 only of these cases, however, did the disease advance as far as suppuration.

Treatment.—In order to guard against the formation of fissures, pregnant women should not only wear comfortable garments, such as do not exert pressure upon the breasts, but should also begin early to wash the nipples, drawing them out when small and flat, and employing, if necessary, a rubber ring to retain them in position; astringent and alcoholic lotions should also be resorted to, in order gradually to render the tissues of the nipple firm.

It has long been known that these fissures frequently resist all treatment, a fact that may be readily appreciated if we but consider the large number of remedies recommended for the relief of this trouble. The following very simple and inexpensive mode of treatment, the efficacy of which was first demonstrated to me at the clinic of Prof. Martin, in Berlin, has proved to be of great value in my practice: In simple erythema and phlegmon, compresses wet with *aqua plumbi* are applied; there need be no fear of a deposit of carbonate of lead, provided care be taken to cleanse the nipples before giving them to the child. If slight vesicles, erosions, or excoriations exist, these may be washed with a solution of nitrate of silver (1 : 30 grms.), or covered with compresses wet with astringent solutions, such as alum (1 : 30), sulphate of zinc, etc. Tannic acid (1 : 50) may also be advantageously employed. If ulcers form, smearing them with balsam of Peru, or copaiva, has a very soothing and curative effect; they may also be covered with compresses wet with *aqua plumbi*, with the view of allaying the adjacent inflammation.

The child should not be allowed to nurse directly from the nipple, but a rubber shield should be employed. If, in spite of these remedies, the raw spots remain in the same condition, if the ulcer is extending superficially and increasing in depth, if the patient has fever and the breast begins to ache, the child must be at once weaned. At all events, it should be applied less frequently to sore nipples than to healthy ones, and its mouth should always be cleansed with especial care after nursing. In many cases, the frequent use of moist and cold linen compresses assuages the tenderness of the nipples.

The following advice of other authors is likewise worthy of notice:—

Velpeau recommends lotions of lead-water, or of oil and red wine, if the pain is very acute; oil and lime-water (equal parts); a solution of nitrate of silver, or sulphate of zinc (1–2 to 6 parts water). If there are cracks, he advises sprinkling with the seed of earth moss; touching with solid nitrate of silver or collodion; or the use of artificial nipples made from the prepared skin of a cow's udder; in cases of inflammation he advises local discutients, mercurial salves, and poultices.

Legroux suggests painting the raw spots with collodion, castor oil, and oil of turpentine (30 : ½ : 1½ parts), and afterwards covering them with gold-beater's skin perforated with pin-holes over the apex of the nipple; this covering should be softened with sugar and water before the child nurses.

Wagner was accustomed to strap sore nipples with adhesive plaster, in such a way that the excretory lacteal glands were not obliterated, while the excoriations were covered with subsequent applications of collodion. This method is in many instances entirely impracticable.

Bourdel and Anselmier tried benzoin (both in powder and in tincture), and claim to have had good results. Painting with collodion, which has been extolled by many, proved at times of value in their experience also.

Elsässer uses oil of cloves with lime-water, when there is inflammation, and in case of painful, bleeding excoriations unguentum rosatum with laudanum and flora zinci. When ulcers are present he employs Peruvian balsam, etc.

When the child is weaned, even the worst excoriations usually heal of themselves in a few days.

Finally, the most obstinate form is *eczema areolæ mammæ*. None of the remedies recommended for this disease—such as fresh zinc ointment, with or without oil of cade; tannin with glycerine ointment; solutions of nitrate of silver and potash; —have any certain effect, and I have seen several cases of eczema which persisted obstinately, in spite of prolonged treatment with such remedies, not only during pregnancy, but also in childbed; in the last case which came under observation here, it lasted throughout the second pregnancy, and even after the second confinement.

Hebra employs for obstinate eczema of the nipples cauterization with corrosive sublimate (1 : 90), or with caustic potash (1 : 2) in solution.

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CHAPTER II.

DISEASES OF THE INTEGUMENT OF THE BREAST AND OF THE SUBMAMMARY CONNECTIVE TISSUE; PARAMASTITIS.

I. Furunculosis et Phlegmone Subareolaris.

As a result of the inflammation of the glands in the areola, nodules are formed, which are accompanied by an infiltration of the adjacent tissue, and redness of the integument. After a while a drop of pus appears on the surface of these nodules, which, perforating the skin at one or more points, discharges, leaving behind a deep ulcer. This trouble generally has its origin in contusions produced by the child's gums, the nipples being in these cases so retracted and flat that the child, in its attempts to grasp them, seizes also the surrounding parts: the affection may also appear spontaneously, giving rise to severe pain and intense fever, and leaving behind either disfiguring cicatrices, or small, hard nodules which do not disappear for a long while. The treatment of these inflammations is the same as that of phlegmons: an impervious covering as a protection (emplastrum saponis); evacuation of the pus by means of a small incision; removal of the core; the application of a plaster covered with collodion to protect the parts from the child, at least where ulcers are left behind; these measures usually suffice to remove the disease in from 8 to 12 days.

II. Erysipelas, Phlegmone et Lymphangitis Mammæ.

In erysipelas, the integument of the breast is of a deep red color; the redness is diffuse, disappears upon pressure, and is accompanied by a burning, shooting pain. The disease commonly attacks but one breast; at times, however, both organs are invaded, though it more frequently happens that the disease appears first in one organ, and subsequently in the other. The condition either passes off with desquamation of the epi-

dermis, or vesicles are formed, which burst, leaving in their place crusts. Now and then a phlegmonous condition ensues, in which case the skin assumes a dark-purple hue, becoming quite tense, smooth, glistening, and diffusely swollen, while at points it appears œdematous. This phlegmonous inflammation generally leads to early suppuration, recovery taking place when the pus has been evacuated. In rare instances the vessels of the mammary integument appear as red cords running up to the axilla and painful to the touch. Here are manifestly developed the same changes in the contents of the lymphatics, and secondarily in their walls, as are encountered in analogous affections of the uterus. In both cases the axillary glands are tender and swollen: the *causes* of these affections of the mammary integument are chiefly *local;* they arise primarily from injuries, colds, and burns, and from the application of too hot poultices; secondarily, from erosions and ulcers of the nipples.

The primary *symptoms* of these diseases are chills, or a severe *rigor*, followed by *fever* and *sweating*. At the very outset acute, shooting, burning, boring *pains* are felt, accompanied by diffuse swelling and a more or less uniform redness of the skin over the breast. The appetite now fails; the tongue becomes thickly coated and a frontal headache sets in. The patient passes a restless night, and the suffering is extreme until pus is evacuated. The fever is at first of a *remittent* type, but the evacuation of the abscess is followed by a rapid fall of the temperature. As to the duration of the malady, the erysipelatous form lasts from eight to fourteen days; the phlegmonous several weeks.

The *treatment* of erysipelas of the breast consists in the application of dry heat; if very acute pain should continue after the breast has been covered with cotton-batting, cold compresses, or even the ice-bag, may be employed; in some instances, when the headache is severe and the tongue thickly coated, large doses of potash are indicated. The reputed effect of emetics is by no means invariably obtained. The child must be weaned. In phlegmonous inflammation prompt incisions are requisite; to be followed by strapping with adhesive plaster. Tepid lead-water compresses are very soothing, at the outset. My experience supports the views of Seiffert and Martin as to

the inefficiency of poultices. On the other hand, painting with iodine is a valuable resource for reducing the thickness of the skin, and expediting the evacuation of the pus. Neutral salts should be administered internally, care being taken that the patient rests comfortably in bed, and has regular, copious evacuations.

III. Inflammation of the Submammary Connective Tissue.

Inflammation of the submammary connective tissue may likewise be developed spontaneously and as a primary affection, or secondarily by peritonitis and caries of the ribs, or perforation of a pleuritic effusion. Velpeau has in one instance seen it follow the fracture of a sternal cartilage. The pus formed may burrow its way either outwards or inwards, and may therefore lead to a fatal result by empyema; or it may extend in various directions under the breast. The mammary gland is in these cases very prominent, and is moreover forced out from the body, appearing to rest loosely upon an elastic base; the surrounding tissue, as well as the integument of the breast, is at times very œdematous. At the outset of the trouble, the pain is at times very great, being accompanied by high fever. The mobility of the arm on the affected side is restricted by the additional pain induced by its motion. These abscesses may attain to a great size. Stoltz upon one occasion let out 300 grms. of pus from a single incision (Driout, *l. c.*). It often happens that several submammary abscesses are found having no intercommunication. At first, the integument of the breast is not reddened but merely stretched, the subcutaneous network of veins being extremely dilated. It rarely happens that the inflammation of the submammary connective tissue undergoes resolution: it almost always passes rapidly into suppuration.

Velpeau recommended the application of leeches to the breast. The essential point in the treatment, however, invariably consists in the prompt evacuation of the submammary abscesses. As soon as the least fluctuation is detected, a free incision should be made at the circumference of the gland, while pledgets of charpie should be introduced and moderate

compression applied, in order to insure a ready and thorough escape of the pus. Any fistulous passages which result will, as a rule, entirely close in from ten to twelve days if only a firm compress be applied; otherwise, the attempt must be made to obliterate them, by daily injections of a decoction of quinine, red wine, or a solution of iodine. (Lugol's solution, Velpeau, tincture of iodine, 1 to 4 parts water.)

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RECORD OF CASES.

No. 37. *Mastitis submammaria of* 9 *months' duration, cured in* $5\frac{1}{2}$ *weeks by incisions and compression by means of collodion.*

Mrs. S., 27 years old, a healthy brunette, who had been easily delivered 9 months before, had contracted mastitis of the left breast, after having nursed her child for a short time. This inflammation soon passed into suppuration; the pus pointed and perforated from time to time at different parts of the breast, especially at the upper border; the openings always closed again, whereupon, 8–14 days later, a fresh perforation would take place.

When the patient entered this institution, the integument over the whole breast, even up to the axilla, was very œdematous, and over the breast itself of a dark brownish-red color; two small suppurating openings were visible at the upper and inner border, through which a sound could be passed to a great depth behind the elevated breast. Upon pressing on the œdematous spots in the axilla, over the middle of the breast, and along the lower and inner border of the gland, a great amount of pus escaped. Patient had very little fever. A plaster of Paris bandage produced pain without expediting the discharge of the pus. A puncture at one point of the mammary gland, where there appeared to be deep fluctuation, evacuated no pus. Carlsbad salt—$\frac{1}{2}$ teaspoonful dissolved in water and taken upon an empty stomach—was given, with the effect of producing copious dejections.

After 6–8 days, the patient having been put under the influence of chloroform, I made a deep incision, starting from the lower inner border of the glands, and penetrating to the

sound, which had been introduced behind the gland from above, whereby a great quantity of laudable pus was evacuated. Yet the exit of the pus on the following days was not through this wound, but constantly from the openings above; it was not till 2–3 days after that the pus began to flow freely from the lower aperture, which had been kept steadily open by the sound; this process was accelerated by applying a coating of collodion (collodion 200 grms., ol. ricini, 3 grms.). The upper perforations closed soon after, and, as soon as the suppuration had diminished, and the discharge become more serous, the fistulous passage, which was more than 10 ctm. long, began at last to grow smaller little by little until it had completely closed at the end of three weeks. The patient was then discharged well.

CHAPTER III.

INFLAMMATION OF THE PARENCHYMA OF THE MAMMARY GLAND.—MASTITIS PARENCHYMATOSA SEU LOBULARIS.

Inflammation of the parenchyma of the mammary gland may involve either separate portions of the gland, or the entire organ. The acini affected appear hyperemic, succulent, hard, and ofttimes distended with milk; occasionally they form the seat of small scattered extravasations of blood. While at some points lacteal ducts are considerably dilated, at others they appear completely empty, being compressed by the exudations and tumefactions in the inter-acinous tissue. The division, proposed by Chassaignac, into canalicular and interlobular, cannot be strictly maintained. The inflammation generally originates in the walls of the lacteal ducts, invades the acini of the glands, and is apt to pass rapidly to the stage of suppuration, forming pale, fibro-purulent coagula. Klob states explicitly that the suppuration begins in the connective tissue, inasmuch as he has not detected in these cases anything pointing to epithelial suppuration. The suppuration of the inter-acinous tissue, and the accumulation of pus, gives rise to a mammary abscess, which only in extremely rare instances exhibits smooth walls, ordinarily disclosing rough, sinuous excavations. The pus evacuated from these abscesses is often full of the thick, irregular, sloughing shreds of the glandular parenchyma. These abscesses usually terminate in spontaneous perforation and evacuation with absorption of any remaining exudations, which is commonly followed by *complete recovery*. Occasionally fistulous openings remain, which may simply discharge pus, or if a lacteal duct has been included in the abscess, may continue patulous for a long time as lacteal fistulæ. At other times milk-nodules, so-called, are formed: these are composed of irregular indurated portions of the gland constricted and rendered useless by the pressure of the hyper-

plastic connective tissue, so that their interior is generally filled with the distended remains of the lacteal canals. It occasionally happens that the abscess becomes encysted, and the inclosed pus undergoes fatty or calcareous degeneration. Klob explains in this manner the chalky and calcareous concretions, resembling tubercles, sometimes found in the glandular tissue, covered by an indurated and retracted skin. In these cases of mastitis, the pus may decompose, and death by septicemia supervene. Finally, the abscess may remain for a long time stationary, not giving rise to severe inflammatory symptoms until later, under which conditions the tumor may be mistaken for a malignant growth (Degliocchi).

Symptoms.—The existence of mastitis is first made manifest by the appearance in the breast of a nodule of variable size, which is hard, of irregular contour, tender to pressure, and covered with a pale skin. It is, at first, freely movable, and is not adherent to the integument. The latter, however, soon becomes red; the nodule enlarges; movement of the arm is painful, and the axillary glands swell. The dull, piercing, or throbbing pain now increases, accompanied by a severe chill, or more brief horripilations, loss of appetite, insomnia, headache, and great exhaustion, while the skin gradually becomes prominent at one point, of a purple hue and œdematous, and the pus then oozes through several small openings as large as peas. Velpeau once found fifty-two collections of pus in one mammary gland. The elevated portions of the integument surrounding the orifice are often subsequently detached, and after profuse suppuration the patient gradually recovers, large cicatrices being left behind, in which there are frequently deposits of pigment. It often happens that these orifices are accidentally occluded, in which case the breast becomes greatly swollen, severe pain and intense fever ensue, and the pus makes its way through a different part of the skin. Considerable fever is apt to accompany this suppuration of the mammary gland; the temperature rises rapidly to above 104° F., but usually falls quite as precipitately after the discharge, resulting eventually in a low, protracted suppurative fever. In rare instances only, a sub-febrile temperature is found; while, as a rule, a fall of the temperature soon follows the evacuation of

the pus, or, at the most, only evening exacerbations take place; I have in several instances observed, soon after a partial evacuation of the pus, a severe chill followed by decided elevations of the temperature. Kiwisch pointed out the fact that when the inflammation ran a slow course, the symptoms were often much more violent after the opening of the abscess, and that the patient might then succumb to pyemia produced by absorption of the pus. A relapse of this nature is probably to be ascribed to the admission of air into the cavity of the abscess, especially if portions of the glands are in a sloughing condition and undergoing decomposition. Sometimes, after the abscess has been evacuated, or when the inflammation has begun very gradually, and run a chronic course without suppuration, there remain in the breast for a long time hard, painless nodules, which, however, completely disappear in the course of time.

Etiology.—Inflammation of the mammary gland occurs with much greater frequency in nursing women than in others. In 50 lying-in women who were afflicted with mastitis, I found but one who had *not* suckled her child. I cannot therefore subscribe to Scanzoni's statement, that it is "so frequent" a complaint of non-nursing women: Ed. Martin, moreover, in 150 cases, met with this trouble only eight or ten times in those who had not been nursing.

Of 72 cases reported by Nunn, 58 *occurred during lactation*, 7 during pregnancy and 7 independently of these conditions.

The most common causes of mastitis among nursing women are wounds of the nipples; the affection is not necessarily developed during the existence of these wounds, but may appear 8–14 days after their complete cicatrization, or even later. The inflammation often creeps very slowly from the orifices of the lacteal ducts toward the periphery of the gland. The position of the acini implicated corresponds, therefore, to the location of the excoriations. This inflammation is quite as common in primiparæ as in those who have had several children. For instance, among 50 women, 22 belonged to the first category, 19 had been delivered twice, 7 three times, 1 four times, and 1 five times.

The assertion that an obstruction to the flow of the milk is

the most common cause of mastitis is absolutely incorrect. If the lacteal ducts are obliterated by the inflammation and swelling, the secretion of milk in those parts of the gland lying behind the obstruction diminishes, and, when the pressure attains a certain force, entirely ceases. It is indeed possible that the distended acini may produce an irritation and congestion of the gland, but it by no means follows that this is the uniform result, and it is still less probable that an exudation should succeed this congestion. This exudation is produced not by the accumulation of milk, which is still said by many authors to be transformed into pus, but rather by the passive engorgement of certain portions of the breast due to the constriction of the lacteal ducts and acini. The inflammation of the breast generally begins by the extension of the disease along the connective tissue, for, as has already been mentioned, mastitis most generally appears after the existence of fissures, whereas the excessive congestion of the breasts seen in the first days of childbed, quite commonly terminates in absorption, and, as previously stated, mastitis in non-nursing, as compared with nursing, women, is extremely rare.

Finally, *a sudden interruption* of lactation cannot be admitted as a cause of mastitis. I can, at all events, testify to having in many instances seen an abrupt cessation of nursing rendered necessary by illness, or the resumption of the menstrual function in the mother, or by the death of the child; but in no single instance have I noticed that inflammation of the gland was thereby produced. I, therefore, agree with Bertuch, Ed. Martin, and others in regarding the attempts to suck or squeeze out the milk from the affected breast, as not only superfluous but (in the words of Bertuch) as both "futile and cruel." "*Ubi irritatio ibi affluxus.*" While the milk is removed by a suction apparatus, the diminution in the secretion will go on all the more slowly. If it becomes necessary to wean the child, it is better, provided the breast be not too seriously diseased, that this object should be effected gradually, allowing two or three days to intervene before the complete suspension of nursing.

Again, injuries may give rise to inflammation of the mammary gland: for instance, a blow inflicted upon the mamma

by the child (Klob). A cold must also be cited among the causes of mastitis, and finally the affection is said to occur more often in scrofulous and debilitated than in strong persons.

The trouble usually makes its appearance within the first four weeks after confinement, and, in the majority of cases, during the second half of this period.

In 58 cases among nursing women, Nunn reported in the

1st month . . .	19 women.	6th month . .	2 women.
2d " . . .	14 "	8th " . . .	1 "
3d " . . .	3 "	9th " . . .	1 "
4th " . . .	1 "	After the 10th month	17 "

In 26 cases the swelling was found to occur

7 times in the upper lobes of the breast.
14 " " lower " "
2 " " " and lateral lobes.
2 " throughout the whole gland, while in one instance it was limited to a lateral lobe.

The affection is therefore most common in the lower portions of the breast; this peculiarity Nunn attributes to their dependent position and to the greater infiltration, which, in accordance with the laws of gravity, would be the natural result.

In the above quoted 50 cases, the affection was observed

7 times during the 1st week.		4 times during the 4th week.	
14 " " " 2d "		7 " " " 5th and 6th weeks.	
9 " " " 3d "		9 " at a subsequent date.	

The affair is generally unilateral, more rarely bilateral. In 44 cases it occurred

21 times on the right side.
18 " " left "
5 " on both sides.

From this table, as well as from the observations of Velpeau, Nunn, and others, the statement that it occurs more frequently in the left (Seyfert) than in the right breast, is seen to be untenable. If cicatrices remain after mastitis, new abscesses are often produced in subsequent confinements by traction upon the cicatricial bands during the act of nursing.

The mammary abscesses that form during the later months of lactation are attributed by Gibb (Nunn, *l. c.*, p. 208) to changes in the character of the milk; and he is of the opinion

that the fermentation of the sugar gives rise to the development of vibriones and monads, which produce an irritation of the gland and a tendency to suppuration. Out of many hundred specimens of milk examined, he detected this alteration in a few instances only, where a mammary abscess had formed during protracted lactation.

Finally, *parenchymatous mastitis* has also been observed in the course of puerperal metastatic pyemia. Rokitansky admits the possibility of its development in the interlobular cellular tissue in case of metrophlebitis. Scharlau has recently published such a case (*l. c.*, p. 198), observed in the clinic of Prof. Martin. In this patient, swelling of both breasts, without redness of the integument, set in on the seventeenth day after confinement, pulmonary emboli having been previously demonstrated. After a few days there was distinct fluctuation on the right side, whereupon the abscess was open; at the autopsy, a grayish-brown sanious fluid was still oozing from this incision, while in the right mammary gland were also found several collections of ichorous matter, some of which communicated with each other, and others with the external opening. In the left mammary gland, which was of a thick and firm texture, there were likewise small cavities, most numerous near the posterior border, filled with a greenish-yellow fluid. In conclusion, the metastatic mastitis is, as has been justly observed by Scanzoni, extremely rare, but one case having come under my immediate notice, and during the epidemics that have prevailed in St. Petersburg, Hugenberger has not met with a single instance.

Treatment.—If a portion of the mammary gland is tender and swollen, and the integument is beginning to turn red ; if, moreover, nursing produces acute pain, the child must at first be put to the breast less frequently, and finally be weaned, if the inflammation continues to spread. It may, however, be allowed to nurse from the other breast if this is healthy, and there need be no fear that congestion of the affected breast will be thereby prolonged, and recovery thus retarded.

Compresses wet with tepid lead-water should next be applied continuously day and night, being renewed every four or five minutes, and the diseased breast be properly supported

by a bandage. Thorough evacuation of the bowels must be obtained by castor oil, sulphate of magnesia or soda, or by small doses of calomel, avoiding however rhubarb and large doses of mercury, because their presence in the milk might be deleterious to the child. [Iron, bismuth, iodine, arsenic, lead, all the preparations of zinc and antimony may be detected in the milk in from one to four days (G. Lewald, Breslau, 1857); opium and alcohol are not eliminated with the milk; Spaeth and Schauenstein found rhubarb, iodine, and mercury, but not sulphate of potash.] This point is worthy of attention because inunctions of mercury have been recommended by several authorities with the object of dispelling the inflammation. Lead-water compresses should be continued, until the nodules have completely disappeared; or these may be alternated with tincture of iodine, applied externally whenever, by reason of the increased swelling, the more intense fever, and the throbbing pain, the suspicion arises that an abscess is forming. The pointing of the pus is hastened by painting with iodine. As soon as fluctuation is perceived, an incision 6–8 lines long should be made; the pus thoroughly evacuated; two wads of charpie introduced, and then a plaster-of-Paris bandage applied. I do not apply the latter before suppuration has set in. If the lead-water compresses are ineffectual, uniform compression is likewise futile, causing only pain. Seutin was the first to suggest a plaster-of-Paris bandage for the breast, and Kiwisch employed it as early as 1840 with remarkable success. I can fully corroborate his statements with regard to the action of this bandage. In applying the linen bandage it is immaterial at what point we begin, but each successive turn must be plastered to the preceding one in order that the successive layers of the bandage may not become displaced. The object of applying the bandage, which should cover the entire breast excepting only the point of incision, is to insure a uniform compression of the gland with the view of promoting the flow of pus and the absorption of the exudations; it should be changed after two or three days, or as often as it becomes saturated with pus.

As early as 1844, Kiwisch published 13 cases which were treated with this bandage; in two of these, there was no sup-

puration, in five, convalescence lasted 8–16 days after the abscess had broken, in four from 16–24 days, and in one 28 days.

The chief advantage of this treatment arises from the fact, that in very exceptional instances only, is there more than one opening to the abscess. This bandage has been recently again recommended by Scanzoni, Hugenberger, Vidal, Bardeleben, Ed. Martin, and others. The results of the employment of other bandages prove that mechanical compression of the breast is here the actual agent; thus, Mayor speaks highly of a feather cushion held in position by a round bowl or dish; Ehrhardt recommends compression by means of graduated compresses and a circular bandage; Paterson, and of late W. Lange, compression by means of strips of adhesive plaster. Fans, Foster, and Johnson advise compression with a soft fine bathing sponge moistened in warm water, which acts as a poultice, and at the same time absorbs the pus; it must be secured in place by a suspensorium mammæ. Finally, Seyfert applies compression to the breast by means of two towels crossing each other, which must be securely pinned under the axilla and upon the shoulder. The plaster bandage has this advantage over all other methods, that it acts most simply and uniformly, besides being about the most economical.

At all events, it will not be long before this treatment by compression will have completely superseded the use of warm poultices. The assertion of Bardeleben, made as recently as 1860, "All are agreed upon the usefulness of warm poultices," is now no longer true. When the latter are now employed, they are only applied, 1st, for the sake of their palliative action, when the pain is great; 2d, to promote the absorption of any nodules remaining in the breast (Seyfert). Other practitioners, including myself, are in the habit of resorting to poultices only when perforation of the pus is long delayed, and very rarely even in these cases. The objections brought forward by Kanter, Seyfert, and E. Martin, that the poultice causes perforation of the skin at many points, and that it may very easily scald the woman, are rarely well founded.

Painting the affected breast with a thick layer of *collodion* is worthy of recommendation, and has been employed with

good results by Latour, Spengler, and others. It is, indeed, affirmed by Ed. Martin, that, notwithstanding repeated experiments, he has never seen any effect produced by this agent; Bartscher, however, has quite recently recommended it again, and I have likewise found that it exercises a very forcible compression, which proved in one instance so great after several applications, that those parts of the integument, which were nearest to the pus, protruded perceptibly. In several cases, however, a great number of large blisters containing yellowish serum formed along the edge of the collodion; these broke and gave place to crusts. If experience should show that these vesicles leave white spots behind them, such marks would, to many women, prove extremely unwelcome sequelæ.

The introduction of canulæ into the incision (Chassaignac), and the employment of injections to wash out the cavity of the abscess (solutions of iodine or nitrate of silver [Velpeau]) are not needed when a plaster bandage is used. Such injections may be combined to advantage with a uniform compression, when lacteal or suppurating fistulæ obstinately resist for a long time all attempts at healing.

It is scarcely to be expected that any more favorable action can be exerted by the abortive treatment, which consists in carefully painting the skin with five or six coats of nitric acid, applied by means of a charpie brush.

To remove any lacteal nodes remaining, mercurial ointment or iodide of potash ointment may be rubbed in; or the parts may be covered with *emplast. sapon.*, *emplast. de cicuta*, or *emplast. melliloti*, while iodine, iodide of potash, and mercury may be administered internally, provided the child has been weaned. Bartscher has given eight grammes of iodide of potash within ten days with favorable result. Nunn recommends electricity.

The application of leeches to the periphery of the breast in beginning mastitis, a proceeding which can only be resorted to in non-nursing women, has never proved necessary in the course of my practice. Still less advisable is *venesection*, although this treatment is still advocated by Kiwisch, Scanzoni, and others. Mastitis cannot be arrested by this procedure, which tends rather to drain the vital force, already greatly impaired by the inflammatory process.

The English (Harley, Nunn, Braxton Hicks, Tyler Smith, Richard, and others) employ belladonna (extr. bellad., glycerine, equal parts) externally, with a view of promoting the absorption of the exudation, of preventing suppuration, and diminishing the secretion of the milk.

There is commonly no need of any internal treatment, other than that given above. During the period of convalescence, a generous diet, combined with nutritious beer, etc., is more efficacious than all drugs.

When the mammary abscess is quite healed, and the induration has completely disappeared, the child may at times be given the breast, if the milk continues to be secreted; this is to be recommended, however, only when the mother is in good condition, and should be at once discontinued, if there be a recurrence of the pain.

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CHAPTER IV.

IRREGULARITIES IN THE SECRETION OF THE MILK.

Under this head will be included: 1st. The absence of the lacteal secretion in recently-delivered women; its scanty secretion; its sudden and premature diminution; and finally its complete suppression (*agalactia*). 2d. The excessive secretion of milk (*polygalactia*, *galactorrhœa*).

1. The Absence, Diminution, and Arrest of the Lacteal Secretion: Agalactia.

Harlau, Reil, Pitschaft, Hohnbaum, and Berndt, Jr., affirm that they have frequently observed a complete absence of milk in lying-in women, and have noticed it in the same woman after several successive confinements. Scanzoni also mentions that a complete absence of milk sometimes occurs; of such instances several are reported in the earlier records of the Rostock Institution, but I myself have never met with one. The following are the causes adduced by the above observers as contributing to produce this defect: extreme delicacy and youth, or too advanced age of the woman; a masculine habitus; torpor of the mammary glands; great tendency to the formation of adipose tissue; premature labor, and the consequent delivery of a still-born child. It also seems probable that this defect may be transmitted from mother to daughter.

The same causes tend to produce a deficient secretion, that is to say, one which does not suffice for the nourishment of the child. The diminution of a previously abundant lacteal secretion, when not caused by a new pregnancy, may generally be traced to an excessive loss of some of the fluids of the body; such as extensive hemorrhages, diarrhœa, or severe nasal, pharyngeal, or bronchial catarrhs: and quite often also to the renewal of the menstrual flow. Moreover, severe mental disturbances, inflammation of the parenchyma of the mammary glands, and

other acute affections (peritonitis, pleuritis, etc.) may lead to a diminution, or premature arrest of the lacteal secretion. It is a well-known fact, that the flow of milk may be entirely checked in a very short time by a sudden fright, or by anxiety and agitation. The frequent disappearance of the milk in recently-hired wet-nurses is usually attributable to the combined influences of mental disturbance, changes in diet and exhausting physical labor; it rarely happens that the phenomenon can be referred to one of these causes alone. It will usually be found that those women who are nursing for the first time are more liable to lose their milk than others; the latter recognize, and avoid if possible, whatever might lead to that misfortune.

No special symptoms are, as a rule, produced by the absence, the diminution, or the arrest of the lacteal secretion; the idea that the milk may "strike in," affecting the brain, the lungs, the heart, or any other organ, is not based upon actual experience. The fluids secreted previously by the breasts are so readily eliminated by the increased action of the uterus, kidneys, and skin, that scarcely any alteration in the general condition can be detected even by the most careful examination. As is well known, it frequently happens that young wet-nurses lose their milk, but it very rarely happens that any trouble is thereby produced. Where, however, diseases really do ensue, or, as is more common, are already present, these as a rule are the causes, not the consequences of the diminished secretion. Becquerel and Vernois have found that in acute febrile affections the quantity of milk is materially lessened, its solid constituents (butter, cheese, and salts) being increased while the sugar is diminished. When the existing congestion and inflammation of the surrounding parts have abated in individuals otherwise sound, the secretion of milk may be renewed, and may become even more abundant than before. It is, moreover, not to be denied, that when there is a sudden augmentation of a lacteal secretion previously feeble, other local inflammatory processes may disappear; exudations may be absorbed, etc.; not, as was formerly maintained, because the milk in any way causes noxious elements to be "retained" within the organism, but merely because congestions, inflam-

mations and exudations in certain organs may be made to disappear rapidly, in consequence of an increased flow of milk, just as by a severe diarrhœa, or an excessive secretion of urine.

It would be altogether superfluous to reiterate here facts so evident and simple as the above, were it not that the injurious effects of a sudden arrest of the lacteal secretion still continue to be alluded to, and the so-called lacteal metastases to be dreaded. Attention is, therefore, again called to the fact that no one has yet succeeded in demonstrating the presence of milk anywhere in the blood by microscopic examination, a moderate increase in the fat elements being the only alterations noticed in addition to the changes referred to on pages 30 and 31. Moreover, Donné's experiments in injecting milk have shown that no further injurious consequences than a temporary stupefaction have resulted therefrom. Wolf, and J. Schramm have recently discoverd that the mean elevation of temperature in childbed is lowest among those who are not nursing. In order to test the point, whether the irritation of greatly excoriated nipples could produce fever, I, as has already been recounted, once ordered a child to be suddenly weaned, while the mother was suffering from severe febrile disturbance produced by ulcers of the nipples: the result was, that within three days the temperature fell from 105° to 97° F. Many other similar instances might be adduced were it at all necessary. The above facts suffice, however, to prove how entirely unfounded is the notion that the sudden suppression of the milk is attended with danger. It should be added, however, that Hugenberger, as well as Kiwisch, has found that puerperal diseases are more common among nursing than among non-nursing women.

In the treatment of a deficient lacteal secretion, we should be governed strictly by the causes of the trouble. If the patient is suffering for want of sufficient nourishment, a strengthening diet should be recommended with stimulants and abundant liquids, such as good beer, water, and gruel. Attention should be first directed toward arresting any extraordinary loss of the animal fluids: the child should either be applied less frequently to the breast, or removed entirely; the nursing should be only gradually resumed when with returning

convalescence, the lacteal secretion is again increased. It will be advisable in many cases, that a portion only of the child's nourishment should be derived from the mother; cow's milk being also given, the quantity of the latter being gradually reduced. When the milk disappears in wet nurses without any local affection being discovered, it is well to try the effect of strong beer; the frequent application of the child to the breast; the administration of tea in combination with fennel and anise-seed, so highly extolled, or the so-called milk-powder (consisting of pulv. sem. fœnic., sacch. alb., flaved. cort. aurant., āā grms. 2, magnes. carb., grms. 4). All these measures are very often ineffectual, and the only resource left will be to procure another nurse without delay. Skinner asserts that he has employed electricity with success in eight cases of agalactia, and this agent is, therefore, well worth trying. Attention must also be directed to the character of the nourishment, for according to Ssubotin, the quantity of milk is greatly reduced by a fat diet; the amount of butter and casein is likewise diminished by a vegetable diet, while the sugar is increased. Animal diet, on the other hand, would naturally tend to produce an increase in the fat and casein of the milk, but a diminution of the sugar. According to Boussingault, the quantity of milk secreted depends upon the aggregate amount of food. If the renewal of the menstrual function is the source of any great diminution in the milk, the child must be weaned, for it is scarcely to be expected that the milk will be again augmented after the menstrual flow has ceased. It is only when, notwithstanding the presence of the menses, the milk continues to flow abundantly, the wet-nurse is strong, and the child takes the breast eagerly, that further nursing should be permitted; it being certain that very many wet-nurses continue to nurse in spite of menstruation, and that their milk continues to be well digested by the children. My experience in this matter corresponds perfectly with that of Joux (*Gazette des Hôpitaux*, 13, i. ii. 1853), and Tilt (Helfft, *Med. Berliner Zeitung*, No. 8, Feb. 1853.) Tilt showed, that out of 100 women whose menses appeared at different times during lactation, in 45 the quality and quantity of milk remained unchanged; in 8, the quantity secreted was diminished; in 1, the secretion of

milk was entirely arrested; in 5, it showed a diminution of its nutritive constituents; in 24, it was augmented during the time of menstruation; and in 15, it was very abundantly secreted after the menstrual period. Helfft expresses the opinion, that most obstetricians have abandoned the theory, that the milk of menstruating women is injurious. Becquerel and Vernois (*L'Union Médicale*, No. 70, 1853), who made quantitative analyses of the milk of nursing women during the period of menstruation, as well as during the intervals, found that in the latter case, the sugar alone was somewhat diminished (43.88 : 40.49), the casein and extractive matters, on the other hand, were increased (38.69 : 47.69); and it was also observed that no injurious consequences followed the protracted nursing of children during menstruation. In what way the milk is altered by violent emotions has not yet been demonstrated. Irrespective of a diminution in the quantity, a chemical change seems to be produced by this influence, colic, vomiting, and diarrhœa being frequently occasioned in infants by milk yielded under these circumstances.

2. Excessive Lacteal Secretion and Flow. Polygalactia et Galactorrhœa.

It sometimes happens, in non-nursing as well as nursing women, that an enormous quantity of milk is secreted, which, as it escapes, completely saturates their garments several times daily. This, moreover, continues undiminished after the child has been weaned, and may become even greater than before. The former condition is termed *polygalactia*, and occurs quite as often in emaciated, as in fleshy women,—in delicate blondes, as in stout brunettes. This is of no great significance so long as the general condition of the women be not affected by the great flow of milk, and provided also that no illness be induced by the exposure to chill owing to the wet garments. It is an entirely different matter, however, when an uninterrupted flow of milk continues after weaning—*galactorrhœa*, so called. The causes of this affection are still unknown; certain it is that it cannot often be referred to the abnormal irritation incident to an inordinately long nursing, although in this condition an excessive flow of milk is observed; it remains

to be determined whether the circular layer of firm elastic fibres in the excretory lacteal ducts is antecedently relaxed, so as to oppose no obstacle to the escape of milk, or whether this questionable relaxation is really a consequence of the trouble. The latter view now appears to me the more probable. The mammary glands may be found almost completely atrophied, as I myself noticed in one case; or they may be not appreciably enlarged; or, again, they may be firm, slightly distended, and even tender. The amount of milk yielded daily is variable: Kiwisch obtained, in the case of a sick woman, one ounce, whereas other observers have reported the escape of many pints. Guéneau mentions a patient in whom the flow amounted at first to seven, and subsequently to four, litres in the course of twenty-four hours; I once met with galactorrhœa in a non-nursing woman where the quantity was decidedly more than 1–1½ pounds. The milk itself is thin, often quite watery and poor in casein. Both breasts are generally affected, more rarely the trouble is confined to one.

Although strong individuals may be subject to such a profuse flow of milk for a long time without injury, in delicate women quite formidable symptoms may be developed, to which the term *tabes lactea* has been applied, and which are as a whole completely identical with those of anemia. The quantity of blood is diminished; nutrition is interfered with; the women become thin and pallid, and the temperature falls. The skin grows dry and withered, while its secretions are deficient; the muscles are easily fatigued and ache when used. The secretions of the larger glandular organs diminish, the result of which is a decreased discharge of concentrated highly colored urine; constipation ensues; the appetite fails; various disturbances of the digestive organs ensue—such as oppression in the epigastrium, distension of the abdomen, and eructations. The pulse is small and accelerated, the respiration hurried, while headache, palpitation, distress, and syncope often occur. The patients are excitable, inclined to tears and to spasmodic attacks.

The same symptoms are also developed in women who nurse too long. S. Ashwell gave especial attention to these conditions, and found that women who nursed for an unusually long time

experienced troublesome stitches in the back when the child was given the breast, also a sensation of distress in the epigastrium, loss of appetite, muscular weakness, headaches, hallucinations, disturbances of vision, palpitations, exhibiting meanwhile a chlorotic appearance. Nunn (*loc. cit.*) has likewise recently directed the attention of physicians to these affections, and has very properly insisted that they occur not only after long lactation, but also when the impaired state of health of the woman does not allow her to nurse.

I wish here to refer to a disease of nursing women which is rather common, and is connected with nursing and the secretion of milk; it has been described by Trousseau, Verdier, and others, and was repeatedly observed by my father in rachitic patients; I refer to the cramps and muscular contractions which occur especially in the muscles of the upper extremities and neck. These are generally ushered in by an itching of the fingers, soon succeeded by painful contractions of the flexors of the fingers and hand, varying in duration from a few minutes to hours, and recurring frequently (10–20 times) each day; these contractions are often excited by putting the child to the breast, and while they last, the woman is unable to hold anything in her hand, although the sensation is unimpaired. Loss of speech, difficult deglutition, and orthopnœa were often noticed by Trousseau, during the paroxysms, and the symptoms were frequently found by him to appear first upon one side, and immediately after upon the other, while, at other times, both sides would be affected simultaneously. He considers it a rheumatic affection. Verdier has encountered the trouble chiefly in weak and scrofulous individuals. From the fact that it attacks especially debilitated persons and such as nurse too long, and moreover inasmuch as a strengthening diet, weaning the child, and the administration of iron and quinine, are usually attended by very rapid and favorable results, the condition seems to me attributable to an exaggerated reflex irritability. In this connection it should be remarked that disturbances of vision are frequent among nursing women. An amaurosis, more or less complete, at times accompanied by hyperemia of the conjunctivæ, is especially common. Eastlake observed this amaurosis in eight successive confinements of

the same woman, attended in each instance with total loss of vision, supervening on the second or third day; this patient was submitted to the examination of skilful ophthalmoscopists who were unable to demonstrate any alteration whatsoever in the transparent media or upon the retina. The sight generally returned in from three to five weeks. Cuvier and Sichel (Schmidt's *Jahrbücher*, 1864, p. 67) have observed the sudden appearance of amaurosis during delivery, which, in Cuvier's case, completely disappeared within six days. Hecker also (*Klinik*, ii. p. 8–11) relates one case of hemeralopia in a pregnant woman who improved rapidly after delivery, and a second case in which no improvement took place during childbed.

No. 38. In August, 1859, I had the opportunity of making an ophthalmoscopic examination of a woman (under the care of my friend, Dr. Wiefel, Sen.), who at that time was 39 years of age, and was nursing her sixth child. She had also previously nursed her five other children, and had manifested an hereditary tendency to scrofula; she had suffered severely from rheumatism, and more recently from glandular abscesses. While nursing her sixth child, there suddenly appeared, unattended by appreciable external change in the eyes, a disturbance of the vision, characterized by an inability to distinguish objects plainly, everything appearing as if in a fog. This was accompanied by considerable cerebral congestion and headache, and even by day she was unable to see objects a few steps off. The pupils responded to light but their movements were slow, and they were slightly dilated. An ophthalmoscopic examination revealed nothing abnormal in the transparent media; there were discovered, however, in both retinæ, around the retinal arteries, numerous narrow, striated ecchymoses, irregularly distributed; the arteries elsewhere appeared contracted rather than dilated. In consequence of these symptoms, the child was at once weaned, belladonna, in the form of an ointment, was applied around the eyes, and blisters behind each ear; the patient improved rapidly under a generous diet. As to her subsequent history, I was informed by letter (Jan. 1866), that with the return of appetite, and the resumption of the digestive functions, there had resulted a material improvement in the power of vision, the patient being able to see objects in her immediate vicinity pretty clearly, though not with perfect distinctness. At intervals only, when she is the subject of cerebral congestion and headache, and especially for a few days before the appearance of the menses, is her sight indistinct, and inadequate for the recognition of objects at a distance.

At the expiration of the menstrual period the power of vision is again improved. It would appear in this instance, that there was left behind some structural alteration in the retina. It should be remembered, that this patient was not suffering from either heart or kidney disease.

Treatment.—When nursing women have a too abundant secretion of milk, this may be diminished by restricting the diet; by promoting copious alvine evacuations (ol. ricini, potass., sulph., magnesia); by moderate compression of the breasts, and taking care that the child should not be nursed too frequently.

Out of a large number of remedies for galactorrhœa, only two have thus far proved of much value; namely, the internal administration of iodine, or iodide of potassium, and the external application of compression by means of a plaster bandage. The former may be prescribed in doses of 0.3 grm., either in the form of pills or in a solution, three times daily for from 10 to 14 days. The latter may be applied so long as any milk escapes, and must be changed whenever it is moist. A strengthening diet must at the same time be enforced.

Kiwisch recommended injections of a solution of caustic potash (0.12 : 60 grms. water) into the excretory lacteal ducts, as suggested by Krombholtz; the English extol inunctions of the breast with extract of belladonna and glycerine; Hauck prescribes compresses wet with a decoction of oak-bark, and afterwards with a solution of nitrate of silver; others recommend the internal administration of quinine, ammoniated iron, alum, quassia, and belladonna.

Lange has employed the compressing bandage without result, and advises the use of lactate of iron with phosphate of lime (calcaria phosphorica).

Joulin uses *agaricus albus*, one gramme daily, divided into four doses; this agent has likewise been extensively recommended for hectic sweating.

Veit advises in many cases the resort to purgative, diarrhœtic, and diaphoretic remedies, and irritation of the skin by daily friction with hand and brush. Abegg brings on, in the course of 10–12 days, by means of the uterine douche, a moderate uterine hemorrhage, thus effecting a cure. Any great

depletion by cathartics, mustard plaster, or the cupping glass, would be indicated in robust individuals only, or when there is evident congestion of the breasts.

If the above detailed symptoms of anemia are found in nursing women, the child must at once be weaned, and better nutrition be sought by strengthening diet, wine, quinine, and iron in large doses—under which regimen the symptoms speedily subside.

The treatment of convulsions and contractions, as well as of the amauroses of nursing women, has already been described.

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APPENDIX.

"MILK-FEVER," SO-CALLED, A SYMPTOM OF VERY DIVERSE AFFECTIONS.

As early as the year 1820, Carus pointed to the fact, that the mode of origin and causes of the so-called milk-fever were very varied, the usual exciting influences being slight colds, emotional disturbances, errors of diet, irritation of the nipples and breasts, and of the internal genital organs. He maintained, therefore, that milk-fever was an extremely variable phenomenon, so that it was necessary in all such light attacks of fever to keep clearly in view the causes that might produce it. Nevertheless, the specific character of milk-fever is obstinately maintained by many authorities even at the present day; in fact a persistent feverish condition, occurring during childbed, is designated as a "protracted milk-fever." The attempt to determine accurately the normal temperature-curve of lying-in women involves necessarily fresh observations respecting the so-called milk-fever, and I was the first, after Hecker (1855), to make a study of this subject (in June, 1861). When it had been established, from the records of 200 lying-in women, that many of this class continued quite free from fever, I at length became convinced, in the year 1863, that it was quite time to *drop completely from scientific language the name of milk-fever*, inasmuch as this vague term, being applied to a number of the most diverse affections, tended to render obscure our knowledge of the genuine causes of the fever, and to make difficult the diagnosis of the trouble.

Relying, therefore, upon numerous observations made during successive years, I deem myself justified in affirming that simple congestion, that is to say, the physiological hyperemia, of the breasts, is not necessarily attended by any febrile elevation of the temperature, a subfebrile temperature (101° F.) at the most, being excited. A genuine fever is met with only

when sore nipples, or incipient inflammation of the breasts or their integument, are present or when ulcers or fissures in the mucous membrane of the genitals, or other affections of puerperal women, arise. In such instances, a rapid and decided rise of temperature (to above 104° F.) is preceded by chills or a rigor, in no way connected with the secretion of milk, but dependent upon a local inflammatory process in the breasts or genitals. The only reason for so frequent an occurrence of such a fever in childbed, is the fact that excoriations and fissures of the mucous membrane, as has been already shown, are extremely common, occurring in about one-half of all cases. So long as it is impossible absolutely to exclude these local inflammations, as well as other influences which tend to produce a sudden and rapid elevation of temperature (mental emotions, errors of diet etc.), it cannot be positively affirmed that the establishment of the lacteal secretion is the cause of the fever.

I discard the term milk-fever, because it is based upon a false conception; the hyperemia is present before the milk is secreted; the flow of milk does not increase until this has existed for some time, while it is reduced by this flow. No one would call a vaginal catarrh, accompanied by hyperemia and an augmented secretion, a vaginal mucous fever; nor would an affection of the uterus be termed a uterine fever; yet the analogous term "milk fever" is adhered to with great pertinacity.

Two authors in particular have been prominent in opposing my views and their ideas must at this point be briefly cited; Schroeder, formerly in Bonn, and Schramm, in Wurzburg. Schroeder found among 135 women in Veit's clinic, only seven with genuine milk-fever, and expresses himself strongly in favor of retaining this name, "because for ordinary use it is shorter than *mastitis parenchymatosa non-suppurativa*, which is unquestionably more correct." He admits, that the congestion of the breasts which appears between the second and fifth days does not usually cause an elevation of the temperature above 101° F., but adds further on—"if the congestion becomes greater, giving evidence of inflammation, the temperature will be elevated to the height which we designate as fever,

and this condition I call, for want of a better or shorter name, milk-fever."

J. Schramm likewise observes that genuine milk-fever is of so very rare occurrence, that in 100 lying-in women it was met with but three times uncomplicated, and eight times associated with various disturbances in the genital organs. According to Schramm, the temperature rises to 105° F. or higher, and persists at this elevation for hours or days, with longer or shorter remissions and exacerbations, sinking when the tension and irritation of the mammary glands decrease. Schramm thinks that the milk, being rendered stagnant by its retention, acts as a mechanical or chemical irritant upon the walls of the lacteal ducts; that this irritation which approximates an inflammation is transmitted to the lymphatics whereby the nearest cluster of glands becomes tender and swollen. The fever therefore arises from the action of an inflammatory irritation upon the peripheric nerves, the vaso-motors being excited by reflex action.

It is evident from Schramm's description, that he in reality applies the term milk-fever to incipient mastitis, coinciding therefore very nearly with the views of Schroeder; whether this nomenclature is happily chosen, is for others to determine. The statistical data collated by these two authors serves, however, to establish this fact;—that the opinion, which prevails among physicians and still more extensively with the public, that a fever due to the milk must always, or as a general rule at least, occur on the third or fourth day after delivery, is absolutely incorrect, for if, according to these two authors, the so-called milk-fever occurs in but 4.2 per cent. of all cases, this proportion affords indisputable proof, that physicians are unwarranted in always designating a fever in the early days of childbed as milk-fever, "for short."

I cannot resist citing here the words of one of Stoltz's pupils, written, it is true, in 1865, but which have but recently come to my notice: they will be found to convey a very fair idea of the former, as well as the present, status of this question.

Eichinger asks (*l. c.*, p. 23): "La fièvre de lait se déclare-t-elle toujours et nécessairement?" and replies thereto, "D'après

les *anciens*, qui la considéraient comme un phénomène physiologique, *oui ;* ils ont neanmoins accordé qu'elle pouvait manquer quelquefois. La plupart des *auteurs modernes* disent qu'elle arrive *habituellement*, mais qu'assez souvent elle manque. Pour *nous*, nous dirons qu'elle *n'arrive jamais* quand on ne l'amène pas volontairement ; car la fièvre qui a pour point de départ la congestion mammaire, n'arrive jamais, si on a soin de prendre les précautions nécessaires."

The extreme vagueness in the application of the term milk-fever, and the arbitrary manner with which it has been employed, will serve to explain how, even up to the present time, the most diverse definitions have been applied to it. Let us refer to some of the latest writers. Hohl, for instance (*Lehrbuch*, 2d edition, p. 916), attributes the febrile action in the early days not to the secretion of the milk alone, but to that process in conjunction with the determination of the fluids to the surface. F. G. H. Birnbaum (*Regelwidrigkeiten der Geburt*, Berlin, 1865, p. 178) regards milk-fever as a transient feverish attack, which disappears in 10–12 hours. W. Lange (*Lehrbuch*, p. 180) holds, that it generally makes its appearance on the 2d or 3d day, more rarely on the 4th ; a chill is followed, in from 8 to 12 hours, by a general perspiration, after which the woman feels very greatly relieved ; the feverish symptoms also disappear. This scarcely coincides with the statements of Schroeder and Schramm, who have seen the milk-fever persist for many days with remissions and exacerbations. Other authors (Naegele, Grenser, and others) affirm, furthermore, that the neglect to put the child to the breast produces milk-fever, whereas Hohl, on the other hand, asserts decidedly that he has been utterly unable to corroborate this theory, he observes that the trouble is often absent in weak aud excitable women, but present in the robust, etc.

I desire finally to call attention to the fact, that Wolff (*vide* Introduction, p. 22), who made extensive observations respecting the temperature among women in Dohrn's clinic, arrived at the conclusion that the elevation of temperature attributable to the secretion of milk did not, as a rule, exceed 1.5° F., but in case of an unusually fast flow a single rise of temperature to 104° F. might ensue without being followed by

any further mischief. Baumfelder, who published examples of the different temperature curves among the feverish lying-in women in Credé's clinic in Leipsic, does not adduce a single instance of the so-called genuine milk-fever. Moreover, he states explicitly (p. 17), that he has no intention of disputing the influence which the secretion of milk has upon the height of the temperature (*i. e.*, the average maximum temperature) in puerperal women, but desires merely to protest against the undue importance so frequently attributed to this influence.

I must, therefore, insist that it is high time to abandon this term, inasmuch as it is now customary to select names for diseases corresponding to the anatomical conditions under which the diseases are produced; it is certainly desirable to give up all symptomatic nomenclature that tends to produce obscurity and error. The expression milk-fever is open to this objection, inasmuch as there is, as Kiwisch very properly remarks, scarcely any pathological term in use better calculated to confuse the mind of the reader.

With the view of illustrating more clearly the above statements, I will conclude by citing a case which many practitioners, relying upon a mere examination of the breasts, or a digital exploration of the genitals, would have pronounced a clear case of milk-fever, involving, however, the action of several febrile influences. Here an examination with the speculum revealed the principal radiating point of the disease. There can, indeed, be no doubt that the endometritis, and ulcer on the os, thus detected, were more extensive when the uterus was larger, and the woman in an acute febrile condition, than at the time of the exploration with the speculum, when they formed merely the remains of a local affection that had almost healed. If, however, Schroeder intends to convey the impression that I regarded the ulcer as the sole source of the trouble, I can only smile at his witty comparison, for in his blind zeal, he has fallen into the very natural error of quite ignoring the endometritis so fully described, and mentioned, moreover, in the title of the article.

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RECORD OF CASES.

No. 39. *Great hyperemia of both breasts. Eczema of both nipples. Endometritis colli. Ulcus orificii uteri externi, with fever lasting several days.* (*Vulgo*, "*milk-fever.*")

S. D., 27 years old, in her 5th pregnancy, was admitted to the lying-in hospital, on Feb. 20, 1866. She was a pretty, well-nourished blonde, weighing 137¾ lbs., and measuring 5 ft. 1½ inches in height. She first menstruated in her 16th year, since which time the catamenia have recurred at regular intervals of four weeks, lasting 2–3 days. The flow had been small, and unattended by pain. The course of the four preceding pregnancies had been normal; the last had terminated on March 2, 1864; the childbeds were all free from complications. During the last gestation, moreover, her condition had been comparatively good. The circumference of the abdomen measured 104 ctms., the back of the fetus was to the left, the small parts to the right and above. In the vicinity of the fetal heart sounds, there was a distinct umbilical murmur; just beneath the orifice of the urethra was a small spot covered with a pale, grayish membrane, containing broad threads of mycelium. Head lying quite deep and impacted. After dragging pains had been present for four days, regular labor-pains set in at 9 A. M. on Feb. 22d. At 1.30 P. M. the membranes were ruptured, and five minutes later a living male child was born at full period, weighing 8 lbs., and measuring 52 ctms. in length. Placenta was soon afterward expelled by pressure. A few weak after-pains occurred during the afternoon. Uterus hard, rather tender to the touch on the right side. Wet compresses prescribed. Breasts secreting abundantly.

Feb. 24, P. M. Both nipples red, swollen, and tender upon pressure, and the seat of eczematous vesicles. A fissure upon the base of the right one. Breasts very tense and painful, especially the left. A fissure at the posterior commissure, produced during delivery, now looks like a small ulcer covered with healthy granulations.

Feb. 25. In the morning, a part of the vesicles on the nipples had dried up. In the evening, the subjective condition was good. Neither chill nor feverishness present. Uterus flaccid, external orifice gaping, lips tumefied, a deep fissure to

the right. Vagina very tender. Lochia offensive. Prescribed enema, ol. ricini ℥ij, and vaginal injections of hypermanganate of potash.

Feb. 26. Right breast particularly painful; nipples swollen, and covered with scabs.

Feb. 27, P. M. Temp. 101.3°, P. 66, R. 20. Both nipples were red, swollen, and tender when the child was applied; the left was covered with crusts.

Mar. 1, P. M. Temp. 99.7°, P. 58, R. 18. Left nipple sound, right still has a half-moon shaped fissure.

Mar. 5, A. M. Temp. 99.5°, P. 62, R. 18. Upon examining the woman in the chair, the abdominal walls were found to be greatly relaxed, and the fundus uteri at the entrance to the pelvis. The entrance to the vagina was slightly gaping at its posterior half.

On the posterior commissure was the cicatrix of a small fissure, and several little red spots on the inner surface of the labia minora; on the left one there was a pale cicatrix, with partially swollen edges. Vagina short, smooth, and quite wide. The os uteri on a level with the spines of the ischia, gaping transversely, and admitting a finger. Granulations on both lips, likewise fissures, to the left on the anterior and to the right on the posterior lip. The uterus could be felt through the anterior vaginal cul-de-sac. Through the speculum the os appeared to be spotted red. On the anterior lip were several distended follicles (cysts from retention) as well as on the posterior. Discharge muco-purulent, but scanty. On the left side of the anterior lip was a small ulcer, as large as a pea, with sharp edges, surrounded by a narrow red stripe, and a gray deposit. Mother and child were discharged. Mother's weight 119¾ lbs. Child's weight 9 lb. 2 oz.

SECTION III.

AFFECTIONS OF OTHER ORGANS THAT OCCUR IN CONNECTION WITH CHILDBED.

CHAPTER I.

AFFECTIONS OF THE URETHRA AND BLADDER.

The lesions of the urethra and bladder which occur in puerperal women, have already been described on pp. 69–83; it only remains, therefore, for us to consider the congestions, inflammations and neuroses of these organs, which are comparatively common in childbed, and which exercise, as we shall see, an important influence upon the condition of the organs of generation.

I. Hyperemia and Inflammation.

The anterior vaginal wall is often forced somewhat downwards and forwards by the pressure of the child during its descent into the outlet of the vagina, and the bladder and *urethra* are then pressed under the pubic arch. The extensive venous network in the neck of the bladder and the vessels of the urethra are thereby considerably distended, and in some cases ruptured, resulting in small extravasations of blood into and beneath the mucous membrane; this condition is very frequently observed after the more tedious labors, and is also often encountered in labors terminating abruptly. Congestion, swelling, and tumefaction of the urethra occur moreover secondarily, where ulcers exist in the vicinity of the urethra, and at the orifice, or within the cavity, of the vagina. The same is true of the *bladder;* although the affection of the mucous membrane occurring under other conditions than those of

childbirth is most frequently primary, yet during childbed, disease of the walls of the bladder is, at least, quite as common as pericystitis: this latter is an affection of the connective tissue of the parts lying between the base of the bladder and the vagina, occurring more rarely than *cystitis serosa* after primary disease of the peritoneum. The layers of connective tissue are then swollen, becoming the seat of an œdematous infiltration; the muscular coat of the bladder is likewise infiltrated with serum, or pus, while the mucous membrane exhibits catarrhal swelling and tumefaction, and is often of a gray slatish color. If the vagina or cervix uteri is the seat of diphtheritic ulcers, diphtheritic patches of irregular shape and variable size are, likewise, frequently found upon the corresponding portions of the bladder. When such plaques become detached, ulcers remain, and these ulcers by perforating the vesical wall may give rise to fistulæ; vesical hemorrhage, and persistent catarrh of the bladder are sometimes produced in this manner.

The *symptoms* of urethral swelling and inflammation are chiefly *pain* and difficult micturition; the former is characterized by a burning sensation after urination, which, if the urethra is much swollen, may result in complete retention; this retention appears soon after delivery. In the analogous affections of the bladder, pain, constant desire to urinate, and retention are likewise commonly present. Ischuria makes its appearance in different ways, depending upon whether a contusion of the bladder has taken place during delivery, or an antecedent affection of the vesical walls has finally brought on diseases of the vagina and uterus. In the former case, the trouble comes on soon after delivery, in the latter, within from three to eight days. The same is true of retention occurring as a symptom of *cystitis serosa*, although it is by no means an invariable accompaniment, and in many instances does not appear until a later period of the illness. The sequelæ of ischuria have already been discussed on p. 127; the sooner it appears after delivery the more likely it is to give rise to considerable hemorrhages, either external or internal; and the longer it persists the more certain it is to exercise a retarding influence upon the involution of the uterus, and upon the ulcers

in the genital passages. If the urine be retained for a long time within the bladder, requiring frequent resort to the catheter, it becomes quickly alkaline, and thus tends to produce further disease of the vesical mucous membrane. This lining membrane may be so affected by the action of the urine as to become elevated in the form of blisters and detached, in which case it will be discharged in the urine in the form of large shreds, or even tubular structures, filled with small cellular masses, which have in part undergone fatty degeneration, or with fine filaments of fibrine, in every respect analogous to a diphtheritic membrane; this phenomenon has been recently observed by W. Martyn, Spencer Wells, Barnes, and Haussmann (who has made a compilation of these cases). The pieces discharged have been found to consist chiefly of submucous tissue, and even portions of the muscular coat of the bladder. In case of retroversion of the gravid uterus, giving rise to a prolonged retention of urine, there have been found by E. Martin, and Wittich, first, croupous and diphtheritic exudations in which various urinary salts, especially the crystals of the triple phosphates, were imbedded, and subsequently pericystitis with exudations between the anterior wall of the bladder and that of the abdomen. [Martin's case, No. 18—Retroflexio uteri: the patient died on the third day after delivery, expulsion of the ovum having followed three days after puncture of the uterus. In Martyn's case the expulsion of the membranes above described took place on the twenty-second day after delivery; forceps were employed on account of face presentation, and ischuria immediately ensued.]

The *duration* of urethritis and cystitis depends upon the causes of these affections, and seldom exceeds fourteen days; the swelling of the vesical and urethral walls disappears in proportion to the degree of improvement of the causal ulcers, though at times it will persist long after these ulcers are healed. If catarrh of the bladder succeeds the acute affection, or the long retention of urine, then the urine evacuated contains a more or less thick deposit (disintegrated epithelial cells, urinary salts, especially the phosphates of magnesia and ammonia); pain is experienced during micturition, and sometimes small mucous plugs are with considerable difficulty forced

through the urethra, whereupon the urine escapes freely. The diagnosis can only be accurately determined by a careful examination of the genitals, and an analysis of the urine. When the exudation is croupous, small shreds are discharged in the urine; when there are extravasations the urine is sometimes bloody, and should it contain a great quantity of pus, we are justified in concluding that a parenchymatous abscess has perforated the bladder, assuming that the kidneys were healthy and that there was no peritonitis or parametritis to discharge its exudations through the bladder. Tenderness to the touch upon catheterization, and difficulty in introducing the catheter, experienced throughout the whole length of the urethra, likewise indicate inflammatory swelling of these parts.

The *causes* of these affections have already been given; they are *contusions* of the parts, occurring during labor; *puerperal ulcers* in the vicinity, especially those situated near the orifice of the urethra; *parametritis*, *peritonitis*, and *retroversion of the gravid uterus*. These troubles are rather more common in primiparæ, occurring usually after tedious labors, and also after a very rapid delivery, especially where the head of the child is hard and unyielding. These affections likewise follow acute retroversion of the puerperal uterus, as has already been stated in the appropriate place (p. 205). In the last 280 deliveries coming under my observation, there was subsequent retention of urine in 50 cases (that is, in 18 per cent.); of the latter 26 women had then been delivered once, 16 twice, 2 three times, 2 four times, 2 five and 2 six times; in ten of these the delivery was completed by the accoucheurs and in the following manner: seven times by the aid of the forceps; twice by extraction in breech presentation, and once by version with subsequent extraction. Of the deliveries, therefore, which were followed by retention, those in which manual interference was required formed but a fifth part. This retention occurred most frequently (37 times) immediately after delivery, or within the first 24 hours; it was observed but 6 times between the second and fourth days, and 7 times after the fourth day. E. A. Meissner met with retention of urine in hospital practice 32 times in 618 cases (5.17 per cent.); 14 times in 253 cases in his private

practice (4.35 per cent.); in 142 other puerperal women, 3 times (2.11 per cent.).

The existing ulcers must first be attacked by prophylactic measures, and an attempt made to improve their character. At the same time the woman must be admonished to evacuate the contents of the bladder every three hours. If this is impossible while lying upon the back, the attempt may be made while resting upon the hands and knees. A very important precaution is that of always passing the catheter when lying-in women have not urinated within four or five hours after delivery, and are not likely soon to relieve themselves naturally. Not only may the danger of uterine hemorrhages be thus obviated, but any swelling of the urethra is reduced by the pressure of the catheter, and thus the subsequent repeated catheterization is avoided. Moreover, by the complete evacuation of the bladder, and by the irritation produced by the introduction of the catheter, a powerful contraction of the bladder is induced, which is peculiarly beneficial at this time, inasmuch as the abdominal walls have not recovered their power and can but rarely assist the *accelerator urinæ* to perform its functions. If ischuria still persists, the catheter must be introduced at least twice a day; or still better, three times daily, or at intervals of from three to four hours; but the instrument should, of course, not be left in the bladder. Vaginal injections are always indicated, and will vary according to the nature and appearance of the ulcers. When the pain is acute, emulsions containing narcotics may be administered internally. (Extr. hyoscyami, tinct. opii, grms. 1.2 to 200.) At the same time cold compresses should be applied to the abdomen, or, if these prove uncomfortable, warm fomentations may be resorted to, or the *linimentum volatile* and laudanum may be rubbed on. If these measures do not afford decided relief, several leeches may be applied over the mons veneris. When this form of ischuria, attributable to lesions in the neighbourhood of the urethra, is very persistent, drinks containing carbonic acid, Seltzer water, soda water, and light beer have proved of great service in my hands. The patients are often able for the first time to evacuate the urine completely and without assistance within half an hour after taking these fluids. The

following drugs have also been recommended: iron, balsam of copaiva, oil of turpentine, and others—which, however, cannot be employed while there is any pain, and must be discontinued whenever it recurs.

If catarrh of the bladder and obstinate ischuria remain (and this I have twice observed after *retroversion of the gravid uterus*) in addition to the regular evacuation of the bladder, injections will be found extremely beneficial; these may consist of a solution of nitrate of silver (0.03–0.12 to 30 grammes), of tannin (0.3 : 30 grammes), or of sulphate of zinc (the same strength). Internally lime-water and milk, Ems or Neuenahr pastiles, and further the milk or whey treatment may be recommended. Baths may likewise be prescribed, especially those of Vichy, Ems, or Neuenahr.

II. Neuroses of the Urethra and Bladder.

During the first few days after delivery, the portions of the urethra which are situated nearest the bladder, as well as the lower part of the bladder itself, are not unfrequently the seat of a *spasmodic contraction*, whereby the evacuation of the urine is interfered with, or completely arrested (*ischuria spastica*). This spasm is easily recognized when the attempt is made to pass the catheter, from the resistance offered by the sphincter, and from the acute pain induced by the endeavor to advance the instrument further. The catheter may, however, generally be passed slowly by rotating it a little, and a single catheterization frequently suffices to relieve the spasm. It is most probable, that the contraction is the result of reflex action induced by the irritation of the sensitive portions of the mucous membrane of the urethra with the catheter; or is in other cases observable, when the sphincter itself has become sensitive and irritable from extravasations of blood, which have taken place during labor. Scanzoni recommends in this spasmodic affection enemata containing laudanum, tepid baths, injections, and warm, moist compresses upon the abdomen. I have often met with this complaint, but have always succeeded in affording relief by one or more applications of the catheter alone. Care must be taken to have the instrument warm and properly oiled:

if the introduction of the metallic catheter be too painful, a moderately large elastic instrument may be substituted.

Paralysis of the *sphincter vesicæ* sometimes ensues after contusions of the bladder produced during difficult, tedious labors, but is on the whole extremely rare. Paralysis of the *accelerator urinæ*, on the other hand, is much more frequently observed. As a result of the paralysis of the former muscles the urine dribbles away uncontrolled by the patient (*incontinentia urinæ*); while in paralysis of the latter muscles, it trickles away only after violent motion and straining of the abdominal walls (coughing, sneezing, etc.). It is important, however, not to confound with this form of paralysis the *ischuria paradoxa*, in which the natural resistance of the sphincter is overcome by great distension of the bladder, in consequence of which the urine also dribbles away. The effect of this continuous flow of urine upon the wounds of the mucous membrane seated at the orifice of the vagina, has already been described (p. 164).

Paresis and paralysis are much less frequently observed in the urethra than in the bladder. Scanzoni says that he has only seen paralytic *ischuria* in the last stage of a puerperal fever which terminated fatally. I have never met with such a paralysis of the accelerator, although I have often seen paresis of this muscle after persistent ischuria attended by infiltration of the muscular coat of the bladder. In these cases of partial or complete paralysis of the sphincter and accelerator, the most important remedial agent will be found to be the regular use of the catheter, and it is often well to allow the instrument to remain within the bladder for a time. The following internal remedies have been recommended by Scanzoni for paralysis of the bladder: *tinctura cantharidum* (2 drops upon sugar of milk twice a day), combined with enemata composed of an infusion of ergot. Externally, the application of aromatic and alcoholic fluids over the mons veneris. The application of the induction current is especially to be recommended, both poles being applied over the symphysis.

The strictest attention to cleanliness, and the frequent use of sitz-baths, are indispensable to prevent inflammation and ulceration of the external genital organs. Cold sponge-baths, the

douche, and the introduction of a powerful stream of cold water by the aid of a syringe are said to have produced favorable results in many instances.

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CHAPTER II.

AFFECTIONS OF THE ARTICULAR LIGAMENTS OF THE PELVIS.

It has been established, as is well known, by the researches of Luschka, that the articulations of the pelvic bones with each other are not true symphyses, but joints more or less complete, the ends of the bones opposed to each other being each invested with cartilage. This cartilage in the ilio-sacral synchondrosis is covered with a synovial membrane, containing round, or polygonal, cells like epithelium. A synovial membrane is found on the inner surface of the so-called symphysis ossium pubis in woman, in which are discovered a collection of round cells only, with no true epithelium. This imperfect articulation may be developed during pregnancy so as to form a complete joint, by which process these cellular elements are considerably increased. A pathological "relaxation" of these inter-articular ligaments should not, however, be confounded with the loosening which occurs physiologically during pregnancy. The latter affection, as well as inflammation of those structures, is not altogether confined to pregnancy and childbirth; it is, nevertheless, so extremely rare at other times that it may be regarded almost as a specific puerperal disease, and this is, therefore, an appropriate place for a discussion of the subject.

I. Hyperemia and Inflammation of the Pelvic Synchondroses.

Before the precise character of the symphyses was understood, it was known that any disease of these articulations generally began at the centre and advanced toward the periphery. Hyperemia and inflammatory swelling of the synovial membrane is attended by an increased secretion of the synovial fluid, by which the bones are forced apart. Thus in one case (*l. c.*, p. 100) Luschka found the extremities of the symphysis

pubis separated by a distance of 15 mm. from each other. If the inflammation pass on to suppuration, the cartilage appears denuded, eroded, and even perforated, while at some points it will be found to be completely destroyed, the caries extending to the bone. By this process an abscess is formed within the joint. At the same time the adjacent soft parts (the external genital organs, the integument over the glutæi, the pelvic cellular tissue) then often become infiltrated with serum, pus, or sanious matter. The abscess may discharge into the deep portion of the pelvis, and thus work its way to the surface, or it may burrow beneath the skin for a long distance, and in this way the pus may be scattered in different directions.

These diseases of the pelvic articulations may be either primary or secondary, the latter forming what is called *metastasis.* The primary affections are developed within a limited time after delivery, occasionally unaccompanied by any other lesions. The secondary affections are preceded by the symptoms of the primary disease (pelvic phlegmon or metro-phlebitis). All three joints are occasionally affected, but more often only one. Whether the pubic articulation is more frequently affected than the ileo-sacral cannot yet be determined, owing to the limited number of cases thus far recorded. Scanzoni states, in opposition to Kiwisch, that disease of the ileo-sacral synchondrosis is the most frequent, and that the primary affections are more common than the secondary. To the correctness of the latter statement, I can myself bear testimony. The ordinary symptoms are pain about the affected joints, shooting down toward the lower extremities, and functional disturbances, the patients being either completely deprived of the power of walking, or else dragging themselves slowly from place to place with the aid of crutches. In one case which fell under my observation (*vide* No. 41), the gait was thoroughly characteristic; the patient pressed the knees together when she walked, and pushed her feet along the floor without raising them, her gait closely resembling that of women suffering from osteo-malacia (mollities ossium). The sufferers complain of a sense of weight and numbness in the legs, and of formication, etc. If the symphysis pubis is affected, severe pain upon

passing urine is at times felt. In cases where an abundant effusion of synovial fluid has taken place, the iliac bone of the side implicated may be elevated while walking, as was noticed by Débout; and in a case of Scanzoni's, according to the statement of the patient, an elevation of the right extremity of the os pubis at the symphysis could be distinctly felt with the hands, when the right leg was raised. If the disease go on to suppuration the pain is exacerbated; chills and fever follow; the severity of the pain prevents all motion of the lower extremities, and swelling soon begins in the neighbourhood of the joint. Large abscesses may thus form in the mons Veneris, in the region of the groin, or over the right ischium and sacrum. Kiwisch once evacuated half a pint of thick pus by an incision into the symphysis pubis (*l. c.*, Observation 38); the patient recovered in six weeks. The terminations of the disease, which we are describing, are, *First*, by *absorption*, complete resolution, and recovery; this is the most common result, and in the lighter cases usually takes place in 2–3 weeks. *Second*, suppuration and perforation, with subsequent recovery in 4–6 weeks. *Third*, a persistent chronic relaxation that may last for years. Danyau has seen this in one case even after fifty years, and in another after seventeen years: Herrgott observed it at the end of eight years. Finally, there may be a recurrence of the disease during, and subsequent to, the next pregnancy. Suppuration of a pelvic joint, appearing in the course of septic puerperal affections, may greatly hasten a fatal result. *Fourth*, septicemia and pyemia in rare instances. (Grenser.)

Diagnosis.—The trouble is, on the whole, easy to recognize, notwithstanding the statement of Scanzoni that it is impossible to distinguish it with absolute certainty. The seat of the pain is peculiarly characteristic, being referred by the patients to the precise spot affected; when pain coexists in the extremities, it is chiefly felt upon movement, and then always with an exacerbation in the diseased parts of the pelvis. The assertion of Kiwisch, that the pain is augmented by pressing the iliac bones together, cannot often be substantiated; the affected synchondroses are, however, so sensitive to pressure from within or without, that the patients at once affirm that the point

touched, is the true seat of the pain. A reasonably careful examination of the legs and genital organs renders it, therefore, impossible to confound this complaint with crural neuralgia, or as Pigeolet suggests, with phlegmasia alba, or with uterine displacements, of which we are warned by Danyau. In the two cases observed by me, the diagnosis could be readily made upon the first examination. In case of suppuration, a probe must be inserted after the abscess has discharged, in order to ascertain whether the joint has been laid open, and the cartilaginous covering disintegrated.

Etiology.—The disease in question is quite as apt to come on after easy and rapid labors, as after those which are more difficult, and which require interference. Stoltz states, that he has not unfrequently met with it in women of a sanguineous temperament, or who are very fat and in a cachectic condition; also where the pregnant uterus has attained unusual dimensions. Moreover, when the head of the child is large and unyielding, the pelvic synchondroses may be forcibly separated, in consequence of which, an inflammation is set up, similar to that produced now and then by a push or blow (Grenser, *l. c.*). Finally, relaxation has been seen to occur after an abortion (Courot), and the same has been repeatedly observed by Débout, during pregnancy, generally between the 7th and 8th months, following some violent strain, or the lifting of some heavy object. The same author found that half of his patients (19 cases) were of vigorous constitution, and in no one of the puerperal women were there any traces of scrofula or rachitis. As to the frequency of this complaint, data are wanting to enable us to form an accurate estimate. Kiwisch has reported one case (see below); Hiller, two; Clay likewise, two; Pigeolet, one; Ferdinand Martin, four; Danyau, two; Courot, two; Débout, 19 in all; Dévilliers, one; Galvagni, two (*l. c.*, p. 26–31, *Primary Inflammation of the Right Sacro-iliac Synchondrosis;* pp. 37–40, *A Metastatic Inflammation with Uterine Phlebitis*), while I have treated two cases (reported under Nos. 41 and 42). Tonnellé, in the autopsies of 222 puerperal women who died in the Paris *Maternité* during 1829, found pus but twice in the symphysis (*vide* Litzmann; *Kindbettfieber*, p. 232).

The prognosis in primary cases is very favorable; there is often (as in the first case occurring in my own personal experience) an entire absence of febrile disturbance. Absorption takes place, and complete recovery usually ensues in the course of a few weeks. When an abscess is formed, the prognosis is less favorable; when the cartilage is destroyed, the inevitable result—provided death does not intervene—will be anchylosis, a matter of no great importance, however, if the diameters of the pelvis are not exceptionally small.

Treatment.—An unusually severe relaxation of the symphysis and sacro-iliac synchondrosis which had commenced during pregnancy, and persisted for four months after delivery, was completely relieved by Scanzoni within a period of eight months, the treatment consisting of the external administration of narcotic ointments containing iodide of potassium, applied by inunction to the vicinity of the affected joints; baths in water charged with the salts of iron; and finally baths of Brückenauer. At the outset of the inflammation, and also when the pain is severe, blood should be abstracted from the parts around the joint, to be followed by inunctions with narcotics, or mercurial ointment (*linimentum volatile* and *tinct. opii*, which alone proved effectual in my cases). Women should of course keep their beds and avoid every exertion. In the case of delicate persons, Stoltz recommends iron and quinine internally, together with tonic inunctions and cold sponge baths. When several days have passed free from severe pain, the woman, if in other respects well, may be permitted to indulge in a few cautious movements. A padded belt made of steel, and provided with a double cushion like a truss, has been described by Ferdinand Martin, the spring of which attached to the posterior upper border is curved forwards and downwards, and running parallel to the crests of the iliac bones, is supposed to exercise constant pressure upon the joints. These belts are recommended by Pigeolét, Débout, Danyau, Putégnat, Dévilliers, and Stoltz. If suppuration take place, the pus must be promptly evacuated by an incision. If the complaint assumes a chronic form, the use of sea baths, douches, inunctions, and especially the employment of water from Baden-Baden is advisable (Stoltz).

II. Forcible Separation of the Pelvic Synchondroses.

Complete separation of these joints sometimes occurs in the course of difficult, but spontaneously terminated labors, or severe obstetrical operations, and is therefore especially frequent in women having contracted pelves. Thus Scanzoni observed it in one instance in the right sacro-iliac synchondrosis, after a delivery which had been completed without interference, but where the head had descended with the forehead pressing against the joint. Its other mode of origin—viz., from the application of the forceps—is more common; instances of its production in this manner have been reported by Bignet, Hoffmann, Hecker, Scharlau, Hildebrandt, Odier, and Galvagni. In Hecker's case, a rachitic pelvis was the cause of the difficult labor, some injury being inflicted upon the pubic articulation. Ahlfeld has described a labor occurring in the Leipsic lying-in establishment, in which, after twelve ineffectual tractions with the forceps, the child's head was perforated, and extracted by the aid of the cephalotribe through a pelvis contracted in its congugate diameter by rachitis. Here, a post-mortem examination revealed the fact, that the symphysis pubis and both sacro-iliac synchondroses, had been torn apart.

The *symptoms* attending these lesions are great pain, and at times a sensation as though something had been ruptured. Since, however, the application of force, sufficient for the extraction of the child, involves the injury of other parts also, the articular lesions may entirely escape notice, death taking place as a consequence of the affections of the vagina and uterus. In cases where this disrupture is the only lesion, it may terminate in suppuration, perforation of the pus, and recovery. In a case reported by Scanzoni, perforation of the skin situated directly over the large bloodvessels took place. This result cannot often be looked for, however, inasmuch as any contractile power of the uterus, which when exerted upon the child's head is sufficient to start the *bones* of the pelvis from their attachment, can hardly fail to produce at the same time severe and extensive injuries to the soft parts.

The treatment should conform to that appropriate to the

strain of any other ligaments; local abstraction of blood; ice-bags or ice-water compresses; the lateral decubitus in case a sacro-iliac synchondrosis is ruptured. If an abscess forms, an early incision should be made, and if the inflammatory symptoms are relieved, the use of a firm pelvic belt is indispensable, without which no movement will for a time be possible.

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RECORD OF CASES.

No. 40. *Inflammation of the Symphysis Ossium Pubis: Recovery.*

Mrs. S., aged 31, a small brunette, powerfully built, well nourished, though rather pale, had always enjoyed good health from childhood. At the conclusion of her first pregnancy, she was delivered by me with the aid of the forceps (head presentation, second position), from the circumstance that the second stage had been prolonged beyond three hours, the woman being greatly exhausted, being unable to effect the expulsion of the head, which occupied the floor of the pelvis, and presented a large "caput succedaneum." During her subsequent convalescence, she experienced no trouble, with the exception of a small puerperal ulcer; she was unable, however, to nurse her child. Upon the ninth day, she got up. After the twelfth and thirteenth days, when the first attempts were made to walk,

she began to experience a constant and severe pain in the bones, which she at once referred to the os pubis. Upon a careful examination of the genital organs, nothing abnormal could be detected; the ulcer had healed; the uterus had undergone involution, and occupied its normal position; the organ was not sensitive; when, however, pressure was applied against the middle of the anterior wall of the pelvis from within, or from without directly over the clitoris, severe pain was thereby induced. Urine and feces were discharged as usual. The patient was unable to walk unassisted, but shuffled cautiously along, holding on to objects in her path. There was no tenderness at the sacro-iliac synchondroses. The pain was relieved in about fourteen days by the aid of inunctions with glycerine and laudanum (ʒj to ʒj), and rest in the horizontal position. In her first attempts to walk after leaving the bed, she walked unsteadily and staggered, but she made a speedy recovery, and eighteen months later was confined for a second time without experiencing a recurrence of the trouble.

No. 41. Mrs. S., aged 29, primipara, small, quite fleshy, a light blonde. This patient, who had enjoyed good health during gestation, was delivered by me instrumentally, Dec. 4, 1865, at 1.30 A. M. The child's head had remained firmly wedged within the pelvis since 10.30 the previous evening. The head, bearing forcibly against the symphysis, compressed the neck of the bladder, on which account it was repeatedly necessary to resort to the catheter during labor. The child, a pretty vigorous boy, weighing rather less than 7½ pounds, appeared at first asphyxiated, but was speedily revived. A slight rupture of the perineum was produced. At 12 M., Dec. 4, her condition was good, the pulse being 84, and temperature 99.7° F.; the only unusual symptom noticed was that the uterus was somewhat sensitive to the touch. Upon the evening of the 5th of December, the patient had a chill. Dec. 6, noon, the temperature was 103.4° F., the *fundus uteri* extremely sensitive. The wound in the perineum became the seat of a purulent discharge, while the nipples were excoriated. This state of things was ameliorated after the employment of injections, and cold, wet compresses. Dec. 7, temp. 99.9° F., pulse 108. Dec. 8, temp. 100.9°, pulse 84. Dec. 9, pulse 96, temp. 102.9° F. Patient complained of great heat; the abdomen was more distended and tense, and but slightly painful; the perineal wound looked well. It transpired that the woman had risen to have her bed made, and walked to another bed in the same room (sixth day). These unfavorable symptoms were again speedily allayed by a similar treatment, and by Dec. 16 she left her bed for the first time. Upon the 18th of

Dec., as she was making her first attempts to walk, she noticed a certain stretching and tearing, attended with a stiffness of the feet; still, she succeeded in walking a few steps. The pain now rapidly increased, and by the 20th of December, she was no longer able to move the limbs forward without assistance, and complained of pain in the bones, and lameness of the legs. Yet she could plant her feet firmly, and also draw up her legs in the lying posture. In order to move, however, she was obliged to press the knees together, keeping them slightly bent, with the upper half of the body firmly braced, and then shove both feet along the floor together. She suffered no pain whatever, when pressure was applied to that part of the mons veneris situated directly in front of the symphysis, but when pressure was made, either from within or without, against the symphysis (which seemed to the touch unusually broad), she recoiled at once. She suckled her child, exhibiting scarcely a trace of any lochial discharge; the rate of the pulse was slightly diminished, while the temperature was somewhat elevated. With the aid of enemata, inunctions with the volatile liniment and laudanum (℥ij to ℥j), absolute rest and a nutritious diet, the patient improved so rapidly, that by January 10 (at the end of three weeks) she was able to walk across her room with no great difficulty, and at present goes about as readily as before her illness.

CHAPTER III.

NEURALGIA AND PARALYSIS OF THE LOWER EXTREMITIES.

Anatomical Condition and Causes.—In a great majority of cases puerperal neuroses of the lower limbs have their seat, as Kiwisch has already shown, in the nervous trunks, far more rarely in the nervous centres. As a rule, their origin is attributable to the process of labor itself, for even though the nervous plexus and separate nerves are usually protected from any great pressure, occupying as they do a secure position in depressions of the bones, or being embedded in the soft tissues, yet they are not unfrequently exposed to such pressure when the child's head is hard, or when its position is unfavorable and the pelvis is not particularly capacious; this is most likely to occur on the side toward which the occiput is turned when very prominent. Great compression may result in a complete rupture of the nerves at the exposed point, which sometimes happens when there has been instrumental interference during labor, the surfaces of the blades, and more particularly the edges of the forceps, producing harmful contusions of the nerves.

The diseases occurring in connection with childbirth are also quite frequently complicated by neuralgia and paralysis of the lower extremities. For instance, separate nerves (a) may be compressed and irritated by pelvic exudations; (b) small extravasations in their vicinity may extend along the sheaths of the nerves; (c) hyperemia and œdema of the neurilemma may appear independently. It has already been mentioned (p. 206) that such a neuralgia is sometimes produced by parametritis, and an instance (No. 18) adduced in proof. The varying location and extent of these exudations causes these affections to attack at one time the external and median cutaneous nerves, at another the obturator and sciatic. In a majority of cases, however, the two latter nerves are those implicated during labor. That congestion and œdema of the nerves which pass

through the pelvis occur as a primary lesion can hardly be doubted ; and yet, it is quite as difficult to furnish direct proof of the fact, as in the so-called rheumatic paralyses. We are, nevertheless, in possession of facts which make it clear that even small exudations in the pelvis, those for instance produced by periphlebitis, may, without compressing the whole nervous trunk, impair it so much by pressure, as to render it incapable of performing its functions. Leyden has reported a case from Traube's clinic, by which this has been very clearly demonstrated. In a person who died of metro-phlebitis, in whom many of the pelvic veins were filled with thrombi, and their walls thickened, such a venous trunk was found running beside the right sciatic nerve, united to the latter by a firm infiltrated tissue. The microscopic examination of the tissue lying between the vein and nerve disclosed purulent infiltration with abundant formation of young nuclei. This had extended along the nerves and appeared not only within the sheath of the neurilemma between the primitive bundles, but even penetrated this substance itself. In both the longitudinal and transverse sections, there was observed quite an active proliferation of connective-tissue elements, which were clustered between the nerve fibres. The formation of these young nuclei appeared to be going on most rapidly around the bloodvessels, extending thence between the nerve-fibres; in like manner they were seen originating from the sheaths of the primitive fasciæ ; even the nerve-fibres were forced apart, while, owing to the firmness of the sheaths, their diameter was sensibly diminished. Where the most active proliferation of nuclei had taken place, the volume of the nerve-fibres was then found in transverse sections to be abnormally small, exhibiting in most instances a clearly describable axis cylinder, in which, as well as in the myeline substance, no characteristic abnormity could be discovered.

If we consider how difficult it is to make out such spots, and bear in mind the fact that the examination of the pelvic walls and of the vessels and nerves lying upon them is generally neglected in autopsies, it will be readily appreciated why these lesions are so rarely reported in medical literature. It should by no means be inferred, however, that they are rarely found.

On the other hand, the frequent occurrence of small ecchymoses and exudations on the pelvic walls serve rather to justify the assumption that these lesions are frequently, if not always, the causes of secondary nervous affections. Tension and pressure may be applied to the several nervous trunks of the small pelvis owing to lesions of the vagina, with subsequent great contraction of the cicatrices whereby hyperæsthesia and motor disturbances are induced (*vide* Case No. 44).

The disturbances in the motor and sensory functions caused by thrombi in the veins of the lower limbs have already been discussed in Sec. I. Chap. V. p. 287, under the head of *Phlegmasia alba dolens.*

Furthermore, *affections of the sacrum* (caries, tumors), as well as *tumors of the ovaries, the uterus, and the Fallopian tubes*, may exert a pressure upon these nerves, though such causes of crural neuralgia are very rare in childbed. Finally, neuralgia and paralysis of the lower extremities are also associated with diseases of the central organs occurring in lying-in women. Thus, in the spring of 1868, I saw a paraplegia, the result of chronic myelitis which had originated thirteen weeks before the birth of a healthy child at full term; this case terminated fatally on about ten weeks after confinement. In a case which Scanzoni reports (*l. c.*, p. 501), he thinks he is justified in attributing its origin to a hyperemia of the lower portions of the spinal cord produced by "taking cold" owing to great exposure of the feet; though his description of the case is strongly suggestive of peripheral paralysis, induced in the manner above mentioned.

Symptoms.—The pain and convulsive twitching produced in the course of labor by pressure upon the obturator nerve, are experienced in the pectineal muscle, the adductors and the gracilis: the phenomena which follow irritation of the sciatic are seated chiefly in the calves of the legs. All these symptoms generally disappear soon after delivery, although a feeling of numbness and formication sometimes persists; as a rule, however, this soon ceases.

It usually happens that but one extremity is involved. If, in the further course of childbed, exudations are formed, which continue, ordinarily, for a long time, these either give rise

merely to neuralgia, to disturbances of the motor functions, or both these affections may at the same time be induced. Thus crural neuralgia (ischias antica) is common in puerperal women, and is attended with great pain on the outer or inner side of one thigh, involving usually the upper two-thirds of the limb, but sometimes extending to the knee; this pain is located in the *nervus cutaneus anterior externus* or *medius*, is very persistent, and moreover often liable to exacerbations, so that the patients anxiously avoid every movement of the limb. At times, when the exudation is great, neuralgia of the obturator supervenes, in which case the patient experiences pain along the inside of the thigh over the adductors, and drags the affected limb after her in walking.

A still more frequent result is genuine sciatica of varying severity. The pain in this case is most frequently located in the calf, the heel, the instep, and the sole of the foot, but may also involve the nerve trunk throughout the whole extremity, including the portion situated behind the trochanter major. It is at times quite impossible for the patients to stand or walk, and they complain of numbness and coldness in the legs. It often happens, that the sensory functions are not at all implicated. Occasionally, these functions may be weakened and yet at the same time the skin may be in a condition of hyperæsthesia. In certain cases violent convulsive movements appear in one or both extremities. The skin of the affected limb is then pale, but not swollen, while the joints are movable and unaffected; the pain is increased, if pressure be made at certain points (tuber ischii, the popliteal space, etc.). When the trouble has existed for some time, the diseased limb becomes emaciated, the irritability of the muscles appears to be diminished, the limb feels colder, and at last complete paralysis supervenes.

If these symptoms are the result of an exudation, referable to mechanical pressure upon the nerve, the pain and immobility may rapidly diminish, and at length disappear altogether upon the absorption of the exudation, or upon the evacuation of any abscess which may have formed, as has been observed by Kiwisch, Scanzoni, Tott, and others. Complete, permanent paralysis is extremely rare in puerperal women. But

one instance of this kind has ever come to my knowledge, and Kiwisch states explicitly, that in cases of paralysis developed in childbed, he has invariably noticed steady improvement and that recovery takes place at the expiration of a few weeks. Romberg, on the other hand, has in three instances, met with disturbances of the sensory and motor functions (anæsthesia of the soles of the feet, a troublesome sensation of weakness when walking) as a sequel to this affection. The patient alluded to by me in Case 44, who had a partial paralysis of the deep peroneal nerve, recovered completely after eighteen months.

From explanations given above, it is evident that this affection is usually attended with fever, the type of which depends upon the nature of the exciting causes. In one case in which there was only a very slight exudation (*vide* No. 42), I observed a fever which for several days was of a continued, and subsequently for a long time of a remittent type, for which no other causes could be discovered than sciatica, and an exudation into the cellular tissue of the pelvis, by which the sciatica was induced.

A careful examination of the affected leg, or of the internal organs of generation, and especially of the regions lying posterior to one or the other ischiatic spine, will usually dispel any doubt which may exist, as to whether the disease of the nerves is of central or peripheric origin. As soon, for instance, as the region of the sciatic plexus is reached, and pressure made with the finger at that point, the patients complain of pain, and describe its exact locality. If the trouble has its origin in some central seat, there is, as a rule, congestion of the head, a sensation of numbness, or even loss of consciousness, frequently coexistent with an affection of the upper extremity, but no such prominent symptoms in the limbs as with sciatica, or crural neuralgia.[1]

[1] A class of affections has recently been described by Warmont, under the name of myodynia, as having occurred in the clinic of Legroux, in which the calves of the legs of women, who, five or six weeks previously, had undergone easy confinements, were affected, the trouble usually coming on when an attempt was made to rise. In these women the effort to extend the limb, or to walk, was attended with considerable difficulty; the pain, which

Treatment.—With the view of preventing the occurrence during labor of the above described forms of neuralgia and paralysis, careful attention should be paid to the presentation of the child's head, the position of the woman, the mode of handling and introduction of the instruments which may be required, so that injurious pressure against the walls of the pelvis may be prevented; and yet, in spite of the greatest care, this will often occur even in the easiest and most rapid labors. If the pain persist after delivery, speedy relief will generally be afforded by the inunction of narcotics, by enemata containing a few drops of laudanum, or by the application of mustard plasters. If, however, these symptoms originate during childbed, their causes must first be elucidated and relieved; and when, in cases of extravasations and exudations for instance, this relief is not rapidly afforded, recourse should then be had to hypodermic injections. Counter-irritation may afterwards be set up by establishing continued suppuration from blistered surfaces, as recommended by Boer and others, and successfully tried by myself in Case No. 42. Kiwisch is perfectly right in recommending the application of local remedies, as near as possible to the seat of the trouble, however great inconvenience this procedure may involve, rather than their useless application to the extremities; the proposal to introduce numerous leeches high up within the vagina, is open to serious objection, since a very considerable amount of blood may thus be abstracted without in the least diminishing the extensive exudations, which may exist, or relieving the pressure upon the nerve-trunks produced by this exudation; and for the further reason, that no effect can possibly be produced when even slight proliferation of connective tissue has taken place around or within the neurilemma; more especially, because in the majority of cases, the precise seat of this growth cannot be demonstrated.

was persistent, was subject to exacerbations, and was sometimes increased by pressure. Both feet were usually affected; there was an absence of constitutional symptoms. From the description of this affection taken as a whole, there is scarcely any question that it is a neuralgia occupying the tract of the sciatic nerve, and cannot be ascribed to any primary lesion of the muscles; the symptoms disappearing upon recourse to rest, poultices and inunctions with the oil of hyoscyamus.

We are compelled, therefore, to restrict ourselves to the employment of *narcotic injections* (infus. fol. hyoscyami, grms. 15 : 200, to two or more teaspoonfuls of lead-water for each injection, etc.), which stimulate absorption, and later, to inunctions of ung. potassii iodidi; ung. hydrarg. ciner.; ung. roris marini comp., over the course of the implicated nerves, provided the inflammatory symptoms have abated. Cathartics and enemata must always be administered in conjunction with the above remedies. Basedow has derived benefit from applying a firm bandage to the affected leg.

As a subsequent treatment for any remaining disturbances of the motor functions, an induction stream of electricity, or aromatic inunctions, are to be recommended; for baths, those of Teplitz, Warmbrunn, Johannisbad in Bohemia, and Kissengen, are most likely to afford relief.

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RECORD OF CASES.

1. Neuralgia Ischiadica Puerperalis.

No. 42. R. G., 27 years of age, primipara, was easily delivered of a living male child after a normal pregnancy terminating in a labor of average duration; she continued perfectly well during the first days subsequent to her confinement; the temperature immediately after delivery was 100° F.

1*st day.* A. M. Temp. 99.3°, P. 74; P. M., Temp. 100.3°, P. 88. In the afternoon a clot of blood was discharged from the vagina.

2*d day.* A. M. Temp. 102.7°, P. 103; P. M., Temp. 102.6°, P. 112. Since night patient had complained of a "cramp" in the right leg (calf), and acute pain in the right sacro-lumbar region. The leg was not red nor swollen, but could scarcely be moved; the skin was dry and hot. The discharge was still

bloody, the abdomen free from pain. An enema and twenty cups about the trochanter major were ordered.

3d day. A. M. Temp. 102.2°, P. 110; P. M., Temp. 103.5°. P. 116. The pain had almost entirely abated; mobility greater; breasts distended.

4th day. A. M. Temp. 102.2°, P. 100; P. M., Temp. 103.4°, P. 104. One dejection following an enema.

5th day. A. M. Temp. 101.3°, P. 96; P. M., Temp. 102.7°, P. 108. Since 10 A. M. the pain in the right leg had returned, together with a sensation of numbness and weight. Pressure behind the greater trochanter was extremely painful. Upon vaginal exploration there was found close behind the spine of the right ischium a prominence as large as a silver dime, which was very tender upon pressure and from which the pain radiated throughout the whole leg. The chief seat of the pain was still in the sacro-lumbar region and in the calf. The uterus was healthy and freely movable; no exudation or other tumor could be detected near it. *Treatment:* a blister was applied behind the right trochanter, and vaginal injections of lead-water and linseed prescribed.

6th day. A. M. Temp. 101.3°, P. 96; P. M., Temp. 102.7°, P. 100. The blister had drawn well, and the pain was greatly relieved.

7th day. A. M. Temp. 100.8°, P. 94; P. M., Temp. 103.8°, P. 108. Return of severe lancinating pains in leg. No dejection; enema and ol. ricini.

		Temp.	Pulse.		Temp.	Pulse.	
8th day,	A. M.	101.5°	100	P. M.	104.2°	108	Pain on the whole
9th "	"	101.3	96	"	103.8	96	moderate; occasional exacerbations during the evening.
10th "	"	101.9	100	"	104.9	104	Ol. ricini; copious
11th "	"	101.7	108	"	104.9	114	dejections. Subjective condition somewhat better.

12th day. Temp. 101.3°, P. 96; P. M., Temp. 103.7°, P. 100. Blistered surface still suppurating.

13th day. Temp. 101.1°, P. 96. The pain had now entirely disappeared, and, as the temperature fell in the evening, the patient was allowed to leave her bed on the fourteenth day. At first she dragged her right leg somewhat, and could hardly bear her weight upon it. Stools regular; the painful spot could still be readily found, but was much less sensitive, and this tenderness gradually subsided, so that the patient was discharged *cured* ten days later.

2. NEURALGIA PUERPERALIS NERVI CUTANEI FEMORIS ANTERIORIS.

No. 43. Mrs. B. G., 26 years old, a medium-sized blonde, reached the end of her first pregnancy June 20, 1862; my assistance was summoned, for the reason that, although the liquor amnii had escaped (endometritis colli), and the pains were most powerful and acute, the head was making no advance. I found the head low down in the small pelvis, and greatly tumefied; the fetal heart-sounds were strong; the woman was screaming wildly, throwing herself about the bed, disposed to listen to no one. After waiting an hour, and becoming convinced that the head was making no advance, I put the woman under the influence of chloroform, laid her on her right side, and applied the forceps. Although she was in a state of pretty deep anæsthesia, she was very restless when each blade was introduced. The head was, however, easily extracted by a single traction (first occipital presentation), and the placenta soon followed. When the patient recovered consciousness, she complained of severe labor-like pains, which elicited a scream with each recurrence, and which, as was readily demonstrated upon palpation, were very severe after-pains. These were relieved on the morning of the second day by an emulsion containing tincture of opium. She still, however, complained of pain in both hips, which rendered movement of the thighs almost impossible, and which was especially excited when pressure was applied above or below Poupart's ligaments. The uterus was also very tender to the touch, but the abdomen was relaxed. On the afternoon of June 22d—scarcely forty-eight hours after delivery—the pain in both legs changed to a severe dull ache of a spasmodic character, extending down the inside of the right thigh almost to the knee, corresponding precisely to the course of the *nervus cutaneus anterior medius*. Active movements were only possible to a limited extent, but the passive motions and perfect sensations of the extremities demonstrated that the articulations of the hip and knee and the muscles of the leg, as well as the ileo-psoas, were perfectly sound and not painful upon pressure. Nothing abnormal could be found in the pelvis or about the uterus.

The woman described the pain as "boring, piercing, and stinging," comparing it to that of rheumatism; she stated that it was augmented by movement of the body, and that there were also at times exacerbations, when she was absolutely quiet; the lateral decubitus was unbearable.

Inunctions of *ung. potassii iod.* were prescribed over the whole thigh, the limb being enveloped in cotton-batting; ol.

ricini and opium were administered at night. She nursed her child, which was strong and healthy. After a few days the pain gradually abated; by June 27th it had entirely disappeared, and the woman was able to leave her bed. No disturbance of either the motor or sensory functions remained behind. The same woman gave birth without difficulty to another child 1½ years later, and had a normal childbed.

3. *Puerperal neuralgia and paralysis along the tract of the nervus peroneus profundus sinister, occurring after a forceps delivery. Large cicatrices in the vaginal cul-de-sac.*

No. 44. M. G., 30 years old, was healthy as a child, has menstruated regularly since her 19th year, became pregnant for the first time in Dec. 1863. Gestation ran a normal course until July, 1864, when both feet began to swell, and the woman experienced constant, severe pain in these parts, especially in the left foot. On Sept. 9th, at 10 P. M., labor commenced; at 12 P. M. the waters escaped, but, no progress being made towards delivery, the physician in attendance applied the forceps at 3 P. M. on Sept. 10th. The patient stated that while the extraction was being made with the forceps, she had had a sort of cramp in the calves of the legs. The child was a female, large, and was said to have had a hard head. The delivery with the forceps was, according to the report, very difficult. The placenta came away soon after.

During the first week of childbed, the patient was utterly unable to move, yet suffered no pain; she was so exhausted that she could not turn in bed, or void her urine without assistance. Tumefaction of the left leg persisted after delivery. On the 7th day there was very severe pain in this leg, especially in the great toe, which felt "as though it had been cut off." The other toes of the same foot likewise ached, though the pain in them was by no means so severe. Soon after the pain started, the leg was gradually drawn up, and the thigh rotated outwards, the knee somewhat bent, and the lower leg slightly flexed. The patient could not endure letting the foot lie with the heel resting directly upon the bed. Just before Christmas, 1864, pain was experienced along the back of the left thigh (nervus cutaneus femoris posterior), which, however, disappeared upon the application of a blister.

In this state of constantly recurring pain, lasting often for weeks, the patient kept her bed until Easter, 1865, without ever moving her leg from one position; when, at last, the pain began to abate, she left her bed. Since then she has succeeded by great efforts, and in spite of occasional recurrence of the pain, in extending her leg. At first she was unable to put her

foot on the ground without suffering acute pain; by great perseverance, however, she gradually regained the power of walking a few steps, at least while receiving some support from others. It was now observed by her, however, that during these attempts to walk, her toes dragged upon the ground, and that she was obliged to raise the whole leg to avoid stumbling over her own foot. She tried every variety of inunction, but in vain, and from time to time was compelled to take to her bed. During the childbed she had no abdominal pain or other trouble apart from painful micturition, which, however, persisted for a long time. The catamenia returned about eight weeks after delivery; were at first very profuse, but subsequently became regular. A tenesmus vesicæ, however, resulted from the ischury, and the patient ever after felt an impulse to micturate after any unusual emotion or physical effort, at which time, the contents of the bladder could scarcely be retained. I first saw her upon Easter, 1866—1½ years after her confinement.

She was at that time of medium size, powerfully built, a dark blonde, pale, and emaciated, though she said she had formerly been quite stout.

The whole left lower extremity, especially the lower leg and foot, was thinner than the right; the sensation normal throughout; nowhere any pain upon pressure. The anterior muscles of the left lower leg considerably shrunken; the muscles of the calf on the contrary quite full; the foot is flexed and hangs down, so that the patient cannot even move the point without raising the whole leg. She can only extend the toes a little by fixing the heel firmly, and thus overcoming the antagonistic action of the adductors. No sensitive spots to be found along the leg.

The abdomen is not distended, nor is it anywhere painful; no tumor can be felt. Vaginal exploration revealed the following condition: external genitals normal; vagina funnel-shaped, quite large below; the vaginal cul-de-sac on the other hand constricted by two strong cicatricial bands, one of which, beginning at the right commissure of the os, ran obliquely forward to the right (thus explaining the tenesmus vesicæ), while the other, starting from the left commissure, divided into two branches, both of which passed to the left and somewhat posteriorly, leaving a small cavity between them into which the point of the index finger could barely be inserted; but the moment, however, this was attempted, the patient complained of very acute pain. The lips of the os were patulous, and were, moreover, the seat of numerous notches. The uterus was not enlarged.

Remarks.—This very rare case may be interpreted as follows:

an extensive laceration of the vaginal cul-de-sac, produced probably by the forceps, had undoubtedly taken place, especially on the left side, but involving also the right, and starting from the os uteri. An exudation was then poured out in the neighbourhood, which, though it could not have been extensive, was yet large enough partly to cover the sciatic nerve. When this exudation had partially infiltrated the nerve, or when the cicatrix commenced to contract, a greater pressure began to be exerted upon the nerve, or else a portion of it was stretched, especially the fascia, corresponding to the peroneus profundus; the paralyzed muscles being the tibialis anticus, extensores digitorum pedis brevis et communis, and the extensor proprius pollicis pedis; the most severe pain was situated in the nervus dorsalis pedis internus, whereas the course of the superficial peroneal and the tibial were quite unaffected. The prognosis was of course unfavorable. Yet the patient improved so greatly after many weeks' application of electricity to the paralyzed muscles, that she could walk far more easily, was much stronger, and six months later, under the persistent use of inunctions of ung. rosmarini comp., was able to use the left foot almost as well as ever.

CHAPTER IV.

THE ECLAMPSIA OF LYING-IN WOMEN.

Etiology and Pathogenesis.—By the term puerperal eclampsia is to be understood general convulsions of pregnant, parturient, and puerperal women, accompained by complete loss of consciousness, and followed by coma. We shall consider here, however, that variety only of eclampsia which occurs during childbed.

Eclampsia makes its appearance most frequently at the time of childbirth, yet in many cases of this class the symptoms are not developed until labor is fully over. Brummerstädt found 22 of this description among 135 recent instances collated by him; Wieger 110 among 455; Mieczkowski 6 among 50; making the proportion of cases occurring during the post-partum period, about 21 per cent. The first symptoms of true puerperal eclampsia are usually observed during the first twelve hours after delivery: for instance, in 21 out of 29 cases (Brummerstädt); in 37 out of 29 cases (Wieger); or, to sum up, in 59 cases out of 66, this was the fact, being equivalent to 89.4 per cent. A few cases appear even as late as the 12th day. With reference to the character of the labors, it should be stated that they are for the most part normal.

These data refer solely to the eclampsia of lying-in women; the other predisposing influences play an equally important part in all varieties of puerperal convulsions, which in the first place are much more common in primiparæ than in multiparæ. Thus of 683 cases of eclampsia, 526 were primiparæ and 157 multiparæ, giving a proportion of one of the latter to 3.3 of the former.

This affection is, moreover, comparatively frequent in women bearing children for the first time when advanced in years, to which point attention was called by Mauriceau; Wieger, however, was of the opinion that this theory could not be demon-

strated, although his own statistics rather tend, on the whole, to support this view; for out of 148 primiparæ as many as 49.33 per cent. were above 25 years. Of the 50 cases compiled by Mieczkowski from the records of the University Lying-in Hospital of Berlin, there were 40 primiparæ, and of these 50 per cent. were advanced in years.

The trouble frequently comes on also after a twin pregnancy. Thus:—

Of Wieger's	455	cases	there	were	53	instances	of twins.
" Brummerstädt's	122	"	"	"	13	"	"
" Mieczkowski's	50	"	"	"	3	"	"
	627				69		

From which it appears that in every nine women affected by eclampsia, there is one who has had twins; or in other words, twin pregnancies are 7 times as frequent among eclamptic as among non-eclamptic women.

Eclampsia is, besides, of more frequent occurrence in those who have already suffered during pregnancy from œdema and albuminuria. It is also more prevalent among women suffering from extreme anemia, than among those whose blood is in better condition.

According to Wieger's researches, about one case of eclampsia is found in every 519 deliveries. In addition to the 6 cases related by Dr Brummerstädt in the inaugural address above referred to (pp. 90–94), I have since met with 5 cases, which are reported in my clinical observations.

If we now turn to the essential anatomical causes of eclampsia, we shall find two recent antagonistic theories: the so-called uremic theory, propounded by Frerichs and whose chief advocates are Litzmann and Hecker; and the theory promulgated by Traube, Munk, and Rosenstein, according to which, eclampsia has no connection with disease of the kidneys, except so far as anemia and the predisposition to eclampsia are increased by albuminuria.

The *condition of the brain*, as revealed at the autopsies of those dying of eclampsia, is, in the first place, that of extreme anemia with more or less marked œdema, and obliteration of the convolutions; much more rarely, in only about one-sixth of the cases, there has been found extensive hyperemia, or even

capillary ecchymoses and apoplectic deposits as large as pigeon's eggs. The brain has very rarely (2–3 per cent.) appeared to be perfectly sound. The condition of the kidneys is, on the other hand, almost the opposite, since in 35.7 per cent. these organs have been found healthy, and only in 64.4 per cent. were there detected any decided lesions (Brummerstädt). The comparative number of sound kidneys is, therefore, considerable, being more than one-third.

The diseased kidneys are hyperemic and swollen, and the uriniferous tubules are of irregular form, filled with albumenoid masses, and at times with fat globules. In the mudullary substance, the fatty infiltration of the cells is often still more pronounced. The *urine* contains as a rule (84 per cent.) albumen, which is, however, very often found not only during normal labors, but also in the urine of lying-in women, suffering from no illness. Still, in many cases (15 per cent.), no albumen can be detected, even immediately before the attack, that substance not appearing in the urine until the attacks are over (cases reported by Dohrn, Brummerstädt, and myself).

The presence of albumen in the urine is, therefore, by no means a constant phenomenon of eclampsia. Nor is there any greater uniformity in the presence of fibrinous casts. Upon the whole then, in two-thirds of those cases associated with renal disease, there have been usually demonstrated merely the symptoms of acute hyperemia, and of a congestive catarrh of the kidneys; much more rarely (at most in one-third only of the cases), a diffuse interstitial nephritis has been discovered.

If, now, we proceed to the examination of the two above-mentioned theories, it will be seen that those who maintain that uremic poisoning is the cause of eclampsia, assert that this affection is produced by the sudden retention in the blood of the products of the renal secretion. It should be borne in mind, however, that experiments on animals have shown that injections of filtered urine into the blood did not necessarily produce any uremic symptoms whatever, not even after the kidneys had been excised. Indeed the presence of a large quantity of urea has been demonstrated in the blood of patients suffering neither from coma nor convulsions. The above facts, taken in connection with the experiments in which the urea

was injected into the blood, would seem to afford sufficient proof of the harmless character of this substance, at least as regards its influence in producing convulsions. The theory was therefore suggested, that the affection was induced by the decomposition of urea by means of some ferment, into carbonate of ammonia, the so-called ammoniemia. Even though Petroff thought he had corroborated this theory by the discovery of a relatively larger amount of ammonia in the blood of eclamptic women, yet injections of carbonate of ammonia into the blood, after ligature of the ureters, showed that slight convulsions were indeed excited by the presence of this salt (as in the case of carbonate of soda), but that no evil consequences ensued, nor was there produced any decided depression in the condition of the nervous system.

It is quite certain, therefore, that the theory of Frerichs is not applicable to all cases of eclampsia, and it is very doubtful, whether it can be adopted in any case whatever. On the other hand, Traube and Munk have demonstrated, that when œdema of the cerebrum is occasioned by an *increase in the quantity of serum contained in the blood*, and by the *tension produced in the arterial system*, and is succeeded by *anemia of the brain*, coma sets in, and later, convulsions ensue as soon as this anemia extends from the hemispheres to the mesencephalon. The existence of two causative agents has thus been established: anemia and increased tension of the arterial system; and two conditions of the brain are shown to be associated with eclampsia, at first the cerebral œdema and subsequently anemia, particularly of the mesencephalon.

If appears, therefore, that the above theories, which attribute the causes of eclampsia to retention of certain constituents of the urine, can neither stand the test of experiments, nor of clinical observation; and quite as much ammonia has been found in the blood of healthy, as of uremic animals; moreover, the kidneys in these cases have been often found to present a perfectly healthy appearance, and it is certain that in many cases no albumen could be discovered in the urine within a very short time previous to the attacks. Traube's explanation, on the other hand, appears to be fully verified by careful experiments; when, for instance, a ligature was applied

to both ureters of a dog, and subsequently to a jugular vein, and water injected into the carotid artery, the animal at once fell into a comatose condition accompanied by convulsions, and very severe spasms of the most varied character. The autopsy disclosed anemia and œdema of the brain. Test experiments have also demonstrated that when one of these conditions was absent, the convulsions did not take place.

The objection has been made, however, to these experiments, that water is not suitable for the injections, because it destroys red blood corpuscles. While Otto has essentially corroborated the experience of Munk and Rosenstein, E. Bidder has in addition discovered by further researches, that merely pressure of a certain extent and duration, occurring in connection with hydremia, may evoke symptoms which bear a close resemblance to those of eclampsia, though by no means identical with them. Bidder thinks, that in his experiments the eclamptic attacks were caused by the expulsion of the blood from the cerebral vessels, and the immediate arrest of nutrition thereby produced in the brain, and urges the assumed impossibility of supposing that a sudden arrest of nutrition would take place in such a way in a living woman, as affording evidence against Rosenstein's theory. A series of clearly demonstrated clinical facts, on the other hand, tend to favor that theory, eclampsia being known to occur most frequently in cases where the deterioration of the blood—the hydremia of pregnant women—is particularly great; among persons, for instance, who suffer from great œdema or albuminuria, and especially in case of twin pregnancy. Then again, the disease is far more frequent among primiparæ than among multiparæ, and is most liable to come on during labor, or during the first twelve hours following. An increased tension in the arterial system is readily produced under all these circumstances, which, when a certain degree of pressure is obtained, combined with a deterioration of the blood, may finally give rise to eclampsia. In the great majority of cases the convulsions diminish in severity soon after delivery, provided the disease does not terminate fatally. Eclampsia frequently sets in after an otherwise normal labor, notwithstanding the completion of the birth and the loss of blood attending it, if the labor has been com-

plicated with hyperemia of the brain. This state may be attributed to an increase of pressure in the arterial system, indicated by a full hard pulse and an elevated temperature (*vide* Introduction, p. 22). This condition does not arise under ordinary circumstances, for the reason that a marked cerebral hyperemia with incipient œdema, rarely occurs during labor, because, moreover, great hydremia is on the whole rare among parturient women, and because the increased arterial pressure after delivery is, as a rule, soon compensated for by the profuse perspiration and largely increased action of the kidneys.

If, in view of the above facts, I still adhere, as in 1864, to the theory advanced by Traube, Munk, and Rosenstein, yet I would by no means assume that it is in this manner alone, and by the above-mentioned changes in the brain, that eclampsia can be produced. This much seems to me to be undeniable, that at least in *many* cases its origin is due to affection of the brain. I must indeed admit that in my own experience there have been numerous instances in which this explanation has not been satisfactory. To this category belong Nos. 2, 3, and 4, which are given in detail on pages 260 *et seq.* of my clinical observations.

It appears from the researches of L. Landois that epileptic attacks may be induced by the presence of an abnormal quantity of blood, and especially by a venous stagnation of the region lying between the corpus quadrigeminum and the spinal cord.

Inasmuch as a thoroughly satisfactory explanation of many cases of eclampsia has not yet been found, it is to be hoped that additional light may be thrown upon the subject by carefully conducted clinical and experimental researches.

Symptoms.—Distinct *precursory symptoms* sometimes precede the actual appearance of eclamptic convulsions (in 43 out of 140 cases, Wieger); such as headaches, nausea, dizziness, *muscæ volitantes*, amblyopia, even amaurosis, pain in the epigastric region and muscular tremor, mental depression or excitement, laughing and crying, loquaciousness, etc.; these symptoms, as a rule, last but a short time—scarcely twenty-four hours, often only a few minutes—yet are prolonged at times for days. More frequently the eclamptic attack is ushered in of a sudden

with a loud cry; at other times, without any such manifestation the patients are suddenly attacked with convulsive movements of the extremities, appearing often at first in one arm only, a few minutes afterwards in the other, then in the head and the lower limbs. While the arms and legs are violently twitched, or stiffly swung about, the eyes roll in their sockets, the respiration, at first panting, is afterwards completely arrested, froth issues from the mouth, the teeth are gnashed, the tongue is bitten, the face is livid and distended, the pupils are dilated, or, on the other hand, may be greatly contracted, and no longer responding to light; there is complete loss of consciousness. The pulse is small and very rapid; at the climax of the attack the respiration is stertorous, while the temperature rises perceptibly with every fresh attack, exceeding at times 105° F. When the convulsions cease the pulse becomes fuller and slower, the respiration more uniform, loud, and snoring; the temperature falls somewhat, a bloody froth is expelled during respiration, the patients lie in a state of sopor, from which after a certain time they awake. The uterus sometimes participates in the violent contractions, and feels as hard as a board, the discharge being but slight. The urine and feces are usually passed in bed. The number and rapidity of these paroxysms vary greatly. The number was found by Hugenberger to vary between 3 and 28, by Mieczkowski between 1 and 30; the greatest number which I have seen, occurring in a patient who nevertheless recovered, was 17, and it was noticeable, that the recurrence of the attacks in this case appeared to be quite regular. Recovery took place here, as in the majority of cases, with a decrease in the duration and intensity of the paroxysms, the patient dropping finally into a deep peaceful sleep. Death may supervene either during an attack; or it may occur in the comatose stage from pulmonary œdema and cerebral apoplexy; or finally, it may take place subsequently from some other puerperal affection. While the ratio of mortality is about 35.1 per cent. (17 deaths out of 33 cases, Hugenberger), of 29 women in whom eclampsia appeared during childbed, only 6 succumbed (equivalent to 20 per cent.).

In forming our *diagnosis*, it is important at the outset to distinguish between eclampsia and epilepsy. If it cannot be ascertained from the attendants whether the patient has

had such spasms previous to pregnancy, the physician should carefully investigate the character of the convulsions, and their probable results as regards the mother. The intensity of the comatose stage is said to be greater in this disease than in epilepsy (?). In hysterical convulsions the consciousness is not generally lost, the spasms are less violent, there is no comatose stage, and the patients weep, scream, or laugh in the midst of the attack.

One instance in which eclampsia was mistaken for convulsions dependent upon meningitis, occurred in my practice in the case of a pregnant woman. In the latter affection, however, the symptoms are seldom so general and regularly recurrent, they consist rather in gradually increasing irregular spasms of certain groups of muscles, preceded as a rule for a considerable time by fever, the patient having been previously unconscious and somnolent; yet the distinction is by no means so clear in all cases.

It results from what has been said above, that the *prognosis* is ominous even for the true puerperal eclampsia; but much less so than in that form which occurs during labor, inasmuch as 80 per cent. of lying-in women recover. The smaller the number of spasms, and the longer the interval between them, the more favorable the prognosis. If death, or complete recovery, do not result, a unilateral paralysis may in rare instances follow these complaints.

Treatment.—We have at our command two classes of remedies for relieving the increased pressure on the arterial system —the true cause of eclampsia—namely, general bloodletting and a vigorous stimulation of the intestinal, urinary, and perspiratory secretions by diaphoretics, diuretics, and drastics. Although venesections have a very beneficial action upon eclampsia during labor, from the fact that at that time an increased pressure is always a much more serious affair, and because during the period immediately preceding delivery no blood can escape from the uterus, yet this procedure is very rarely required in puerperal women. Only the most imminent danger to life in plethoric individuals will be an indication for resorting to this measure. Generally speaking, attacks previously severe, become milder when profuse perspiration is established after the birth of the child. On the other hand,

the attempt must be made in the interims to excite copious evacuations by means of drastics, such as jalap, aloes (extr. aloes with extr. colocynth), and enemata of vinegar and salt. As diuretics, tartaric acid, lemon-juice, and flower of benzoin may be given. During the attack chloroform may be administered, it having often been considered that the paroxysms were diminished, and even completely arrested by its inhalation. If chloroform be of no avail, strong doses of opium—in one case I gave 0.09 grm. after every paroxysm, so that the patient took in all 0.6 grm. within 10 hours—may be prescribed internally, or, morphine subcutaneously, which is of great value. Sometimes only the hypodermic injections can be employed, because the patients are no longer able to swallow. If there is great cerebral congestion, leeches may be applied to the forehead or behind the ear, according to circumstances. Cold compresses, ice-bags, counter-irritants (sinapisms) at the back of the neck, or even cold irrigation of the head are here advisable. In the after-treatment, a threatening collapse must sometimes be averted by stimulants; the attempt should be made also by the exhibition of tonics and strengthening nourishment to relieve the hydremic condition. The child should in no case be nursed by the woman during her convalescence, for her irritability and hydremia would be thereby augmented.

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Vide also Virchow-Hirsch's Jahresbericht für 1867, iii. 589.

CHAPTER V.

THE MENTAL AFFECTIONS OF LYING-IN WOMEN.

In treating of the psychical affections of puerperal women, we must again refer to what we have had occasion to allude to in the case of several other affections, and particularly in the so-called puerperal fever, namely, that from the earliest times the attempt has been made to connect these maladies with some specific cause. They have been attributed to a "morbid process" in the central nervous system, brought on by some alteration in it, and produced by the puerperal crasis (Haidenhain). More recently, however, this opinion has been refuted, and the idea adopted that the so-called puerperal mania has absolutely nothing characteristic, but is merely a complication of the puerperal state. A description, therefore, in the present work would seem superfluous, were it not that these very mental disturbances are of so common occurrence in lying-in women, that they could not properly be passed over in a work devoted to the diseases of the puerperal period.

The following figures will serve to illustrate the frequency of these diseases. Of 1119 cases of insane women treated by Esquirol in 1811–1814, 92 were attacked during the period of childbed or lactation, and of these 92, as many as 60 (one-tenth of the entire number of patients), occurred during the years 1812 and 1813, when the total number admitted amounted to 660. Of 1091 deranged women who were received into the Bethlehem Hospital, 131, or almost one-eighth of the whole number, were afflicted with puerperal mania. Leubuscher found among 92 women afflicted before the climacteric years, 5 cases of derangement following childbed, etc. This circumstance can hardly be a matter of surprise when it is considered, that at almost no other period of life are all the various causes, predisposing as well as immediate (losses of blood, physical exhaustion, congestion of the central organs, defective character of the blood, physical and mental pain), so

easily and frequently combined as in childbed. In 155 cases of mental derangement during childbed, Tuke found that 28 had originated during pregnancy, 73 during the real puerperal period, and 54 during lactation.

The forms of mental alienation, which chiefly prevail among lying-in women, are insanity and melancholia. Monomania is less common, and imbecility is only seen as a sequel of chronic mania and melancholia. Insanity was formerly regarded by many as the true puerperal mania. The affection can, however, in no way be distinguished as regards external manifestations from common insanity (Leubuscher, *l. c.*, p. 116; Griesinger, *l. c.*, p. 147; Simpson, *l. c.*, p. 448). Thus Helm asserted (1839), that puerperal mania should not be regarded as a disease peculiar to childbed, although admitting that the very nature of the puerperal state involved a predisposition to this malady. By him it was recognized only as a symptom of phlebitis, ovaritis, scarlatina, and puerperal peritonitis (*l. c.*, p. 147). Kiwisch, who likewise shared the conviction that the insanity of lying-in women presented in its external features no characteristic peculiarities, and further, that no absolute form of alienation could be ascribed to childbed, divided the mental derangements of childbed into symptomatic and idiopathic (1841). Berndt, Jr., recognized (*A.*) the mental affections which occur incidentally in lying-in women: (*B.*) the symptomatic mental affections; (*C.*) those immediately dependent upon the act of delivery; (*D.*) the mental diseases directly arising from the puerperal condition, puerperal mental affections in the restricted use of the word, *mania puerperalis*. The class *A.* has, as regards its development, no connection with the puerperal state, and can at most only have its course modified by the latter; its introduction here is consequently just as inappropriate as that of any other disease existing antecedent to childbirth. Classes *C.* and *D.* of Berndt's division would be included in the classification of Kiwisch, under the head of idiopathic insanity, for it would be difficult, and often quite impossible, to determine whether in many cases, when the mania appeared between the first and fourth days, the act of delivery should not here also be regarded as the chief factor in its causation. From Berndt's

division there would consequently result but two varieties of these diseases. The classification of Kiwisch, however, does not embrace all cases, and includes under the so-called idiopathic variety those also which, though first developed during childbed, yet originated in hereditary or other predispositions. Yet this form must be carefully distinguished from the true idiopathic insanity of childbed. It is, therefore, more appropriate to recognize with R. Leubuscher three varieties of the disease in question, viz. :—

1. " Such cases as are only equivalent to the delirium of a fever; a mania which increases and subsides with the affection upon which it depends. This variety may be termed symptomatic."

2. " Puerperal mania, having its origin and development in pre-existing conditions, and tending towards insanity, in which childbirth or the puerperal state has merely served as accidental cause to induce the final outbreak."

3. " Cases of mania following eclampsia, great hemorrhages, severe physical or mental distress without hereditary predisposition—the true idiopathic mania of childbed."

1. *Symptomatic Puerperal Mania.*

This may supervene upon all the severe affections of lying-in women, and has been observed not only in endometritis and phlegmonous metritis, complicated with thrombosis of the lymphatics and veins, but may also accompany very sore nipples, or exceedingly painful mastitis, etc. Instances of each of these occurrences have been observed by Kiwisch (*l. c.*, observ. 15 and 36); by Leubuscher (*l. c.*, p. 99); by Fischer (Bericht, *l. c.*, pp. 70, 83, and 90). Such a temporary delirium, increasing and subsiding synchronously with the aggravation, or subsidence of the principal disease, is, in the majority of cases, attributable entirely to cerebral hyperemia. The time of its appearance is, therefore, dependent upon the period and stage of the disease which it accompanies. It is most common within the first 8–10 days after confinement; the character, moreover, of this delirium is very varied, the patient often indulging in lively songs, or exhibiting an animated, joyful expression of countenance, notwithstanding the severe illness

from which she is suffering. Sometimes, and particularly if the pain be severe, attacks of extreme mental agitation set in (*vide* Case 46), in which the patients cry out, call for help, tear off everything in the form of clothing, complain of great mental anxiety, and toss about incessantly. They see forms which threaten them, and, frightened by imaginary objects, spring out of bed, beat and thrash round, etc. Others sit in a despondent state, with vacant countenance, and sad expression, constantly worried with thoughts of death.

The duration of the primary disease may exceed that of the delirium, which, however, may subside even when no improvement has taken place in the other symptoms, or in fact when the latter have been aggravated (Case 46). If the primary disease admit of a good prognosis, the early cessation of delirium may be predicted with a tolerable degree of certainty. In the treatment, the principal disease must be kept constantly in view, although the cerebral hyperemia may be symptomatically attacked either with ice-bags, or, in robust individuals, by the application of cups to the back of the neck, and by inducing a free catharsis by means of drastics and cathartics.

2. *Puerperal Mania in Lying-in Women, attributable to the aggravation of some pre-existing morbid condition.*

Here, the puerperal condition is merely the accidental, not the actual cause; the latter is to be sought for either in a congenital predisposition, or in antecedent affections resulting from previous pregnancies. It has been calculated that 40 to 50 per cent. of all the cases of puerperal mania may be traced to some hereditary tendency. There is no variety of mania that may not be referred to this cause, not excepting that characterized by an erotic tendency, such as erotomania, or even nymphomania, as well as the various religious delusions, and the mania persecutoria. Under this head must be classed those extravagances of volition which manifest themselves in every kind of muscular action—genuine insanity, as well as those wild, exaggerated, erroneous mental conceptions whose aim is the attainment of certain ends—mental aberration, both with and without the most multiform hallucinations. A complete description of the several varieties is not appropriate to

this place, but the instance adduced under No. 47 will serve as an illustrative example.

There is a very great difference in the exact period of the attacks in these cases, yet it can hardly be questioned that they may be brought on suddenly, and in an intense degree by mental impressions, the period at which they appear depending upon the degree of exhaustion of the patients, and the pain, agitation, fever, and cerebral congestion to which they have been subject during childbed. It is interesting to note that many instances have been reported by Esquirol, Simpson, and Leopold, in which the same woman has been subject to mental affections for a certain period in several successive childbeds. It is, furthermore, worthy of mention that at times, in spite of a predisposition and the existence of an acute fever, the attack does not come on, at least so long as intense pain accompanies the affection, but only shows itself when the symptoms begin to be alleviated. A single exciting cause may sometimes be detected in such cases, as, for instance, a sudden fright, violent emotions, a severe mental shock. Instances have been repeatedly adduced, where a violent impression upon the olfactory nerves has given rise to an attack of insanity. Physical and psychical causes are, as a rule, intimately connected, and even if the former cannot, in many cases, be surely demonstrated, yet they are unquestionably more common than admitted by Georget, who ascribed the attack to moral influences in 15 out of 17 cases. Esquirol's calculation that about one-fourth of the affections may be attributed to the mental influences, certainly approximates nearer to the truth. The fact should not be lost sight of, that the examination of those who are insane, or mentally deranged, is very difficult and often quite impossible; further, that spots which were once acutely tender to the touch, appear all of a sudden to be entirely free from pain during the attack itself; and that even if no local affection can be discovered in the thorax and abdomen, it does not always follow that disease of the brain or its envelopes can be excluded, irrespective of those conditions which may underlie the hereditary or other predispositions. Whereas, formerly, the cause of puerperal mania was attributed directly to a decrease of the lacteal or lochial

secretions, and a "milk mania" was accepted, of late, the opinion has pretty generally prevailed that if there be a derangement of these secretions, the phenomenon is to be regarded as a consequence rather than a cause. Yet it is far from being always true in this form of mania, that these secretions are reduced or completely arrested. The case reported by Schmidt (Kasper's *Wochenschrift*, 1845, No. 15) has been particularly convincing to many writers, who consider "the absorption of the retained lochial secretions by the circulation (Fischer, 1845), to be the cause of mania." In this instance, after the arrest of the lochia, violent mania set in, which was apparently relieved by a leap from the window, and the immediate reappearance of this secretion. It is hardly necessary to allude to another fact, which might possibly serve to explain this result, viz., that cerebral congestions may be and often have been speedily relieved by sudden hemorrhages.

No prognosis can, in general, be given in this form of puerperal mania, nor have we any indications for specific treatment. The individual peculiarities of each case must be taken into consideration. The commendation bestowed upon certain remedies, and methods of treatment, employed in this class of cases, shows either that they are constantly confounded with the varieties described under 1 and 3, or else it affords evidence of an inexact and prejudiced view on the part of the observer, as regards the pathological processes which give rise to the trouble. Whenever there is any hereditary tendency; when the woman's mind has been previously affected; or when she is very excitable, restless, or eccentric, she must not be allowed to nurse the child: and if she has already begun to suckle, it must be forbidden, before any injurious effects have been thereby produced.

The numerous hallucinations which lie at the root of the insane ideas, could be very readily distinguished in Case 47, in which hereditary insanity had commenced during pregnancy, but had not really developed until the period of childbed.

3. *Idiopathic Puerperal Mania.*

Three principal causes may act, singly or together, to produce these mental derangements of childbed, viz.: the loss of a large

quantity of fluid from the body, especially extensive hemorrhages; great pain; and severe cerebral congestion. These affections are most likely to be developed, therefore, after tedious, prolonged, and painful labors, after severe hemorrhages and too protracted lactation, or from the exhaustion and irritation which are apt to accompany an insufficient supply of milk. Cases of mental derangement, occurring during and immediately subsequent to delivery, have been reported by Wigand, Naegele, Luther, and Kopp (*vide* Berndt, *l. c.*, p. 456). Severe after-pains are sometimes said to give rise to attacks of insanity in recently delivered women of a nervous, excitable temperament, in illustration of which several instances have been related by Barth and Kiwisch. My own experience in the year 1859 convinced me that acute pain, in the last moments of delivery, may at times impel the woman to involuntary violent acts.

A large strong blonde, a primipara in the second period of labor, with the child in the 1st occipital presentation, was lying upon her left side and seconding the very frequent pains with her whole strength. I stood behind her, and was stooping somewhat in order to support the perineum; when the head was already pressing upon the external genital organs, and she, moaning aloud, had reached the height of a new pain, she suddenly raised her right hand and struck me so stout a blow on the back, that it resounded through the chamber and caused great alarm on the part of the midwife. The head was delivered at once, and the woman humbly begged my pardon, saying that the pain was so fearful that she could not resist it. Here there could be no question of revenge, for the person did not know me at all. It is not a rare occurrence for women to strike the wall with the closed fist, and in this case it would appear that I was the victim of a misapprehension, the result of which was to me more surprising than agreeable.

I have also once seen very vivid hallucinations of the auditory faculties occurring when the uterus had for a long time been subject to tetanic convulsions, the temperature being considerably elevated (103° F.), and the brain evidently congested.

No. 45. A woman in labor, who had been lying for hours alternately upon her back and side, and had only at times complained of pain, suddenly sprang up with a wild, bewildered gaze, called for her clothes, and said she must leave; wished to

spring into the water, and asserted firmly that some one outside was calling to her to come. She could scarcely be held in bed, but suddenly raised up her head from time to time as though looking about for the person who was shouting to her, or to hear the call more distinctly. The head of the child was finally extracted with the forceps, the fetal heart-sounds having decreased perceptibly in frequence. There had been so tight a contraction of the uterus that there was a distinct line marking the boundary between the parts of the fetus (head, neck, and shoulder) which had been outside of the uterus, and which were of a uniformly livid color, and the remaining parts (breech and extremities) which were quite colorless. After completion of the delivery (in narcosis) the hallucinations vanished, and during the subsequent childbed no trouble whatever was experienced. No trace remained of any mental derangement. This is the case reported by Ed. Martin in the *Monatsschrift für Geburtskunde*, Bd. xxi. p. 401.

Simpson saw a woman attacked with mania in five successive deliveries, during which she was not anæsthetized, while she remained unaffected after the sixth, which had been terminated under the influence of chloroform. The same author remarks, that he has also observed puerperal mania following the use of chloroform during labor, but not more frequently than in cases where it was not employed.

If the three above-mentioned causes occur in consequence of delivery, they only produce, as a rule, mental alienation in persons previously weak, irritable, and hysterical; the strength, at no time robust, being completely exhausted by the fatigue of labor; or at other times, the patient having been worn out by fever, pain and mental emotions. The mental diseases of such lying-in women resemble, as Thomas Mayo and Leubuscher have remarked, the delirium which accompanies anemic conditions resulting from exhausting affections. When it is considered that of Marcé's 504 and Grundry's 53 patients, 14 and 18 respectively were primiparæ—of 107 maniacal women 32 had been confined for the first time —it cannot be denied that mania is more common among the latter than among those who have been confined several times.

Cases in which puerperal mania has persisted for a time after the occurrence of eclampsia, have been reported by Biber-

geil, and recently by Archibald Hall, but are, on the whole, very rare.

Symptoms.—Berndt, Jr., described four symptoms as distinctly characteristic of this puerperal mania: (1) Its relation to the puerperal diathesis as a cause, and the absence of other causative agencies; a theory which is, however, hardly supported by facts. To cite but one case: in marked grades of periuterine hematocele, unconnected with childbed, the same hallucinations are met with as are observed after severe hemorrhages in childbed. In October, 1860, I had the opportunity of observing a typical case of this kind in the ward for mental affections in the Berlin Charité: the patient had been transferred from the gynecological department to the above-mentioned ward because of her many hallucinations, great restlessness and constant complaints about her neighbours. She recovered speedily, as the tumour in the pelvis diminished, and her strength returned. There will be found in the appendix two cases of mental derangement, occurring after great loss of blood in childbed. As a further cause, Berndt mentions: (2) a peculiarly excitable temperament, which is, of course, met with in every case of mania.

(3) The relation observable between the mental delusions and some sexual excitement. The cases, however, reported by Leubuscher (*l. c.*, pp. 105, 106), Esquirol, Gooch, and others, as well as those adduced by myself, all tend to show that this condition, so far from being constant, is, on the whole, of rare occurrence.

(4) The coexistence of other local affections dependent upon the puerperal diathesis, a phenomenon by no means constant in idiopathic puerperal mania. We not uncommonly find a total absence of any local affections about the organs of generation; or, if present, they are of so trifling a nature (*vide* Case 48), that the mania cannot be attributed to them as a cause. Haidenhain, moreover, states that the majority of women suffering from mania have had easy confinements; in view of which circumstance, we are hardly justified in attributing the subsequent affections of childbed to labor as a usual, or very frequent, causative factor. These four signs, which are said to

be characteristic of idiopathic puerperal mania, will not stand the test of a careful examination.

If we now turn to the separate stages of idiopathic puerperal mania, the so-called *stadium prodromorum* generally begins with insomnia, great restlessness, distress, incoherent speech, hasty movements, loss of appetite, etc This stage is often very short, sometimes is entirely absent, and the disease reaches its height with an outbreak of insanity. The patients begin to scream, wail, pray or preach aloud, spring out of bed, uncover themselves, seek to escape from the room through the doors and windows, tear and pull out their hair, struggle with their nurses, and do not hesitate to bite and strike. The attack lasts several minutes, or even hours; it often suddenly breaks out afresh, long intervals of quiet intervening. In the cases coming under my observation, the remissions and exacerbations have alternated at irregular intervals. My own experience, as has already been stated, does not corroborate the assertion, that excitement and irritation of the sexual functions prevail in the majority of these patients. The exposure of the patients has been rather the result of their attempt to throw everything from them, in order to remove all hindrance to free motion; I have frequently found that an exploration of the genital organs was exceedingly unpleasant to them, and that they screamed, or at least offered resistance. In the melancholic stage which usually succeeds the other, there is to be observed a feeling of contrition, mortification at having exposed themselves, prayers, tears, wringing of the hands, etc., at the thought of their manifold sins: at other times, the patients become quiet and listless, manifesting an indifference to what is passing around them; they are still distressed by illusions, without, however, giving utterance to them; they worry, and at this stage often begin to think of suicide. In 131 cases of puerperal mania, 41 of the patients exhibited a tendency to suicide (Helfft).

As would be expected from the above-mentioned causes, the period, at which this puerperal alienation generally appears, is soon after delivery, and most frequently within the first 14 days of childbed. According to Jacquemier, out of 92 women

who suffered from puerperal mania, 37 were attacked within the first two weeks.

With reference to the physical condition of such invalids, it should be first of all stated, that the secretions, as Kiwisch has correctly and appropriately remarked, (1) have already been arrested previous to the attack in consequence of some other puerperal affection; or (2) they may remain entirely unaffected, or but slightly altered, during the attack; or (3) they may be suppressed at the very outset of its appearance; it is to be added, moreover, that the secretion of milk is much more likely to be the cause of mental derangement when too abundant (the same is true of excessive purging) than when it is too scanty, or altogether absent. The fact is also to be noted, that quite a considerable amount of albumen may be very readily and frequently found in the urine of feverish women in childbed; this is equally true in cases of mania, owing to the great congestion of the kidneys (great dilatation of the internal spermatic veins); one is by no means justified, however, when the presence of albumen is recognized in the urine, in attributing the delirium to uremic poisoning. Simpson was the first to point out that puerperal mania is of frequent occurrence in cases of albuminuria, assigning causal relations to the two affections, on the ground that in 8 out of 10 cases he discovered more or less marked albuminuria, and observed an increase or reappearance of albumen in the urine after every acute attack of mania. He was of the opinion, that the uremia which existed during albuminuria, should be regarded as the cause of puerperal mania.

A. S. Donkin has recently divided puerperal mania into the constitutional, which is dependent upon uremic poisoning, and the unconstitutional, which occurs independently of that condition; a division which is of no practical utility. It is interesting to note that attacks of insanity are sometimes preceded by great elevations of temperature, so that occasionally a severe attack may be prognosticated, especially at the outset of the affection. The patients are otherwise generally free from fever, exhibiting an abnormal elevation of temperature only when some local inflammation exists.

The mental derangements which arise during protracted

lactation are evidently the results of anemia, and take the form of mania and melancholia. The latter is said to be more common, and is often characterized by illusions of an apprehensive nature, with a tendency to suicide. The mania is more easily relieved, and is not attended by the obscurity which is observed in the puerperal form.

Autopsies have invariably failed to reveal any certain lesions to explain this condition, except œdema of the pia mater, serum in the ventricles, and anemia or hyperemia of the brain, such as has been noticed in other mental disturbances. It is uncommon, moreover, for an autopsy to be obtained, inasmuch as the puerperal mania generally ends in recovery. For this reason the post-mortem condition of patient No. 49 was all the more interesting, wherein the sequelæ of a very diffuse meningitis were demonstrated, that possibly owed its origin to the phlegmonous disease of the abdomen. (*Vide* pp. 227 and 230.) The general course of puerperal mania is that, after a stage of frenzy of variable duration, the patients remain in the melancholic state for weeks, or even months, according to their strength; but from which, as the functions of nutrition are restored, they pass in two or three months through a stage of apathy to complete recovery. According to Esquirol, in 55 recoveries from puerperal mania—

11 occurred within the first 2 months.
13 " " " " 4 "
14 " " " " 6 "
17 " between 6 months and 2 years.

Some are quite unconscious of their recent actions and insanity, and the whole affair seems to them to have passed in a dream; others, however, recollect perfectly their distress and excitement, the visits of the physician, or even many of the expressions employed by him. The patient is not always restored to her previous physical condition, notwithstanding the disappearance of the mental hallucinations, since an extensive bed-sore is often formed, especially in very wild and persistent attacks of insanity, which sometimes confines the patients to their beds for months, and to which many succumb. These ulcers are produced by extreme restlessness and violent

jactitation while in bed, and are not to be prevented even by air-cushions or any arrangement of the mattress or bed. Such patients suffer at the outset from constipation, and, as a rule, evince so great torpidity of the stomach and intestines that the most violent purgations and enemata produce little or no effect. It is all the more important, therefore, that the strictest attention be paid to matters of cleanliness, and that the region of the sacrum be carefully watched, since this class of patients, as is well known, manifest great insensibility to pain, and likewise go for days without taking nourishment; this peculiarity is analogous to the diminished sensibility to fatigue, due to the fact that the delirium occupies their entire attention.

With reference to the prognosis, it has already been mentioned that recovery is the rule; in 81 cases out of 131, equivalent to 61.83 per cent. (Helfft). It is in rare instances only that the trouble becomes chronic, or that mental derangements remain which finally terminate in imbecility. The early appearance of the maniacal state, especially if it has an erotic tendency, is, on the whole, more favorable than the melancholia with suicidal tendencies, which appears later. The condition of melancholia appearing in the later period of lactation is, as a rule, less hopeful. As often happens at the crisis of a disease, patients who have until within a short time been very restless, become of a sudden quiet, call for water to drink, express a desire to evacuate the bowels or bladder, and recognize those about them. Hopes of a speedy amelioration of all the symptoms may then generally be entertained, although patients who have made good progress toward recovery may still be greatly predisposed to fresh attacks of insanity. In addition to those who commit suicide, many subsequently die from exhaustion, septicemia, and pyemia (decubitus).

Treatment.—As a prophylactic measure, it is very important to guard against all excessive loss of fluids in lying-in women, such as are involved in hemorrhages, diarrhœa, profuse perspiration, as well as the excessive flow of milk. Care should be taken, also, to relieve any pain that may exist; to provide for absolute rest; and to build up the strength of the patient. If

it is observed that a woman in childbed is restless and disturbed, and is becoming irritable and excitable, the child should be promptly weaned, and every disturbing element removed from the vicinity. None but the husband, or immediate relatives, should be allowed to watch by her at night. All articles which tend to attract her attention, or trouble her, should be removed from the room. If, in spite of all these precautions, mania supervenes, some one must watch constantly by the bed, giving unremitting attention to the patient. The watcher must see that the woman is lying in a comfortable position, and is well covered, administer the drink, induce her to relieve the bladder, etc. For the rest, the patient should not be encouraged to indulge in conversation. The room should be slightly darkened, for in too glaring a light, patients are more readily excited. The temperature of the room should not be too high, and the bed should not be an uncomfortable one.

As respects the management of the disease, three prominent indications must be borne in mind by the physician. In the first place, great pains should be taken to relieve the physical exhaustion, the principal cause of the trouble; or, at least, to support the patient's strength, as far as possible, by the occasional administration of liquid nourishment, such as beef-tea, milk, water-gruel, and drinks flavored with fruit syrups. The bladder and bowels should be evacuated at regular intervals, the catheter and enemata or cathartics being resorted to if necessary. There should be frequent examinations of the back, and especially of the sacral region, with the hope that, by inducing a frequent change of position, or by the application of soap plaster, etc., the formation of a bed-sore may possibly be prevented. Finally, various medicinal agents must be appealed to, in order to allay the excited condition of the brain. The first two indications are, surely, quite as important as the last; for experience has shown that drugs have little or no effect in the case of puerperal women, even when administered in heroic doses.

If there is violent headache, or cerebral congestion, cold compresses or the ice-bag upon the head are very beneficial. In these forms of the disease, the abstraction of blood is abso-

lutely contra-indicated, as has been very clearly shown, especially by Ideler and Tuke. On the other hand, opiates in variable doses have been recommended by the English, and more recently highly extolled by numerous writers; Tuke, however, is of the opinion that they have no value. Engelken has given them in gradually increasing doses. The hypodermic injection of morphine, or narcein, is preferable to their internal administration, as the former method does not exercise any retarding influence upon the peristaltic action of the alimentary canal, and the action is generally more prompt and decided; this was used with good results in the case last reported by me. If the patient will take drugs, as soon as the attack of madness has passed off, quinine, iron, and other tonics may be given, in order to keep up the strength. When the skin is dry or parched, diaphoretics and baths are indicated; the latter are often of very great service during the height of the attack; the patient becomes somewhat quieter, even falls asleep shortly after, and there is a lowering of the temperature. A woman when excited, however, should not be put into a bath, for she is thereby only made more wild, and even irrigation of the head with cold water generally fails to insure rest in these cases. There are no specifics in this disorder; no favorable results can be expected from the employment of *tartarus stibiatus*, *extractum hyoscyami*, or camphor, though the latter has been extolled by Berndt.

During convalescence, absolute quiet should be maintained in the sick-room, while a strict watch should be kept up, and the patient should not be suffered to indulge in much conversation. Attention must be given to providing a nourishing bland diet, to regulating the action of the bowels and securing sufficient sleep. Step by step only should the woman be allowed to renew her acquaintance with the outer world.

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RECORD OF CASES.

No. 46. *A case illustrating symptomatic mania, accompanying phlegmonous metritis and lymphatic thrombosis. Peritonitis.*

		Temp.	Pulse.	Resp.	
1st day.	P. M.	100.6°	88	24	M. J., 32 years old; first delivery;
2d day.	A. M.	99.7	76	20	was perfectly well the first two
	P. M.	100.4	80	24	days of childbed; in the night of
3d day.	A. M.	105.3	136	28	the 2d and 3d days rigor and dis-
	P. M.	104.7	120	32	tress, together with abdominal
4th day.	A. M.	104.1	128	32	distension and pain. *Peritonitis.*
	P. M.	103.1	140	38	On 4th morning:—
5th day.	A. M.	104.5	136	36	Headache; cold compresses;
	Pleuritis dextra				child was weaned. Had scarcely
	P. M.	101.8	120	32	slept at all during the night
6th day.	A. M.	103.3	146	32	owing to the severe and painful
	P. M.	104.2	140	36	cough and diarrhœa which had

set in. At about midday the patient suddenly began to scream aloud; cried for help; complained of great distress, affirming she was about to die, and must have assistance; the compresses and clothes upon her abdomen were thrown off. She grasped her abdomen with force in order to show that this part was no longer sensitive, and was with difficulty held in bed, etc. On being spoken to she gradually became quieter.

No. 47. *Mania persecutoria puerperalis.*

R. H., 37 years old, of a healthy family. Her father died, she knows not why, five years ago; her mother and three brothers and sisters are still living, and in good health. When a child, and perfectly healthy, she said she had struck herself in the forehead with a flail, thereby inflicting a trifling wound of the integument, and was sure she had not lost consciousness. When twenty-one years old she had an epileptic attack at the first appearance of menstruation, but no subsequent recurrence of the trouble. Since then she had always menstruated irregularly, and, as a rule, not at all in the summer months; at the same time she suffered greatly from headaches, but in different parts of the head. Her father, she said, was always very stern in his treatment of her, so that she had a great dread of him. She therefore acted as nurse for six

months in an insane asylum, in compliance with the request of a brother, who held the position of attendant in the same institution. She left the place because of a quarrel with the head nurse. She then took service in the country, and afterwards in the post-office. Being already four months pregnant, and not knowing what resource now remained to her, she made a trip to Berlin in November, 1861, "owing to an impulse." In December, 1861, she applied to the Royal University Lying-in Establishment to make provision for her confinement. According to her account, she had only suffered from nausea and headache during pregnancy, but had been otherwise healthy. There was nothing noticeable in her behavior at that time. She entered the establishment May 18, 1862, when already in labor. In the ward for pregnant women she is said to have repeatedly attempted to strangle herself with a towel in the course of the evening. The pains did not increase in severity until the evening of May 19, the woman in the mean time being quiet, and only at times appearing morose and talking to herself. The delivery had to be completed at 9.45 P. M. with the forceps, because of danger to the child from the spasmodic character of the uterine contractions. The child, which was imperfectly developed, was asphyxiated, and could not be resuscitated. Placenta was expelled promptly, with no after-hemorrhage. The first day after confinement the patient appeared pretty well; but upon the second day she was found to be suffering from puerperal ulcers, with œdema of the vulva and endometritis, which necessitated an energetic antiphlogistic treatment (leeches, etc.). The local trouble abated pretty rapidly under this regimen, but there were gradually developed indications of mental derangement, accompanied by a high fever (pulse 146, temp. 104° F.) until she became the subject of various hallucinations.

The local inflammations after a while diminished, but the delusions and hallucinations remained. The patient continued in a depressed state, indulging at night only in abusive and blasphemous language. At length she was handed over to the police authorities, and passed from observation.

It can hardly be expected that recovery should ensue under these circumstances, where a blow upon the head had been inflicted, by which the patient was predisposed to brain trouble, not fully developed until after confinement. It is noteworthy that upon the upper edge of the forehead a narrow, superficial cicatrix was found, but upon other portions of the head there was nothing abnormal.

Idiopathic puerperal mania after severe hemorrhage. [*Rostocker Anstaltsjournal*, No. 560, 1857.]

P., 29 years old, pregnant for the second time. As a child, feeble; later, suffered at menstrual epochs from pain in the abdomen, lower part of back, with general feverishness. She had menstruated every four weeks, the flow being usually quite profuse for about six days. During the summer the menses appeared but once or twice. After the first confinement the menses were quite normal. The first labor and childbed were normal; she nursed her child, getting up on the third day. During the second gestation there were fluor albus and excoriations of the vulva. Patient was a blonde, of medium stature, well built, but pallid; suffered from œdema labiorum; was confined December 1, 1857. The first stage lasted about twelve hours, the pains being rather weak; the second stage lasted one hour, and was followed immediately by a profuse hemorrhage, in consequence of which the placenta was forcibly removed, the hand passed around the inner surface of the wound, and, later, repeated injections of vinegar and water made into the uterine cavity. The hemorrhage lasted forty minutes, the quantity of blood lost being estimated at above 3½ lbs. The woman was greatly blanched, but retained consciousness; the pulse was small, and scarcely to be felt. Dec. 2, condition fair. Dec. 3, meteorismus; at night, rigor, fever. Dec. 5, evening, considerable intolerance to light, though both eyes appeared perfectly healthy. Dec. 7, intolerance to light disappeared; strength increasing. Dec. 8, had a poor night, child being restless. At 4 A. M. she broke out in a series of loud but unintelligible complaints, speaking in a sad, pathetic tone, and made several attempts to get out of bed. Dec. 9, symptoms continued. She was in a state of excitement, owing to the death of another woman recently confined. A regular attack of mania set in at 9 A. M., the patient striking out with her hands, springing out of bed, crying out, etc. In sad tones she predicted that her death was near; the attack lasted an hour. P. 90–96. Urine, drawn by means of catheter, was quite pale, faintly acid; contained no albumen. During the evening she continued to indulge in loud talk, and, for fear of poison, would take neither food nor medicine. Dec. 11, passed a restless night, talking in a low tone, referring to her sins and impending death. Dec. 12, quieter. Dec. 13, an attack of mania, in which the patient made fearful outcries. She was rendered quieter by the use of morphine. Evening, a new attack of so great severity that it became necessary to put her in a strait-jacket. Dec. 14, morning, a fresh attack of mania. She was transferred to the State

Hospital, from which, at the expiration of fourteen days, she was discharged *cured*.

No. 48. Mrs. D., 27 years old, a small, spare brunette; previous health good; menses always regular; married 3½ years since; has already had one easy confinement. Jan. 18, 1866, delivered of second child; confinement was premature, coming on three to four weeks before the termination of the full period. Considerable after-hemorrhage. From first to fifth day patient was extremely weak, but in other respects well. She nursed her child for a while, but the supply of milk subsequently failing, the child was weaned. Jan. 27, evening, she became of a sudden very much excited, and began to be delirious. The house-physician, being summoned, found the pulse 120, temp. 102.2° F. Patient was very restless, tearing off the clothing, and raving about God and the Bible. I was called to the patient at 10 A. M., Jan. 28. Found her with pale countenance and vacant expression, extremely excited, lying transversely upon the bed, the feet sticking out from beneath the clothing. At times she would suddenly start up, gaze about her in a frightened manner, calling for her husband and sister. She would respond to questions in a disconnected manner, and in a whining tone. She fancied she saw a lighted Christmas tree, and complained that some of her children's playthings had been taken away from her. No local disease could be detected, aside from a moderate discharge of foul, bloody mucus from the womb, and an anemic condition. Bladder relieved by means of catheter. As there appeared to be some intestinal obstruction, I prescribed calomel (gr. v.) and a hypodermic injection of morphine; soon after which a sleep of one-half hour was obtained. Temp., noon, 100.5°; evening, 100.3° F. Injection of morphine repeated at night. Jan. 29, noon, pulse 88, temp. 99.2°; much more quiet; seizing the head constantly with the hands; complaining of severe headache; urine discharged in bed; no dejection. Evening, pulse 104, temp. 100.4°. Jan. 30, morphine repeated; pulse 104, temp. 100.4°. Evening: recognized her husband and the house-physician, but lost all control of herself, being completely out of her head, though less violent. Morphine repeated. Pulse 104, temp. 101°; dejection. Feb. 3, patient free from fever; much quieter; expressed a desire to micturate; inquired for her child; took some soup and her medicine (tinct. ferri acet. æth.). Feb. 9, patient restored to reason; free from headache; recognized those about her, and was well enough to get up. Perfect health was eventually regained, so that she resumed her household duties.

No. 49 is omitted from this edition.

CHAPTER VI.

SKIN DISEASES OF LYING-IN WOMEN.

Diseases of the skin, of a primary and secondary character, occur during the period of childbed, as well as at other times. The former class concerns us here, only so far as they affect the puerperal processes, or form a troublesome complication of some pre-existing disease of the organs of generation. It is, however, in the case of lying-in women above all others that these diseases are often confounded with secondary affections. The consecutive, or septic, skin diseases would naturally be considered under the chapter of septic puerperal affections, but will be treated at greater length here, since an attempt has always been made to attribute to them a specific character, and even in recent times, they have been frequently regarded as the principal affection. We shall discuss here only the most common of the severe, primary affections of the skin, viz., erysipelas, phlegmon, scarlatina, and variola.

1. *Erysipelas.*

This disease breaks out primarily in lying-in women, as the result of local causes; for instance, it is apt to supervene in inflammation of the deep-seated tissues (mastitis lobularis, pelvic phlegmon), or it may be produced by the action of pus, secreted from pustules or ulcers situated upon the surrounding soft parts. In this connection, it is worthy of remark, that puerperal ulcers of the external genitals, and of the orifice of the vagina, were formerly pronounced a fertile source of erysipelas. As in the case of non-puerperal, so also in puerperal women, erysipelas occurs at times upon the external genitals, when it cannot be attributed to any internal cause. The same appears also upon the face, the extremities, various parts of the buttocks, and especially over the nates. In the annals of the Rostock establishment, eight cases of erysipelas are recorded

in 816 childbirths; thus: erysipelas of the face two, of the body two, of the extremities three, of the nates one.

All known forms of the malady occur; *erysipelas glabrum*, as well as *vesiculosum* and *pustulosum*. Severe rigors, the swelling of the integument, at first circumscribed, the brilliant hue vanishing upon pressure, the rapid spread of the exanthema, all contribute to make the diagnosis on the whole easy. It is not of uncommon occurrence, however, to observe erythema bullosum confounded with scarlatina miliaris. It is, therefore, important at the outset to endeavor to ascertain the point from which the erythema originated.

In the primary erysipelas of childbed, the prognosis is, as a rule, less favorable than in the other forms, from the circumstance that the fever is usually intense, and may attain, especially during the first days of childbed, a very great height (106° F.). The patients are thereby reduced, and recover but slowly; this class of affections, nevertheless, generally terminates favorably, unless complicated by other internal affections, such as meningitis, œdema pulmonum, etc. Other cases of erysipelas in lying-in women run a regular course, being by no means more severe than at other times (*vide* Case 50).

The treatment is familiar to all: internally, acidulated drinks, full doses of potash, etc. The employment of emetics and cathartics, which are steadily losing in favor in this malady, and by many are completely discarded (Hebra), is still less advisable in the case of puerperal women, whose strength is taxed often enough and severely enough, without resorting to these debilitating agents. The disease cannot be abbreviated by the administration of these remedies. In the vicinity of the genital organs the eruption should be treated with wet compresses, or lead-water fomentations; upon other parts, either by means of dry warmth (cotton batting), meal, powdered-chalk, or, if the pain be very severe, there need be no hesitation in trying the effect of cold, in the form of cold compresses, or ice-bags.

What has been said with regard to erysipelas in puerperal women is, in general, true of the primary form of *phlegmon*, which, surely, is of more rare occurrence among this class.

The treatment has been already discussed under phlegmasia alba dolens.

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Byrne and Barnes (Purpura puerperalis), Med. Centralblatt, 1868. No. 3.

RECORD OF CASES.

No. 50. *Erysipelas faciei et capitis, beginning on the* 5*th, and terminating on the* 14*th day of childbed; maximum temperature of* 103.8° *F., on the evening of the* 7*th day.*

Sophie Fischer, a blonde, 28 years old, weighing 119½ pounds, 4 feet 11 inches in height, 4th pregnancy, was delivered, at 3 P. M., Feb. 5, 1869, of a mature, live, female child after a labor of 6–7 hours' duration.

The vaginal temperature rose during delivery from 99.3° (10 A. M.) to 99.7° (11 A. M.), 99.9° (12 M.), 100.2° (1 P. M.), 100.8° (2 P. M.), 100.6° (2.30 P. M.), and immediately after its completion, fell to 100.2° F. There was no flooding.

Her condition during the early days of childbed was good, except for a slight tenderness of the left side of the uterus, and headaches. The temperature only rose to 100.6° in the first 12 hours, was 99.7° both morning and evening of the 2d day; 100.4° on morning and evening of 3d day; on the 4th A. M. 100.1°, P. M. 101.5°, with pulse of 68, and respirations 24. The excretion of urine was very abundant.

On the 5th day the temperature persisted above 100.4°, P. M. 100.5°, she again complained of headache, and passed a sleepless night; the headache was still more severe on the 6th day, the temperature rose to 101.9° (P. M.); considerable redness and swelling of the nose and both infraorbital regions were then first perceived. This increased on the following day (7th), and large bullæ formed on the swollen parts of the

cheeks. A. M., temp. 100.4°; pulse 92; resp. 28; P. M. 103.8°; pulse 92; resp. 28. The erysipelas crept on the right side as far as the ear. 8th day A. M. temp. 101.8°; pulse 96; resp. 28; P. M., temp. 102.7°; pulse 92; resp. 28. On the left side the redness and swelling had advanced upwards and laterally. The abdomen was not tender, the discharge was still rather bloody; the external genital organs did not appear to be swollen, although there was a small perineal rupture. Bowels moved twice a day. In the night of the 8th and 9th days, the patient had several slight chills for the first time. The temperature on the morning of the 9th day was higher than it had been before, being 101.7°, and in the evening 103.4°. On the 10th day, it remained at this elevation (101.7°; 102.6°). The patient had another short attack of chills, lasting 10 minutes; the erysipelas had spread to the integument of the head, though, on the whole, it was but little swollen. On the morning of the 10th day, in spite of the erysipelas, the temperature had fallen to 99.2°, the pulse to 68, and the respirations to 22 in the minute, and from that time the patient was free from fever, and had no new elevation of the temperature to 100.4°, although the redness and swelling persisted for three days longer. On Feb. 19, the desquamation was almost completed, the face resuming its normal appearance and color. The treatment consisted in wrapping the parts in cotton-wool, and the administration of a solution of potash internally.

The woman was discharged on Feb. 24, when the following notes were recorded respecting the condition of her genital organs: The rima vulva was gaping somewhat; at the entrance to the vagina there was a small fresh cicatrix at the anterior end of the perineum; this latter was short; vagina was normal; the uterus lay with its body on the posterior wall of the pelvis, and was rather larger than usual; discharge abundant, and somewhat bloody; nowhere any exudation. The child was nursed by the patient herself, and on the 19th day had gained 10 ounces.

It must be mentioned that this case occurred soon after the woman Dahse had died (*vide* Case 20, pp. 237), and at a period when Rostock was visited by a severe epidemic of diphtheria. At the same time this must be regarded as a simple, primary erysipelas, because no disease of the genitals could be demonstrated, and these organs, surely, were not the seat of any phlegmonous or erysipelatous affections.

It is, however, of interest, to note that S. Schroeder, who was delivered subsequently to Fischer, on Feb. 28, 1869, although in another room, was likewise attacked with erysipelas of the face, of a lighter character to be sure (maximum temp. 103.1°, and 4 days of slight fever), but likewise with-

out any apparent affection of the genital organs; yet her disease began on March 12, in the face. A pregnant woman named Anschütz occupied the same room with this patient, and as early as March 13, had a commencing erysipelas faciei, ushered in by a chill, and subsequent feverishness, after the trouble had almost disappeared from Schroeder. Although immediately isolated and suitably treated, the patient was attacked by meningitis attended by very high fever, and succumbed on March 16.

2. *Scarlatina Puerperalis.*

There is no doubt that scarlatina also may occur primarily in lying-in women. Its appearance, however, is extremely rare, and it is not to be denied that those authors who assert that puerperal women are more liable than other adults to be attacked with this affection (Berndt, Sen.), and that at this time it more frequently assumes an epidemic form (Malfatti, Eisenmann, Hodge), have had to do, not with primary scarlatina, but rather with the inflammations of the integument that accompany septic puerperal affections; at least, that is the conclusion that would be naturally arrived at from a perusal of the description given by Malfatti (which is known to me through Berndt's *Krankheiten der Wöchnerinnen*, p. 297). It is stated explicitly by this writer: "In these cases there were detected upon the os uteri, traces of an antecedent inflammation, a quantity of purulent matter, while the edge appeared of a dark, livid color which penetrated more or less into the substance. In some instances an odor was evolved from the discolored tissue resembling that peculiar to a slough: The parts involved in the process of labor also seemed to be inflamed." The contagious nature of scarlatina is so well established, as is, furthermore, the rule that this exanthema appears commonly but once in human beings, that when lying-in women, who have previously had this disease, and in whose case the idea of contagion can with certainty be excluded, become the subject of this doubtful eruption, we are justified in pronouncing this to be not scarlatina, but rather a traumatic, or symptomatic, dermatitis, which has nothing in common with scarlatina but the color.

Another mistake, which is likely to occur, is the confounding of primary scarlatina, which may supervene in childbed

as a complication of pre-existing uterine affections, and the scarlatina so-called, which is merely a symptom of the latter. It does not seem to me improbable that the former variety may occur, but no instance of the kind has as yet come under my observation.

Scarlatina may also accompany mild inflammatory processes in the internal genital organs, greatly aggravating the trouble, and likewise complicating and augmenting any other febrile affections that may be present. In such cases, however, the acme of the latter process would appear after the eruption of the scarlatina. Halahan, McClintock, and Hervieux appear to have had the most extensive experience with scarlatina in this connection. According to Gusserow's *Reisebericht*, Hallahan has had 25 cases of this character, in 3 of which the eruption appeared during labor (all of these died); in 5 it appeared upon the 1st day after confinement; in 10 upon the 2d day; in 4 upon the 3d day; in 2 upon the 5th day; and 1 upon the 6th day; of the latter 16 died. All the above had high fever and angina; the majority metritis and peritonitis. Such a case I have come across under No. 913 in the records of the Rostock Institution.

On the third day of childbed, after an easy labor, a scarlatinal eruption was discovered upon the face and forearms, a difficulty of deglutition having been observed for some days previous. On the third day after the appearance of the eruption (6th day post partum), the patient began to experience pain in the side upon moving or coughing, and a tumor as large as a hen's egg was detected on the right of, and somewhat anterior to, the uterus (perametritis), not extending to the iliac bone. The urine was loaded with albumen. Upon the sixth day, desquamation commenced, and in the course of two weeks, the tumor had become appreciably smaller. The patient did not leave her bed until 5 weeks after the outbreak of the exanthema, but 14 days subsequently was discharged well. The maximum temperature observed during the attack was at the first appearance of the eruption (105.4° F.); during the desquamative stage, however, after the fever had begun to abate, there were two exacerbations to 105.5° and 105.8° Fahr.

Cases of primary scarlet fever, occurring in previously healthy lying-in women, have been reported by Retzius, A. Clemens,

and others. In an extensive epidemic of scarlet fever prevailing in 1836, two puerperal women under the care of the latter writer, were attacked with that malady, both of whom recovered. One such instance has been observed in this institution (No. 369.)

The symptoms in these primary cases are precisely the same as in non-puerperal women; the *stadium prodromorum* lasts from a few hours to three days. In most instances the disease makes its appearance one or two days after delivery. The period of incubation is said to be remarkably short, only 24–48 hours (Hervieux). Very considerable elevations of temperature then follow; in rare instances a chill; great congestion of the head; dryness and burning in the throat, at times even delirium; a white tongue with reddened apex and borders; excessive thirst, loss of appetite, nausea, generally constipation, more rarely diarrhœa and vomiting; the conjunctivæ are injected, and the nasal secretion augmented. The lochial and lacteal secretions continue uninterrupted. The eruption appears twenty-four hours after the first symptoms, and lasts 4–6 days. As in other patients afflicted with disease of this sort, the eruption generally appears first on the anterior surface of the body. The so-called *miliaria alba* are not unfrequently found at the same time on the extremities and abdomen. The latter may nevertheless remain soft and free from pain, and the lochia follow its usual course, while the involution of the uterus and all the genital organs may make good progress. Peritonitis and metrophlebitis may be regarded as the most unfavorable complication of scarlatina. Yet in most of the autopsies, the peritoneum and uterus have been found healthy. Any of the sequelæ may, however, supervene, whose unexpected appearance always makes even light forms of scarlet fever serious and usually necessitates a long and very tedious convalescence (exceeding six weeks). The desquamation in puerperal women is said by Hervieux to be more gradual and not so marked as in scarlatina occurring at other times.

The *prognosis* is, therefore, always very serious, and in the experience of McClintock and Halahan is on the whole unfavorable. The *treatment* should not be modified by the circumstance that the patient is a lying-in woman. There are

no specifics. A low temperature of the room; plenty of cooling drinks; a light covering; frequent change of the bed-clothes; bathing with tepid or cold water, are to be recommended. Diaphoretics and drastics, which were formerly so much extolled, have not proved of value; many women, it is true, recover in spite of these agents (Clemens), but certainly more slowly. As for the Priessnitz water cure, and the inunctions of fat suggested by Schneemann, the most recent experiments (Hebra) do not speak in their favor. The latter, like cold baths, only alleviate the itching and burning of the skin, diminishing the dryness and heat. Hervieux thinks cold irrigations too bold a remedy, considering their doubtful utility, but he does not appear to favor cold under any circumstances (*vide* p. 180). Halahan has given wine and brandy in heroic doses.

3. *Variola Puerperalis.*

Besides scarlatina, lying-in women may be attacked with smallpox, a disease which ranks among the most serious complaints of childbed. The greatest number of cases of this description during pregnancy and childbed have been observed by Von Pastau, who found among 510 women suffering with smallpox, 19 who were pregnant and 9 in childbed. Four of the pregnant women, and three of those who were lying-in (in all 25 per cent.) succumbed, whereas of the total 510 women, only 36 (7.15 per cent.) died. Of the pregnant women, 4 died subsequent to the expulsion of the fetus. One of these, who was afflicted with hemorrhagic variola, sank in consequence of very serious flooding, which took place 2½ hours after delivery. One of the three lying-in women also died of hemorrhage. It is worthy of mention that at the autopsies, in addition to the extravasations of blood into the mucous membrane of the stomach and large intestine, into the muscles of the heart, beneath the capsule of the kidney, etc., numerous ecchymoses were in many instances found in the vaginal mucous membrane, whereas the substance and inner surface of the uterus remained free from such lesions.

The *symptoms* do not differ from those observed in non-puerperal women. As a rule, no affections manifested themselves in the genital organs of those who recovered. The duration

of the stages of incubation, eruption, and desquamation was not abnormally long (12 to 21 days). In one woman who was attacked with smallpox on the first day of childbed, after a severe forceps-delivery, the temperature did not exceed 104.9° F. The fall during the effervescence amounted to 2.7° F. (from 104° to 101.3°). In the one fatal case, the temperature fluctuated between 104° and 106.2° F., and the pulse between 120 and 160 beats; the patient died on the seventh day.

Of course, there is no special treatment of variola in lying-in women. With them, as with others, compresses wet with chlorine water, cold, or even ice compresses, may be employed; suitable injections may be made into the vagina when the lochia is offensive, while acids may be administered internally.

The secondary, or septic (including pyemic), affections of the skin, which are met with among lying-in women, are: erysipelas, scarlatina miliaris, and miliaria crystillina.

(*a*) Erysipelas is pre-eminently an exanthema which so often accompanies septic puerperal diseases, that, as already mentioned, puerperal fever and erysipelas are in England regarded as identical (Moore, Ramsbotham, Nuneley). The simultaneous appearance of extensive epidemics of erysipelas and puerperal fever have been observed not only in England but also in America (Hodge, Wilson, Holston, Galbraith, Corson, and others), Germany, France, and other countries. In this connection it must be again stated that diffuse phlegmon of the connective tissue is very often included under the term erysipelas, especially in England. In fact these forms of skin diseases and the septic puerperal processes are identical in their causal relations; their origin can be attributed to the same causes—to infection by means of putrid matter. It is equally true for the so-called puerperal fever, as for most cases of erysipelas, due to internal causes, that the disease is produced through infection of the blood by means of foul matters, it having been demonstrated that decomposing substances when inserted beneath the skin of animals give rise to these same symptoms. Each affection can, moreover, evoke the other, for it is well known that transmission of the secretions of very sick puerperal women to healthy persons will generate ery-

sipelas, phlegmon, etc., and in the same way an infection of the abrasions of the mucous membrane in puerperal women with pus from a phlegmon will produce phlegmonous puerperal affections. This occurrence of erysipelas has been properly compared with those affections of the skin which manifest themselves after external wounds, especially in hospitals, and has led to its being designated erysipelas *nosocomiale* of lying-in women. This view was distinctly enunciated, as early as 1840, by Kiwisch (*l. c.*, i., pp. 172, 173). He stated it as his opinion that the erysipelas of lying-in women was in the majority of instances only a symptomatic complication of puerperal fever, and acquired its significance only from the presence of the latter disease.

Local changes in the skin are here found varying in intensity, every grade, from the simplest exanthema to the most diffuse erysipelas, being consecutively or simultaneously developed. The disease often originates in the external genital organs and perineum; in other cases it first appears in the extremities, especially about the joints (Quadrat, Retzius); in other instances again, the body or head is the seat of the eruption, and, if angina occurs at the same time, the affection acquires a strong resemblance to scarlatina, for which it has been mistaken by Helm, Böer, Malfatti, and others. Although this mistake is not easy, in cases where severe diseases of the genital organs already exist, yet it is very excusable where the erysipelas plays the chief role, as has been the case in several epidemics. The most extensive epidemic of this kind in recent times was observed by Retzius. According to his description, the symptoms which attended these affections were as follows: the disease began with a chill and high fever, during which patients complained of pain in the whole body, and the entire surface became so sensitive that the slightest touch caused pain, and even the weight of the blanket and sheets was insupportable. It was with the greatest difficulty that the women were able to move their arms and legs. The tongue, which was at first coated, soon became dry, red, and shining. A few hours after the rigor, circumscribed, bright red, hard swellings appeared on the extremities, involving the whole limb, and diarrhœa set in at the same time. Ten or twelve

hours later, the red color became black, and sloughing of the integument followed. The affected extremities became cold, œdematous, and deprived of sensation. The pain ceased; sopor and speedy death ensued. The lochial secretion was very offensive during the whole course of the disease, and so corrosive as to produce excoriations of the vagina and external genitals; there was, however, no sloughing of these parts.

When incisions were made into the affected limb a quantity of reddish serum exuded from the infiltrated cellular tissue. The muscles were soft and flabby almost to their insertion into the bones, though not affected by fatty degeneration. The inner surface of the uterus was of an ashy-gray color, and covered with a thin layer of an offensive yellowish fluid with red streaks; the parenchyma being soft and pulpy to the depth of two lines. In two instances only was there a small amount of a thin, grayish-yellow, sero-purulent fluid, discovered in the peritoneum. The liver was soft and anemic, the spleen larger than normal, the kidneys pale and flabby. In the spermatic vein, purulent deposits were found, as well as œdema and congestion of the lung. The whole description leaves no doubt that the affection referred to was a puerperal septico-pyemia originating in the uterus.

(*b*) *Scarlatina miliaris* is much less common as a septic disease of the skin in lying-in women. Mayr says, in Hebra's Skin Diseases (p. 120), that the so-called puerperal scarlet fever has nothing in common with the true scarlatina except the color, and falls, therefore, under the head of erythema; but this statement is, at the most, intended to be applied to simple scarlet fever, since, with reference to scarlatina miliaris, it is pointed out later (p. 142) "that it is not infrequently a symptom of pyemia," and it is not easy to see, *a priori*, why a scarlatina miliaris might not also occur in puerperal septicemia. Yet it has been previously shown (p. 466) that this statement will not bear critical examination even in case of scarlatina lævis. There are developed in lying-in women inflammations of the skin, which bear a very marked resemblance to scarlatina miliaris, beginning, as in case of simple scarlatina, with an eruption upon the neck and breast, and characterized by the extreme rapidity with which this erup-

tion spreads diffusely over the whole body, while the extremities remain entirely free, or are only covered with miliaria alba. It is, furthermore, marked by the intense, and to all appearance uniform, redness, and by a difficulty in deglutition more or less serious. After this has existed for two or three days, very minute vesicles, filled with a transparent watery fluid, form upon the inflamed skin, and sometimes coalesce in large blisters, chiefly confined to the trunk, as was shown by Mayr to be the case in scarlatina miliaris. A very high, continued fever (103°–106° F.), a very rapid pulse (130–160), a very much diminished secretion of urine, burning pain in the skin and in all the limbs, catarrh of the conjunctivæ and bronchi may accompany the disease, which in itself is surely but a symptom of puerperal septicemia, although it is invariably the most characteristic feature, and the one most likely to catch the eye. The result is, as a rule, fatal in 7–9 days, the chief cause of death being pulmonary œdema, or meningitis and cerebral œdema. This trouble might be most readily confounded with erysipelas vesiculosum, yet its sudden appearance over the whole body, the uniform character of the eruption on all the parts attacked, and the evidence of contagion, or even the possibility of this mode of origin, would seem to afford the data necessary for a correct diagnosis. It is not to be denied, however, that the disease described by Helm, Litzmann, Byrne, Barnes, and others as purpura puerperalis, appears to present many resemblances to the affection above described, yet the essential difference is, that in the latter case, no scarlet fever contagion can be made out, and moreover, it is only the erysipelatous inflammations of the skin which are supposed to owe their origin to some affection of the genital organs, or to the septicemia arising therefrom. While maintaining the possibility of the existence of scarlatina miliaris in childbed, and regarding it not simply as a symptom, but rather as an accidental concomitant, of the septicemic process, I am inclined to the belief, that the scarlatinal rash attended with innumerable vesicles, may be developed from a putrid infection of the genital organs in parturient, or puerperal, women in the stadium prodromorum. Such an origin of the skin disease in question must nevertheless be extremely rare, and, in compari-

son with the frequency of the erysipelatous process, can scarcely be taken into account in forming the diagnosis. There are however affections of this kind, in which the morbid state of the genital organs remains so completely in the back-ground, that only a rigid investigation of all the symptoms and of all the possible causes will lead us to a proper classification.

As these two forms of skin diseases in puerperal women, erysipelas and scarlatina, do not require any differential diagnosis with regard to the prognosis and treatment, it might appear that the nomenclature was unimportant, were it not that such lying-in women as are attacked with scarlatina must be unconditionally separated from their children, in order to prevent the dissemination of this serious malady. The correct designation of the trouble is, therefore, a matter not only of theoretic interest, but also of great practical significance.

(*c*) *Miliaria* is infinitely more common in the febrile affections of lying-in women than erysipelas or scarlet fever.

The so-called miliary fever was formerly regarded as a specific affection of childbed, and was designated, abdominal, puerperal, or uterine miliaria (Schoenlein), attributable, as it was believed, to a peculiar dyscrasia of the blood, which often developed during pregnancy, and which might lead to a fatal result, without the eruption of any characteristic exanthema. The disease was even subdivided according to the seat of the exanthema into miliaria pectoralis and abdominalis (Fuchs). This characteristic miliary eruption was described as consisting of vesicles about the size of a millet-seed, with or without a narrow, pale areola of a hemispherical or irregular shape, and containing a turbid fluid very like whey, and having a very sour reaction. The vesicles would sometimes attain to the size of peas, beans, or cherries, and were then filled with a yellowish-green, or purulent fluid (pemphigus miliaria, or, according to several authorities, vesicular miliaria). It was believed that this fever, attributable to epidemic and miasmatic influences, was connected with childbed, and that it assigned to "childbed fever the character of miliaria." Such views could only be entertained and disseminated, at a time when the pathologico-anatomical principles of the severe puerperal processes had not been sufficiently ascertained; just

as typhoid fever (as has been shown by Hebra) was regarded as a miliary fever, until numerous and careful autopsies had led to the adoption of more correct theories as to the true character of the malady. At the present day, we distinguish a miliaria alba, rubra, and crystallina; and regard them all as simply adventitious skin diseases; the first as sudamina produced by heat and sweating; whereas the last is explained merely as a symptom of septicemia, or pyemia.

The former has absolutely no significance, occurs constantly on the breast, abdomen, neck, and limbs of lying-in women, without giving rise to any real trouble.

Miliaria crystallina assumes, according to Hebra, precisely the form of dew-drops with clear contents, which are never yellow or purulent, nor is there a sour reaction; the individual vesicles are not confluent, exhibit no red areola, give rise neither to itching, burning, nor any inconvenience whatsoever. No remission of any morbid symptoms accompanies this eruption, nor is there any exacerbation. Desquamation does not ensue, because the walls of the epidermis are rubbed off when the vesicles burst, and only a fine, garland-shaped, raised line of epidermis remains. The significance of these vesicles is, therefore, neither favorable nor unfavorable. A general subsidence is absolutely impossible, small vesicles being always found even on the cadaver. These statements of Hebra, I am able to corroborate in every respect. A similar view has been expressed by Hugenberger, in favor of the insignificance of miliaria during severe puerperal processes.

Hebra assumes, that the miliaria crystallina is likely to result only from the so-called pyemic process. In feverish lying-in women, the eruption is, as a rule, thickest on the abdomen, breast, and thighs. Hebra further asserts (*l. c.*, p. 261) that there are no febrile complaints which may not be followed by true miliaria crystallina; and I can also testify that I have met it in the most diverse diseases of lying-in women, without regard to the degree of intensity of the fever.

Miliary vesicles can only be mistaken for erysipelas and scarlatina when they coexist, and are then regarded as the chief complaint, or the acme of the eruption; or again when miliaria rubra instead of crystallina has appeared. On *a priori*

grounds, it seems almost impossible that these sudamina can be even compared with so severe affections as these skin diseases. Yet from the universal description of miliary fever, this error must have been frequently made, and when these red isolated vesicles, which are often enough met with upon patients, have been very numerous, imparting an appearance of uniform redness to considerable portions of the skin, they have been considered to be the causes of the severe symptoms which often appeared concomitantly in lying-in women.

In view of the fact that there is no real miliary fever, that the so-called sudamina, as well as the miliaria crystallina, have in themselves no noticeable influence upon the course of pre-existing diseases, they may be completely ignored with regard to treatment, and, as Hebra very properly insists, should not prevent our resorting to any internal or external treatment whatsoever, that may be requisite for the relief of the principal disease; this remark applies especially to the employment of cold compresses and ice-bags.

Finally, it must be mentioned that pemphigus vesicles occur in great number during the course of septic puerperal diseases, and are seen to be filled with pus, attaining the size of a bean or almond; these are likewise a symptom of the general blood poisoning.

In the septic skin diseases thus far mentioned, the internal and external treatment will of course be the same as is employed in primary erysipelas, scarlatina, miliaria, and pemphigus, while especial attention should be paid to the affection of the genital organs, among the sequelæ of which it has appeared.

INDEX.

ABODE in lying-in establishments, danger of, 333
Abscesses of the vulva, 164
pelvic, 76, 205, 206
Acids, muriatic, phosphoric, sulphuric—
in diphtheria, 234
in peritonitis, 196
in pyemia, 265
Aconite in diphtheria, 236
After-pains, 18, 19
in endometritis, 172
Agalactia, 338
Agaricus albus in galactorrhœa, 396
Air, its entrance into the uterus, 361
Ammoniemia puerperalis, 437
Anemia of lying-in women, 31
in galactorrhœa, 393
cerebri, 437
Anise for deficiency of milk, 391
Anteflexion of the puerperal uterus, 102, 126
Anteversion of the puerperal uterus, 102, 126
Antiphlogosis, 39
Apoplexy, cerebral, 363
Atmosphere of lying-in establishments, 338

BATHS, warm, in diphtheria, 234
in pyemia, 266
in mania, 457
Belladonna in mastitis, 387
Belt in affections of the synchondroses, 417
Bladder, diseases of (*vide* Urinary fistulæ), 405
hyperemia and inflammation, 405
catarrh, 408
exfoliation of mucous membrane, 407
diagnosis, 408
causes, 408
in retroversion of the uterus, 407
Blisters in peritonitis, 197
in phlegmasia, 294
in neuralgia, 427
Blood, quality of, 30
abstractions of, 39, 40, 41, 42
Breasts, condition of, 20
inflammation of, 375, 378

CADAVERIC infection, 335, 338
Calomel in peritonitis, 193
in diphtheria, 234
Camphor, wine of, in diphtheria, 233
mixture, in diphtheria, 236
Catheterization of the bladder, 74, 409.
Cauterization of ulcers of the vulva, 168, 233
os uteri, 175
urinary fistulæ, 77
Cellulitis in pyemia, 254
Central rupture of the perineum, 50
delivery through the same, 51
Cerebral condition in pyemia, 281
in eclampsia, 435
in puerperal mania, 454
Chloroform in eclampsia, 442
Cicatrices in the vaginal cul-de-sac, 92
Colds in lying-in women, 32, 173
Collodion bandage, 194
in peritonitis, 195
in perineal ruptures, 59
in phlegmasia alba, 254
in fissures of the nipples, 371
in mastitis, 385
Colpeurisis for inversion of the uterus, 118
Colpitis, 168
Compresses, cold, 294
aromatic, 295
Compression, thrombosis due to, 262
by bandage in mastitis, 374, 375
of the uterus in hemorrhages, 135
of the abdominal aorta, 136
of the breasts by bandages in hemorrhages, 137
Concretions in the vagina, 71
Constipation, 71
dangers of, 191
Contagion in childbed, 336, 348

Contusions of the genital organs, 323
Convulsions, 434
Corrosive sublimate in herpes areolæ mammæ, 372
Cramps of nursing women (*vide* Eclampsia), 394
Croup of the vulva, 163
Crowding of patients in lying-in establishments, 342
Cups in galactorrhœa, 397
Cyanosis in diphtheria, 230
Cystitis, 406
Cysts in the lips of the os, 171

DEATH, cases of sudden, 359
Defecation, 29
in ruptured perineum, 30, 58
Diarrhœa in diphtheria, 230
Diet in peritonitis, 196
in pyemia, 264
in lactation, 391
Digitalis in hemorrhages, 134
in peritonitis, 196
in diphtheria, 234
Dilatation, thrombosis due to, 261
Diphtheria of the vulva, 164
of the vagina, 223
of the uterus, 223
bibliography of, 236
ulcers of, 223
parasites of, 224
symptoms of, 229
recovery from, 233
diagnosis, 232
results, 231
prognosis, 232
treatment, 233
of the bladder, 406
Douche, cold, in versions and flexions of the uterus, 107
in hemorrhages, 139
in galactorrhœa, 397
in paralysis of the bladder, 412
Drugs, their entrance into the milk, 384
Dysuria in puerperal ulcers, 164

ECCHYMOSES of the nipples, 366
Eclampsia, puerperal, 434
bibliography, 442
causes, 435
condition of the brain in, 445
condition of the kidneys in, 436
theories about, 436
symptoms, 439
diagnosis, 440
results, 440
Eclampsia, puerperal—
prognosis, 441
treatment, 441
Eczema of the nipples, 365, 371
Effusions, pelvic, 206
Electricity in hemorrhages, 137
paralysis of the bladder, 411
Embolism of the lungs, 251
spleen, 252
kidneys and liver, 252
eyes and brain, 253
pulmonary arteries, 359
Emphysema of the uterus after rupture, 93
Emetics in diphtheria, 236
Emotions, 362
Ems, water of, for catarrh of the bladder, 410
Endocarditis in pyemia, 252
Endometritis, catarrhal, 168
bibliography, 175
anatomy, 169
symptoms, 171
causes, 173
prognosis, 174
treatment, 174
diphtheritic, 223
Epidemic of puerperal fever, 349
time of its appearance, 332
place of its appearance, 333
Epistaxis in diphtheria, 230
Ergot, employment, doses, 107, 134
Erysipelas in pyemia, 254, 470
primary symptoms of, 462
treatment, 463
instances, 464
Erysipelas of the breast, 373
Eruption in pyemia, 256
Erythema of the nipples, 365
Excision of the inverted uterus, 118
Excitement, danger of, 33, 128
Exertions, the too early, dangers of, 32, 127
Exfoliation of the mucous membrane of the bladder, 407

FAT, drops of, in the blood in pyemia, 272, 282
Fatty degeneration, acute, 363
of the heart, 222
Fecal fistulæ of the vagina, 84
of the uterus, 84
spontaneous cure of, 87
Fever in ruptures of the perineum, 51
of the vagina, 63, 67, 68
Fever in urinary fistulæ, 71
in traumatic peritonitis, 92, 185
in puerperal ulcers, 164
in endometritis, 171

Fever—
in parametritis, 208, 209
in diphtheria, 231
in metastatic pyemia, 257, 268, 275
in fissures of the nipples, 366
in mastitis, 379
Fissures in the os uteri, 89, 95
of the nipples, 365
Fistulæ of the vagina, 69
of the uterus, 187
after hematoma of the vulva, 149
Frequence of puerperal affections, 35, 36
Fungi in diphtheria, 224
in the milk, 383
Furuncle of the mammary integument, 373

GALACTOPHORITIS, 366
Galactorrhœa, 392
Gangrene of the uterus, 101
in inversion of the uterus, 310
of the vulva in hematoma, 148
in diphtheria, 225
Genital organs, erysipelas of, 464

HEADACHE, anemic, 130
Heart, fatty degeneration of, 362
paralysis of, 362
aneurism of, 363
Hematocele, ante-uterine, 91
Hematoma of the vulva and vagina, 91, 142
bibliography, 151
anatomy, 142
symptoms, 144
diagnosis, 145
causes, 146
frequence, 147
prognosis, 148
treatment, 149
instances of, 152, 153, 154
Hematoma of the uterus, 156, 157
polyposum, 157
Hemeralopia, 395
Hemorrhages in perineal ruptures, 50
in lesions of the pudenda, 63
in urinary fistulæ, 71
in fissures of the os uteri, 91
in versions and flexions, 103
in inversion, 112
bibliography, 141
from the uterus, 122, 123
vagina, 122
frequence of, 124
in subinvolution of the uterus, 125, 129
in imperfect contractions, 123, 129
Hemorrhages—
in retention of urine, 127, 131
from retained portions of the membranes, 126, 129
of the placenta, 126, 129
in endometritis, 126, 172
in erosions of the uterus, 126
from too early exertions, 127
from rigors, 128
from mental emotions, 128
symptoms, 129
in ulcers of the orifice of the uterus, 133
prognosis, 132, 133
diagnosis, 131, 132
treatment, 133
position of the woman in, 138
diet in, 138, 140
secondary, 138
external, 122
internal, 142
parenchymatous, 142
of the nipples, 366
Hemoptysis in pyemia, 256
Herpes of the mammary areola, 366
History of puerperal fever, 312
Hydremia, 31
Hyperinosis, 30

ICE, pieces of, in the uterus, 135
Ice-bags, action of, 42
use of, 43, 97
in peritonitis, 194
asserted dangers of, 194, 195
in parametritis, 213
in miliaria crystallina, 476
Ice-caps in puerperal mania, 456
in eclampsia, 442
Ichorrhemia, 308
Icterus in puerperal pyemia, 255, 258
Iodine, tincture of, in peritonitis, 195
in phlegmasia, 293
in mastitis, 375, 384
in galactorrhœa, 396
Incision in hematoma, 150, 151
in mastitis, 375
Incontinence of urine, 70, 71
Infection with putrid poison, 309, 324, 325, 335
dissemination of the same, 336
locality, 340
by means of clothing, 342
Inflammation of the genital organs, 163
Injections—
I. *Into the vagina*, 167
methods, 167
in ruptures of the perineum, 58, 59
vagina, 66

Injections—
solutions for, 66, 107, 139, 167, 174
cold, in hemorrhages, 135
insufficient, 174
in diphtheria, 233
II. *Into the uterus*, 43
in non-pregnant woman, 43
in lying-in women, 45
drugs for, 46, 47, 96, 107, 174
reaction and dangers, 43 to 47
instances of, 175, 177
for prophylactic purposes, 48
III. *Into the bladder*, 410
Intestines, condition of, 27
mucous membrane of, in pyemia, 252
Intestino-vaginal fistulæ, 71, 86, 187
Inunctions in phlegmasia, 294
in affections of the synchondroses, 417
Inversion of the uterus, bibliography, 119
anatomy, 110
symptoms, 112
causes, 115
diagnosis, 114
frequence, 116
prognosis, 116
treatment, 117
instance of, 120
Involution, retarded, of the uterus, 132
Iron, tincture of the chloride of, in hemorrhages, 138, 142
in puerperal ulcers, 168

JOINTS, abscesses of, in diphtheria, 227
in metastatic pyemia, 254

KIDNEY, metastatic deposits in the, in pyemia, 252

LABOR, complications of, predisposing to puerperal fever, 233
Lactation, arrest of, 381
protracted, 392, 393, 453
Laminaria, in the diagnosis of placental polyps, 160
Lead-water compresses in phlegmasia alba, 293
in fissures, 371
in mastitis, 383
Leeches in peritonitis, 193
in parametritis, 213
in phlegmasia alba, 294
Leeches—
in mastitis, 386
in diseases of the synchondroses, 413
in neuralgia, 427
Lesions of the genital organs, 28, 29, 323
of the vulva, 61
of the vagina, 62
of the uterus, 92
Ligature in inversion of the uterus, 118
Lime-water in catarrh of the bladder, 410
Limping in parametritis, 207
in affections of the synchondroses, 414
Lochia, offensive, 171
reaction, quantity, 19, 21
in endometritis, 171
in peritonitis, 184
in diphtheria, 229
in pyemia, 254
Lochial theory of puerperal fever, 314
Lungs, capacity of, in lying-in women, 22
metastatic deposits in the, 251, 272
Lying-in establishments and puerperal fever, 332
Lying-in wards, danger of, 337
Lymph spaces, abscess of the uterus, 192
Lymphangitis of the uterus, 223, 225, 226
of the mammary gland, 373

MANIA, puerperal, 442
bibliography, 457
classification of, 444
specific (?), 444
occurrence, 443
symptomatic, 445, 458
from hereditary predisposition, 446, 458
idiopathic, 448
causes, 450
symptoms, 451, 461
stages, 452
time of appearance, 452
secretions in, 453
prognosis, 455
treatment, 455
cases, 458
Mastitis, abortive treatment of, 386
sub-mammary, 375
case, 376
parenchymatous, 378
secondary in pyemia, 253, 383
Melancholia, puerperal, 454

Membranes, remnants of, in uterus, 323
Meningitis in diphtheria, 227
in eclampsia, 441
Mental affections, 443
Mental condition in peritonitis, 185
in diphtheria, 230
Mercury in peritonitis, 197, 213
in diphtheria, 235
in metastatic pyemia, 266
Metastatic deposits in the liver, 252, 274, 278
Meteorism, 184
treatment of, 197
Metritis, 203
Metro-phlebitis (*vide* Metastatic pyemia), 249
Miliaria, 474
alba, rubra, crystallina, 475
Milk, flow of, 392
Milk-fever, 398
definition, 401, 402
appearance of, 400
temperature in, 401
Milk-nodes, 386
Milk-powder, 391
Milk, secretion of, amount, 20
in diphtheria, 229
passage of drugs into, 384
with oleaginous diet, 391
with meat diet, 391
metastatic theory, 313, 390
fungi in, 383
alteration during fever, 389
absence of, 388
change during menstruation, 392
Mobility, interference with, in parametritis (*vide* also Neuralgia and Paralysis), 207
Morphine in eclampsia, 442
Mortality in private dwellings, 37
in lying-in establishments, 38, 39
Muscles, diseases of, in diphtheria, 227
in pyemia, 254, 285
in phlegmasia, 285, 228
Myodynia, 426

NEUENAHR, waters of, in catarrh of the bladder, 410
Neuralgia of the crural nerve, 206, 425
of the external cutaneous nerve of the thigh, 206, 425, 428
of the sciatic nerve, 425
of the deep peroneal nerve, 431
in metastatic pyemia, 255
Neuroses of the urethra, 410
of the bladder, 410
Nipples, diseases of, 365
causes, 368
Nipple-shields, 371
New-born children, puerperal infection of, 321
cases, 351, 354

OBLITERATION, transverse, of the vagina, 80
Obstruction of the bowels, 104
in fistulæ, 71
dangers, 72
Œdema of the vulva, in ruptured perineum, 52
in ulcers, 163
in laceration of the vagina, 63
of the lips of the os, 170
of the ovaries, 226
Oophoritis, puerperal, 180, 181, 190
Opium in hemorrhages, 134, 137, 138
in hematoma, 154
in peritonitis, 198
in diphtheria, 234
in enemata, 427
hypodermically, 427, 442
in eclampsia, 442
in puerperal mania, 457
Ophthalmia in pyemia, 253, 299

PAD for disease of the symphysis pubis, 417
Paralysis of the bladder, 411
of the sphincter vesicæ, 411
of the lower extremities, 422
bibliography, 428
anatomy, 422
causes, 422
in pelvic effusions, 206, 423, 433
in periphlebitis, 423
in lesions of the vagina, 424, 431
in caries of the sacrum, 424
in chronic myelitis, 424
Parametritis, bibliography, 214
anatomy, 203
symptoms, 206
results, 209
diagnosis, 210
site, 211
prognosis, 212
causes, 211
treatment, 213
cases, 215, 221
Paranephritis, phlegmonous, 226
Parotitis, metastatic, 253
Pelvic abscesses, 76, 205, 206
effusions, 206
synchondroses, 413
Pemphigus in lying-in women, 476
in miliaria, 474
Pericarditis in diphtheria, 230

Pericystitis in lying-in women, 406
Perimetritis as cause of rupture, 90
Perineal ruptures, 49
bibliography, 60
division of, 49
central, 50, 51
symptoms of, 50
duration of cicatrization, 51
fever with, 51
sequelæ, 52
diagnosis, 52
causes, 53
frequence, 53
prognosis, 56
as predisposing to puerperal affections, 57
treatment, 57
suture in, 58
serres-fines in, 59
collodion in, 59
old, 60
fistulæ, 51
Perineum, length of, during delivery, 49
Periphlebitis, as cause of peritonitis, 192
Peritonitis, puerperal, 180
anatomy, 180
symptoms, 183
of acute, 183
of very acute, 186
of chronic, 186
results, 187
etiology, 190
prognosis, 190
treatment, 193
traumatic, 98
Phlebitis, crural, 283
Phlegmon of the thigh, 284, 304
of the nipples, 365
of the breasts, 373
Phlegmasia alba dolens, 263, 267, 283
bibliography, 295
hypotheses, 283
forms and varieties, 284
in affections of the muscles, 285
results, 285, 288
symptoms, 286
fever, 288, 297, 301
diuresis in, 288
lochia, 288
diagnosis, 289
causes, 290, 291
frequence, 291
prognosis, 292
treatment, 293
Placenta, site of the, 160
fragments of, retention of, 126, 158, 159, 161, 173
Placental polypi, 156
Plaster-of-Paris bandage in mastitis, 384
in galactorrhœa, 396
Pleurisy in diphtheria, 230
in pyemia, 251
Poison, putrid, 343, 344, 346
Polygalactia, 392
Polyps, placental, 156
fibrinous, 157
diagnosis of, 159
consistence, 160
prognosis, treatment, 161
extirpation, 161
Position of the woman in peritonitis, 195
in phlegmasia, 293
Potash, caustic, in galactorrhœa, 396
Poultices in peritonitis, 197
in parametritis, 213
in paramastitis, 375
in mastitis, 385
Predisposition to puerperal diseases, 29
Prolapse of the uterus after perineal ruptures, 52, 57
spontaneous cure, 110
with inversion, 112
Puerperal fever—
bibliography, 325
history, 312
theories about, 312
derangements of the lochia, 312
lacteal metastasis, 313
physiological, 314
phlogistic, 314
metritis, 314
lymphangitis, 315
entero-peritonitis, 315
peritonitis, 315
erysipelatous, 316
typhous, 318
changeable character, 317
miasmatic, 318, 319
hospital, 318
theory of infection, 318
hemato-theory, 319
hyperinosis, 319
pyemia, 320
dissolution of the blood, 320
theory of Semmelweis, 320, 331
varieties, 306, 307
source, 322
dissemination, 322
causes, 323
facts, 332
Puerperal mania, 442
Pulmonary artery, embolism of, 356
Pulse of lying-in women, 20, 21
Pupils after losses of blood, 130

Purges in diphtheria, 234
in eclampsia, 441
Purpura, puerperal, 473
Putrescentia uteri, 226
Pyemia, metastatic puerperal, 249, 309
occurrence, 261
causes, 261
in phlegmasia, 262
case of recovery, 281
metastases in, 260
results, 360
type of fever, 281
diagnosis, 260
Pyo-salpynx, 183

QUINIA in diphtheria, 234, 235
in pyemia, 265
its mode of action, 266
in puerperal mania, 455

RECTO-VAGINAL fistulæ, 94, 85
Reposition of the inverted uterus, 120
Respiration, frequency of the, 22
Retention of the lochia, 106
of the placenta and membranes, 126, 159, 262, 323
of the feces, 30, 71, 128
Retinitis, apoplectic, 395
Retroversion and retroflexion in lying-in women, 102
Rhagades mammillæ, 367
Rigors, 30, 128
in diphtheria, 229
in metastatic pyemia, 250
causes, 258
Rising from childbed, too early, 32, 127
Rubbing the inner surface of the uterus with the hand, 136
Rupture of hematoma vulvæ, 151
Rupture of the uterus (*vide* Uterus), 90
of varicose veins, 122

SALPINGITIS, puerperal, 179, 182, 183, 189
with peritonitis, 192
care of, 237
Scarlatina, puerperal, 466
symptoms, 468
treatment, 469
miliaris, 472
Scarlet fever (*vide* Scarlatina).
Sciatica puerperal, 425
Self-infection, 262
Semmelweis' theory, 320
Sepsin, 307, 342
Septicemia in gangrene of the uterus, 99, 310
due to self-infection, 173
in endometritis, 175, 177
in parametritis, 209
definition, 306, 307
Septico-pyemia, case of, 275
Skin, metastatic deposits in the, in pyemia, 254
secretion of the, 26
Smallpox in lying-in women, 469
Soil, character of, in puerperal fever, 332
Sound, the uterine, in childbed, 104
in inversion, 114, 118
Spleen, metastatic deposit in, 252
Sponge-tents, in diagnosis of urinary fistulæ, 73
of polyps, 161
Sporadic cases of puerperal fever, 328
Street-deliveries, condition subsequent to, 334
Subinvolution, 106, 132
results, 106, 129
Suicide, 452, 454
Sutures in rupture of the perineum, 65, 66
Synchondroses of the pelvis, affections of, 413
relaxation, 415
hyperemia, relaxation, 413
metastatic inflammation, 414
abscesses in, 414
results, symptoms, 414
diagnosis, causes, 415, 416
prognosis, frequence, 416, 417
treatment, 418
cases, 419, 420
disrupture, 418
Syncope, 362

TABES lactea, 393
Tampons, vaginal, 97
with versions and flexions, 107
with prolapse, 110
with hematomata, 151
with hemorrhages, 137, 139
uterine, for hemorrhage, 135, 137
Temperature, normal, in childbed (*vide*, also, Fever and Milk-fever), 22, 23, 24
after hemorrhages, 130
Thermometry in pyemia, 260
Thrombosis, venous, of the genital organs, 249
placental, 249
from dilatation, 249
from compression, 249
changes in the clot, 249, 307
of the femoral veins, 283

Thrombus vulvæ et vaginæ, 142
uteri, 156
Transfusion after hemorrhages, 138
Transmission of infectious matter, 344
Turpentine stupes, 197
enemata, 195
for vesical catarrh, 410

ULCERS of the vulva, 163
causes, 165
prognosis and treatment, 166, 167
of the lips of the os uteri, 170
of the nipples, 365
Uretero-uterine fistulæ, 70
Uretero vaginal fistulæ, 70, 79
Urethra, affections of, 69
Urine, character of, 25, 26
in icterus, 259
trickling of, 70
retention, results, 127, 131, 406
in hematoma, 144, 159
in perineal ruptures, 51, 146
in vaginal lesions, 63
in deep fissures of the cervix, 92
treatment, 411
quantity, in healthy lying-in women, 25
Urinary fistulæ of the vagina, 69
Urinary troubles in parametritis, 207
in diphtheria, 229
Uterine douche, 107
Uterus, involution of, 18
position of, immediately after delivery, 18
vesical fistulæ of, 70, 79
vesico-vaginal fistulæ of, 73, 81
intestinal fistulæ of, 84, 86, 88
perforation, 89
Uterus—
penetration of, by attrition, 90
laceration of, 90
emphysema of, 93
rupture, 90
causes, 94
frequence and prognosis, 95

VAGINA, involution of, 19
ruptures, lesions, 62
abscesses, 63
results, 63
diagnosis, causes, 64
case, 67
fistulæ, 65, 69
bibliography, 80
diagnosis, 72
causes, 73
frequence, 75
prognosis, 75
multiple, 74
treatment, 65, 77
operations for, 77
Variola, puerperal, 469
Venesection, 39, 40, 41
Veratrin, 236
Vesico-vaginal fistulæ, 69
Vibrios in lying-in women, 343, 344
Vichy water for vesical catarrh, 410
Vision, derangements of, in nursing women, 394
Vomiting in diphtheria, 230

WEANING, 381
Wet compresses, 175
in endometritis, 175
in peritonitis, 193
Weight, loss of, 27

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INDEX TO CATALOGUE.

	PAGE
American Journal of the Medical Sciences	1
Allen's Anatomy	7
Anatomical Atlas, by Smith and Horner	7
Ashton on the Rectum and Anus	28
Attfield's Chemistry	10
Ashwell on Diseases of Females	21
*Ashhurst's Surgery	27
Browne on Ophthalmoscope	29
Browne on the Throat	19
*Burnett on the Ear	30
*Barnes on Diseases of Women	22
Barnes' Midwifery	24
Bellamy's Surgical Anatomy	7
Bryant's Practice of Surgery	27
Bloxam's Chemistry	11
Blandford on Insanity	31
Basham on Renal Diseases	19
Bartholow on Electricity	18
Barlow's Practice of Medicine	14
Bowman's (John E.) Practical Chemistry	9
*Bristowe's Practice	16
*Bumstead on Venereal	20
Bumstead and Cullerier's Atlas of Venereal	20
*Carpenter's Human Physiology	8
Carpenter on the Use and Abuse of Alcohol	12
*Cornil and Ranvier	14
Carter on the Eye	29
Cleland's Dissector	7
Classen's Chemistry	9
Clowes' Chemistry	11
Century of American Medicine	5
Chadwick on Diseases of Women	22
Charcot on the Nervous System	18
Chambers on Diet and Regimen	19
Christison and Griffith's Dispensatory	12
Churchill's System of Midwifery	21
Churchill on Puerperal Fever	21
Condie on Diseases of Children	21
Cooper's (B. B.) Lectures on Surgery	25
Cullerier's Atlas of Venereal Diseases	20
Cyclopædia of Practical Medicine	15
Duncan on Diseases of Women	23
*Dalton's Human Physiology	9
Davis's Clinical Lectures	15
Dewees on Diseases of Females	21
Druitt's Modern Surgery	26
*Dunglison's Medical Dictionary	4
Ellis's Demonstrations in Anatomy	7
*Erichsen's System of Surgery	28
*Emmet on Diseases of Women	23
Farquharson's Therapeutics	12
Foster's Physiology	8
Fenwick's Diagnosis	14
Finlayson's Clinical Diagnosis	18
Flint on Respiratory Organs	19
Flint on the Heart	19
Flint's Practice of Medicine	15
Flint's Essays	15
*Flint's Clinical Medicine	15
Flint on Phthisis	19
Flint on Percussion	19
Fothergill's Handbook of Treatment	16
Fothergill's Antagonism of Therapeutic Agents	16
Fownes's Elementary Chemistry	10
Fox on Diseases of the Skin	18
Fuller on the Lungs, &c.	19
Green's Pathology and Morbid Anatomy	14
Greene's Medical Chemistry	9
Gibson's Surgery	25
Gluge's Pathological Histology, by Leidy	14
*Gray's Anatomy	6
Galloway's Analysis	9
Griffith's (R. E.) Universal Formulary	12
Gross on Urinary Organs	26
Gross on Foreign Bodies in Air-Passages	26
*Gross's System of Surgery	26
Habershon on the Abdomen	16
Hamilton on Dislocations and Fractures	29
Hartshorne's Essentials of Medicine	15
Hartshorne's Conspectus of the Medical Sciences	5
Hartshorne's Anatomy and Physiology	8
Hamilton on Nervous Diseases	18
Heath's Practical Anatomy	6
Hoblyn's Medical Dictionary	4
Hodge on Women	21
Hodge's Obstetrics	25
Holland's Medical Notes and Reflections	14
*Holmes's Surgery	28
Holden's Landmarks	6
Horner's Anatomy and Histology	7
Hudson on Fever	19
Hill on Venereal Diseases	20
Hillier's Handbook of Skin Diseases	19
Jones (C. Handfield) on Nervous Disorders	18
Knapp's Chemical Technology	11
Lea's Superstition and Force	31
Lea's Studies in Church History	31
Lee on Syphilis	20
*Leishman's Midwifery	25
La Roche on Yellow Fever	14
La Roche on Pneumonia, &c.	19
Laurence and Moon's Ophthalmic Surgery	29
Lawson on the Eye	29
Lehmann's Physiological Chemistry, 2 vols.	9
Lehmann's Chemical Physiology	9
Ludlow's Manual of Examinations	5
Lyons on Fever	19
Medical News and Abstract	2
Morris on Skin Diseases	18
Meigs on Puerperal Fever	21
Miller's Practice of Surgery	25
Miller's Principles of Surgery	25
Montgomery on Pregnancy	21
Nettleship's Ophthalmic Medicine	29
Neill and Smith's Compendium of Med. Science	5
Obstetrical Journal	24
Parry on Extra-Uterine Pregnancy	25
Pavy on Digestion	14
*Parrish's Practical Pharmacy	11
Pirrie's System of Surgery	25
*Playfair's Midwifery	24
Quain and Sharpey's Anatomy, by Leidy	7
*Reynolds' System of Medicine	17
Richardson's Preventative Medicine	16
Roberts on Urinary Diseases	31
Ramsbotham on Parturition	23
Remsen's Principles of Chemistry	9
Rigby's Midwifery	21
Rodwell's Dictionary of Science	4
Stimson's Operative Surgery	25
Swayne's Obstetric Aphorisms	21
Seiler on the Throat	19
Sargent's Minor Surgery	28
Sharpey and Quain's Anatomy, by Leidy	7
Skey's Operative Surgery	26
Slade on Diphtheria	19
Schäfer's Histology	7
*Smith (J. L.) on Children	21
Smith (H. H.) and Horner's Anatomical Atlas	7
Smith (Edward) on Consumption	19
Smith on Wasting Diseases in Children	21
*Stillé's Therapeutics	12
*Stillé & Maisch's Dispensatory	13
Sturges on Clinical Medicine	15
Stokes on Fever	14
Tanner's Manual of Clinical Medicine	5
Tanner on Pregnancy	23
Taylor's Medical Jurisprudence	30
Taylor's Principles and Practice of Med. Jurisp.	30
Taylor on Poisons	30
Tuke on the Influence of the Mind	31
*Thomas on Diseases of Females	22
Thompson on Urinary Organs	31
Thompson on Stricture	31
Todd on Acute Diseases	14
Woodbury's Practice	16
Walshe on the Heart	19
Watson's Practice of Physic	15
Wells on the Eye	29
West on Diseases of Females	20
West on Diseases of Children	20
West on Nervous Disorders of Children	20
Williams on Consumption	19
Wilson's Human Anatomy	7
Wilson's Handbook of Cutaneous Medicine	19
Wöhler's Organic Chemistry	9
Winckel on Childbed	23

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4