

**The menopause and its disorders : (with chapters on menstruation) / by
A.D. Leith Napier.**

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THE MENOPAUSE

AND ITS DISORDERS

LEITH NAPIER



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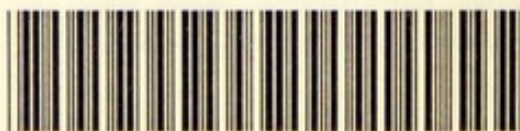
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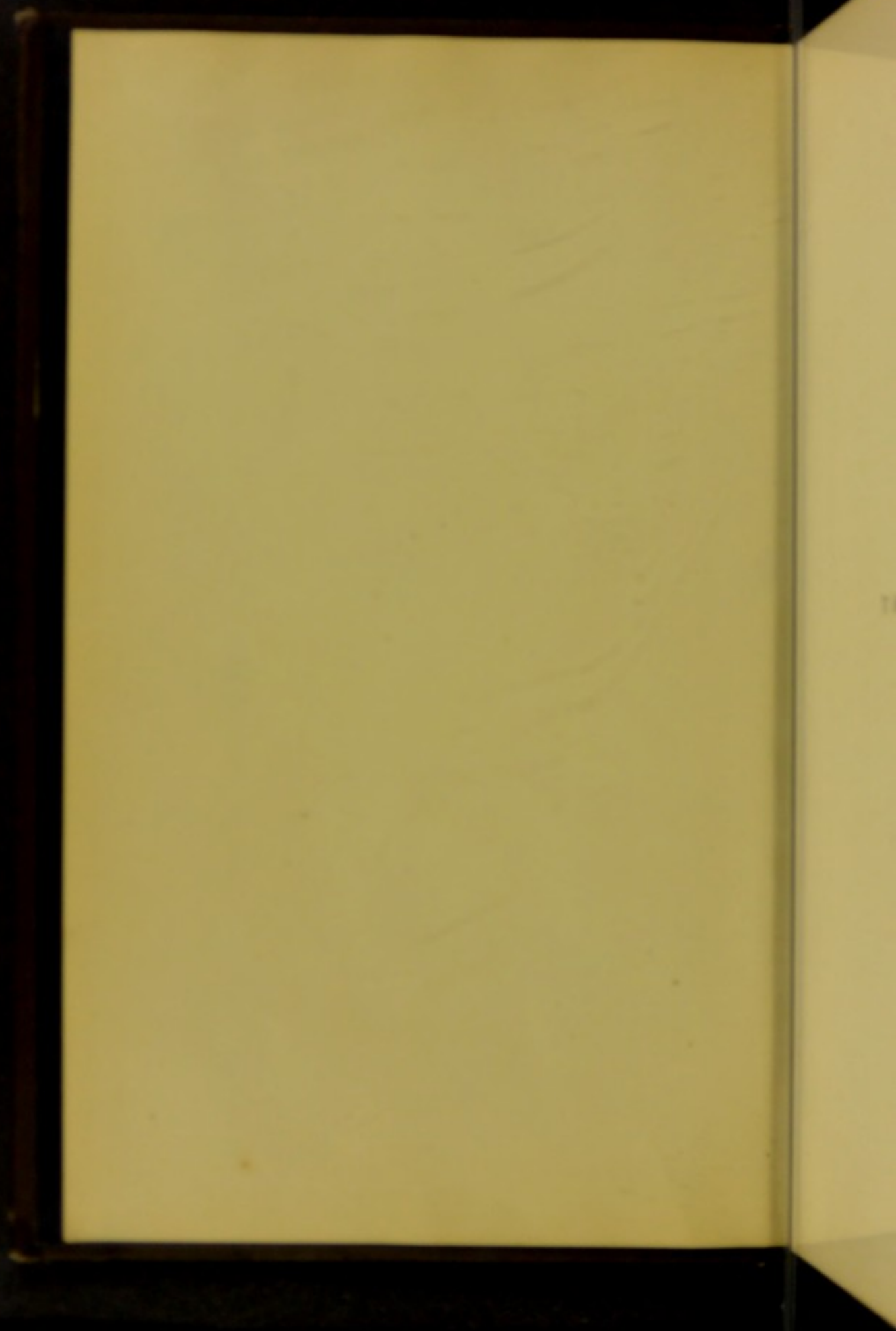


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THE MENOPAUSE

AND ITS DISORDERS

(WITH CHAPTERS ON MENSTRUATION)

BY

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PREFACE.

PREFACES are either apologetic or confidential—either apologies for the appearance of the works they herald, or personal confidences epitomising the author's views. Apologies are, however, unnecessary when a writer has something new to say, or some new way of presenting recognised truths. The *raison d'être* of this work will be at once apparent when I state that no book dealing specially with the subject-matter here treated of has been published in Britain within the last quarter of a century. During that time the whole pathology of gynæcology has been so modified that it is now virtually new.

Not only have our doctrines of the involved pathological processes undergone important and even radical alterations, but much new light has been thrown on the physiological phenomena of menstruation and its cessation; and a clear apprehension of the best methods of treating the abnormalities of menstruation and the menopause, founded upon such pathological and physiological knowledge, must be of vital importance both to the practitioner and his clients.

While this volume has been in course of preparation, I have consulted practically all the available literature which the excellent libraries of London afford. I hoped to append an exhaustive bibliography of all the important works which have been written on the subject. Several reasons, beyond the wish to avoid seeming pedantry, have prevented my so doing. The literature is vast, but for the most part—except from its historical interest—is now of little value. I have nevertheless endeavoured to give such full and accurate references that those of my readers who wish to refer to the original writings should find it easy to do so.

The modern study of the cause of menstruation is of the deepest interest. It appeared to me to be an absolute necessity to find some explanation in conformity with demonstrable physiological facts. I felt that unless one had a better working theory of the cause of menstruation than the former more or less crude hypotheses, any attempt to deal adequately with "the change of life" or menopause would be a futile task. I have, therefore, devoted considerable time and personal observation to this phase of my subject.

Although my investigations have already received the commendation of several leading experts in this branch of science, I shall not attempt to strengthen my theory of the initiating cause of menstruation by special reference to the opinions of these distinguished authorities.

This I confidently claim : that my researches have been made from my own initiative ; that they have been carried out from observations of actual specimens, derived from sources which are accessible to other workers ; and that my photo-micrographs have been in no way "touched up" or altered, but are faithful representations of the specimens in my possession.

A remarkable and, to me, highly gratifying confirmation of my deductions has been made by Mr. Targett, the Curator of the Museum of the Royal College of Surgeons of England, who, at my request—after these photo-micrographs were printed and the MS. describing them was in the hands of the publisher—examined the microscopic slides without knowing the sources from which they were obtained. His confirmation is embodied in the notes under my own descriptions of the plates.

Whether my theory will ultimately be accepted as the true explanation or not I cannot, of course, determine. Yet I venture to think that until my views are proved to be out of harmony with observed facts, they will serve as a better working hypothesis than any of the former theories.

As regards the main object of my work—a fuller account of the menopause, and its many deeply interesting pheno-

mena, is now presented than has within recent years been attempted.

The volumes of Brierre de Boismont¹ and of Raciborski² (both of them developed results of essays submitted for the prize competition to the Royal Academy of Medicine of Paris in 1839), which were published in 1842 and 1844 respectively, with the subsequent volume of the second-named writer, published in 1868,³ doubtless in great measure inspired the well-known English author, E. J. Tilt, to write his treatise,⁴ the first edition of which was completed in 1867 and the third in 1870. And as Tilt was much indebted to the French School, so was Heinrich Kisch⁵ a free abstractor from Tilt; for, although Kisch's monograph contains many references to other authors, it is mainly founded on the writings of Tilt. Two other monographs—those of Ernest Börner⁶ and Meyer⁷ of Copenhagen—deserve mention as recent special contributions to the subject. Scattered throughout English, French, German, American, and Italian literature, in systematic treatises on gynæcology, in transactions of societies and in medical journals, are many valuable essays and digests dealing with one or other phase of the matter; but with the exception of the works above referred to, I am not aware of any systematic work having been recently published which covers the ground I now occupy.

The admitted difficulty in obtaining material from which clear and indisputable conclusions could be drawn has unquestionably greatly hindered observation in the past, and, consequently, many speculative theories have borne a larger share in determining beliefs than has been warranted by the support they are entitled to from experimental and clinical evidence.

¹ *De la menstruation.*

² *De la puberté, et l'age critique chez la femme, etc.*

³ *Traité de la menstruation.*

⁴ *Change of Life in Health and Disease.* London.

⁵ *Das Klimacterische Alter der Frauen.* Erlangen, 1874.

⁶ *Die Wechseljahre der Frau.* Stuttgart, 1886.

⁷ *Der Menstruations Prozess u. seine krankhaftn. Abweichn.* Stuttgart, 1890.

Any one who is acquainted with medical literature knows the danger of too blind reliance on statistics. I have nevertheless been obliged to some extent to refer from time to time to the figures furnished by previous writers. I have, however, verified as far as possible the deductions made by others, and from over twenty years' personal observation and full notes of the menstrual lives of over 700 of my own patients, have been able to substantiate or contradict several traditional beliefs.

I have endeavoured to give full credit to every author whose views I have quoted, and if any omission has been made the press of a busy life must be offered as the best excuse I can submit.

The illustrations are mainly photo-micrographs from my own specimens, and for these I have to express my warm thanks to Mr. Doudney, of the Research Laboratory of the Royal College of Physicians of London and of the Royal College of Surgeons of England, for the great interest, attention and skill he has shown in their production. I have also to thank my friend Dr. Sims Woodhead, Director of the Research Laboratory, for many kindly hints as to the production of these photographs.

My best thanks are due to my friends Drs. J. J. Macan, of London; C. J. Cullingworth, of London; Fourness Barrington, of Sydney; and Mr. Christopher Martin, of Birmingham, for valued help in determining references and procuring specimens; and also to other friends, including Dr. W. Murray Leslie, for additional clinical material.

My former colleague, Dr. ARTHUR E. GILES, has, in consequence of my removal from LONDON to Adelaide, South Australia, very kindly undertaken to see the work through the press; and although now several thousand miles from England, I feel that my best interests are safe in his experienced literary hands. I am also indebted to Dr. Giles for some additional original drawings.

I have further to express my obligation to my publishers for the liberality with which they have met my wishes with respect to the production of the book.

I trust that my work will prove interesting and useful to scientific students, to my gynæcological clinical brethren and to gentlemen engaged in family practice.

In becoming specialists we should never forget that we ought still to remain well-informed general physicians. I have written this treatise not because I wished to write, but because I felt that my experience in former years as a family physician, and subsequently for many years as a specialist, impelled me to deliver my message, which I have learned to regard as one of importance to all who are responsible for the medical care of women.

ADELAIDE, SOUTH AUSTRALIA,
October, 1896.



THE MENOPAUSE AND ITS DISORDERS.

CHAPTER I.

INTRODUCTION.

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(For other references quoted in text see end of chapter.)

It is impossible to appreciate the clinical and pathological questions apposite to the menopause unless we consider firstly the causation of menstruation, secondly the normal, and thirdly the abnormal conditions pertaining to the change of life.

As a short historical *resumé* will afford the best means of understanding our present position with regard to the evolution which opinions have undergone concerning the cause of menstruation since remote times, I venture to think that my readers will not cavil at my attempting in this way to trace some of the many doctrines which have been advanced.

Theories regarding the causation of menstruation have occupied the minds of philosophers and physicians since the beginning of the history of medicine.

Uterine Congestion.—Hippocrates (400 B.C.) may be regarded as the founder of the theory of uterine congestion resulting from general plethora as causing menstruation. The menstrual blood was so named "in consequence of the periodic evacuation of blood every month". If the woman had arrived at puberty, was not pregnant or suffering from disease or suckling a child, it was observed that menstruation occurred. The flow was regarded as a cleansing or purgation of the system whereby the excess of blood was removed.

Lunar Theory.—Aristotle (384-322 B.C.), the philosopher, and Erasistratus (*circa* 260 B.C.), the anatomist-surgeon, agreed that the influence of the moon was one of the provocant causes of the regular appearance of the menses, "Nova luna repurgat". Later, Stahl (*circa* 1710) considered that most women menstruate during the first quarter of the moon, and only a few at new or full moon.

But even then the observation held that menstruation and foetation were in great measure dependent processes. Hippocrates had noted that a woman does not usually conceive until after the establishment of menstruation, and Aristotle wrote "menses prima foetus materia" (1); and Haller (*circa* 1740) says "plethoram in feminis fecit quem uberius in foetum oportebat transmitti" (2).

Mechanical Theory.—Galen (*circa* 160 A.D.), with less imagina-

tion and more original and precise observation, rejected these fanciful effects. He in great measure adopted the congestive theory of Hippocrates. The sedentary life and colder temperament of woman, as compared to man's, required for her maintenance in health that the excess of blood produced by unnecessary nourishment of the (non-pregnant) woman should be removed by periodic evacuations of blood. The blood escaped from the weakest portion of the body; and this escape was effected by general plethora, which caused alteration in the blood pressure. Boerhaave (1668-1738), Pitcairn (*circa* 1650), Friend (1703), Haller, and many later writers maintained Galen's ideas.

The Chemical or Fermentation Theory.—This was a refinement or outcome of the mechanical theory. Diemerbroek, De Graaf (1665), Verheyen, Hoffmann (1660-1742), Lavagna, Regnauld, Albert Becquerel (1841-1854), and Röderer (1779), may be cited among its advocates. It was supposed that a sort of fermentation was the principal cause of the blood flow: this change occurred in the whole blood and caused irritation, which occasioned plethora and uterine congestion; blood then escaped by the most facile channel as a means of natural relief. The condition of the newly made blood was compared to "new wine which in process of its manufacture fermented, and unless the bottles were sufficient burst them". The comparison of new wine fermenting in bottles was probably adopted from theological sources, and applied to this transcendental physiology. The compilations of Pliny and the old Hebraic sanitary laws, as set forth in the book of Leviticus (3), on the destructive nature of the menstrual discharge had more than a purely imaginary basis. Pliny (23-79 A.D.) described menstruation as something mysterious; and depicted the effect of contamination with menstrual blood as something terrible. According to him the odour of menstrual blood, or contact with it, caused new wine to become sour, seeds to become sterile, the buds of trees died, fruit fell off withered, young plants were destroyed; even iron was affected, and the beauty of ivory effaced; the air was polluted, and dogs were maddened by the smell. (This, probably, partly suggested the "chemical theory".) Partly on account of long-established custom, partly from religious observances, and from common-sense hygienic principles, certain beliefs have been held for centuries to the effect that a menstruating woman is, if not "unclean" in the Jewish sense, at least in an unwholesome physiological condition.

That there is a certain amount of truth in Pliny's observation is testified to by the fact that at the present day in cheese-making

districts a menstruating woman is not allowed to prepare the cheese during the time of her period. Nor where hams are cured at home is it considered wise to allow a woman in this condition to share in their preparation. At many farms where large quantities of butter are made, the old hand churn is not allowed to be worked by a woman during her period. Nor are menstruating women allowed to cook fruit for making preserves, *e.g.*, jams, etc. These popular beliefs may be more traditional than scientific; yet that they exist is evidence of the "chemical theory" having permeated into the popular mind.

Heredity, or Heredity and Civilisation.—At the present day, when heredity and Weissmanism are attracting so much attention in both the professional and lay mind, it is of interest to note that certain authors have assumed that menstruation is not an inherent function of woman, but a function which has become acquired by heredity or custom. Roussel (4) may be named as the leading exponent of this theory. According to him, menstruation did not take place during woman's primeval existence or among savage tribes. It was a healthful crisis which had been artificially acquired by civilised women. After they had been accustomed to excesses in dietary and to the luxuries of civilisation their systems became overcharged with blood, and the menstrual flow took place; as a derivative it freed them from the dangers to health engendered by their plethoric condition.

Auber (5), recognising the necessity of improving on Roussel's theory, advanced the idea that menstruation owed its causation to enforced continence. His idea was that during the savage state, when (as he erroneously supposed, forgetting that in many savage tribes the women are as strictly the property of one man as in civilisation) women could always immediately gratify their sexual impulses without restraint, and when these instincts had been satisfied by reproduction of species or had ceased by reason of age—in such circumstances there was no *raison d'être* for menstruation. But when civilisation occurred woman acquired different sentiments, and had to restrain her sexual instincts. As a consequence of this "there arose irritation of the uterus, and hæmorrhagic crises followed. Hereditary beliefs, which had given rise to the idea that these hæmorrhages were natural in women, would then favour the return of these phenomena in succeeding generations."

It is needless to say that the postulates regarding the non-menstruation in savages and their greater sexual impulses were not proved. Further, not only do women of all races menstruate, but an almost similar process occurs in some of the higher apes, and

an analogous condition occurs in all the higher animals. Many years ago Dr. Hill, a surgeon of the Dutch Army stationed in Surinam, observed menstruation in a female ape; it showed itself by an abundant flow of blood from the genitals, which recurred regularly every month, and lasted three days. During these times the animal showed signs of excessive lewdness (6). It appears that apes in captivity are not so regular in menstruation as when in their own country and in freedom (7), (8).

The papers of Bland Sutton, and Heape, to which I shall have occasion to refer later, have within recent years treated this phase of the subject from a scientific standpoint. In domestic animals, such as the mare, the cow, the sheep, the deer, the bitch, in which rut or heat is manifested by a more or less regularly recurrent congestion of the genitals and a hæmorrhagic discharge, one sees an analogous process to menstruation. The processes are not precisely alike, but resemble each other sufficiently to permit us to state that the flow is a natural, not an acquired function. Therefore woman is not the only animal subject to the process, and it is absurd to suppose that, even in her primitive state, woman occupied a lower platform of evolution than is now held by baboons and higher apes.

Ovulation Theory.—Although De Graaf had demonstrated the follicles named after him as existing in the ovary as far back as 1665, it was not until 1827 that De Baer discovered the ovules within them. Ten years later Coste advocated the doctrine of "spontaneous ovulation" with great enthusiasm and ability.

Most writers award the claim of priority to Coste, inasmuch as he observed that at the period of rut or *æstrum* in animals the ova fell spontaneously from the ovary. This has been regarded as the first observation that ovulation was distinct from fecundation. But Coste did not attribute menstruation to ovulation; it seems that Négrier (d'Angers) had stated his opinion in his public lectures in 1832, that ovulation occurred spontaneously, and that it had a direct influence on menstruation. Further, it seems that he had shown the manuscript of his pamphlet, which was not published till 1840, to several professors of the Paris school of medicine, long before the appearance of Gendrin's book. Gendrin was, however, first in the field, and to him has most frequently been attributed the observation that spontaneous ovulation is constantly a feature of early and mature life in women; he believed that menstruation was dependent on ovulation. According to Auvard, Raciborski in 1838, the year before Gendrin's book (*Traité philosophique de Médecine*) appeared, had expressed the opinion that spontaneous

ovulation could be observed in women without being a constant phenomenon. I find Raciborski has referred to his earlier researches explicitly thus: "Ainsi avant de connaître le premier mot de l'ovulation spontanée chez la femme, nous avons déjà admis la nécessité d'un acte physiologique spécial qui devait se répéter périodiquement dans les ovaires en vue de la production de l'espèce, d'une manière tout à fait spontanée, sans intervention du mâle, sans coit, et que nous considérons comme la source de l'hémorrhagie menstruelle. Ne nous préoccupant alors nullement de l'ovulation, cette explication paraissait suffire pour le besoin de la cause. En 1839 au moment de terminer notre mémoire destiné au concours de l'académie de médecine, nous avons appris la publication d'un livre de M. le docteur Gendrin soutenant pour la première fois la thèse de l'ovulation chez la femme." Then Raciborski goes on to state that although this new doctrine (that menstruation was immediately due to ovarian functions, which were accompanied by the monthly ripening of an ovum and the rupture of a Graafian follicle) caused some sensation for a time, the effect was only temporary, as facts of precision in support of it were lacking. It was when Négrier supplied these needed facts in 1840, although, as has been already said, he had lectured on them eight years before, that their actual importance was appreciated. Yet, in the journal which he edited, *L'Expérience*, Raciborski states, in 1841, that he did not consider that it was at all proved that ovules arrived successively at maturity at each menstrual epoch. It is evident from this that Auvard's account is not quite clear, for as late as 1841 Raciborski did not hold the opinion attributed to him in 1838; and furthermore, he specially states in his work, *On Menstruation*, that the real merit of describing ovulation as the factor causing menstruation belongs to Négrier, and gives the relative facts we have alluded to above.

But while the first interpretation of these processes must be awarded to Négrier, and secondarily to Gendrin, it is just to mention that no little credit must be claimed for English physiologists and clinicians, such as Wm. Hunter (9) (1774), Sir Everard Home (10) (1817), Dr. R. Lee (11) (1834), Wm. Montgomery (12) (1856), Ritchie (13) and Paterson (14) (1840), Robertson (15) (1832); with Pétrequin (16) (1835), v. Bischoff (17) (1844), Raciborski (18) (1843), Pouchet (19) (1847), Zwicky (20) (1845), John C. Dalton (21) (1851), abroad, who all paved the way, or brought forward additional or corroborative observations in support of the ovulation theory of menstruation. We need not attempt to apportion the measure of credit each of these distinguished men

earned ; it would form a book in itself were we to discuss their observations at length ; and after all be profitless ; for we can now only regard their excellent work as additional blocks whereon to found our more modern structure of belief.

But as a summation of the deduced doctrines founded partly on the old general congestion theory of Hippocrates with the mechanical theory of Galen, and in some lesser proportion the theories of chemical or metabolic blood changes, probably also giving some weight to the doctrines of heredity and the modifying influence of civilisation, we come to consider, in some further detail, the more definite ovarian theory of Négrier and his followers. This at one time so thoroughly satisfied both physiologists and clinicians that, until comparatively recently, it was generally accepted as a true explanation of the phenomenon of menstruation.

Modern Theories.—It was until recently held that (1) menstruation was due to the periodically recurring ovarian congestion which was caused by ovulation, rupture of a Graafian follicle, concomitant or consequent congestion of the vessels of the Fallopian tubes, and of the uterus, with uterine discharges of altered blood, and complete or partial shedding of the uterine mucous membrane ; (2) or, on the other hand, that nidation or periodic regeneration of the uterine mucous lining preparing it for gestation acted reflexly, and induced ovulation (Aveling) (22). We need not discuss the second theory at any length, for we have no proofs whatsoever in support of menstruation causing ovulation. It is true that women who menstruate regularly are more likely to conceive than those who are irregular, and that immediately after a period is over a woman is more likely to become impregnated than immediately before its advent, and least likely in the middle period. On the other hand, ovulation, at least in a modified manner, exists without menstruation ; ovulation takes place before puberty, and after the menopause. Young women who have never menstruated, not infrequently conceive ; women who are not menstruating, in consequence of lactation, may readily conceive. In my own experience I have had several such instances. One patient had four children successively without ever having had more than one period before marriage, and none between the births of her children.

The other theory (1) has been advocated by Löwenhardt and Löwenthal. We will briefly state the views of the latter (23), as they are more widely known.

Löwenthal describes the relationship thus : (1) The Graafian follicle bursts, and the fully matured ovum passes out of the ovary and travels by the oviduct to the uterus.

(2) In the first fold of the uterine mucous membrane that it comes across, and therefore usually near the uterine opening of the tube, the unfertilised ovum becomes imbedded, and evokes, as the direct consequence of its presence, the swelling of the uterine mucous membrane, that is, the menstrual decidua.

(3) If it here becomes fertilised by a spermatozoon lying within the uterine cavity, the menstrual decidua becomes a gestatory decidua, the uterine lining of pregnancy.

(4) If, on the other hand, it is not fertilised within a given time (which depends on the duration of its vitality) it causes both active congestion and disintegration of the menstrual decidua, *i.e.*, the menstrual flow.

(5) The congestion produced reacts on the ovary, and contributes to the bursting of a follicle which has meantime been ripening.

Now this, while probably so far correct, is only partially explanatory of the appearance of the rhythmical flow.

Two other theories, which are less recent than Löwenthal's, but are still frequently quoted in text-books, may be briefly stated. Pflüger (24) regarded the hæmorrhage from the superficial layers of the uterine mucosa as a physiological "freshening" or preparation of the tissue for receiving the ovum which is *en route* to the uterus; nature thus preparing a roughened rawed surface upon which the ovum will rest and adhere readily, and from which it will derive nourishment.

Reichert (25), on the contrary, held that before an ovum is discharged there is a sympathetic change in the uterine mucous membrane whereby it becomes swollen, more vascular, and softened. The mucous membrane is now the *membrana decidua menstrualis*, and is in a proper condition to receive, keep, and nourish a fertilised ovum. If the ovum is not fertilised, and passes outward, then the mucous membrane degenerates and blood is discharged. This view holds that hæmorrhage from the uterine mucosa is a sign of non-pregnancy; the mucous membrane degenerates because it is of no physiological utility. The menstrual blood, which contains mucous and epithelial cells, altered blood corpuscles, etc., and has been shown to be chemically different from blood, is a definite sign that the ovum has not been impregnated.

It may be fairly added that no one of these theories of ovulomenstruation can be demonstrated. Much is assumed, and the exact order of events is in great measure guesswork.

Before we proceed to consider the ovular theory further we may mention another which is exactly the antithesis of the ovulation

theory, namely, that ovulation and menstruation are wholly independent.

The mere periodic discharge of blood does not of itself constitute menstruation, for there are preparatory metabolic changes going on in the system leading up to the final effect, the uterine hæmorrhage.

Beigel's (26) view was that ovulation occurs at any time, and that menstruation was the result of sexual excitement. The first postulate is probably correct, the other has very little, if any, evidence in support of it.

We are prepared to admit that there is a correlation between ovulation and menstruation; it may be that both processes are mainly influenced by similar causes, but this is a totally different view to that of assigning the one as the cause of the other.

From the anatomical examination of forty-two pairs of carefully selected ovaries, obtained by castration or a total extirpation of the uterus, the following results were obtained: Menstruation is usually accompanied by ovulation, but not rarely is unattended by ovulation. Menstruation is not dependent upon the maturity and rupture of a Graafian follicle; the presence of the ovary and a sufficient development of the uterine mucosa are necessary. Ovulation is connected with menstruation in so far as it requires a congestion of the sexual organs lasting several days for its occurrence. Ovulation occurs outside of the time of menstruation, but, under physiological conditions, rarely. To sum up: Most frequently menstruation with ovulation, less frequently menstruation without ovulation, and finally ovulation without any sign of blood at a regular menstrual period (27). Those who state that when ovulation and menstruation occur simultaneously the condition is physiological, and that when they occur independently the condition is generally pathological, have brought forward no proofs to help the assertion.

Ovulation may, and does, as we know, occur independently of menstruation. But that impregnation may happen within a very short time of parturition, and in some exceptional cases before uterine involution, is less generally known. I have, in more than one instance, known one pregnancy at full term to be followed by impregnation resulting in full term pregnancy with less than eleven months between the births, and with no re-establishment of the menses having taken place.

A remarkable case is reported by Krönig (28): A woman, twenty-two years of age, healthy, and always regular before her first impregnation, was delivered at full term on 4th July, 1892. The child was nursed by the mother for ten days; it was strong, and is still alive and well. On 8th July (the fourth day of the puer-

perium) the patient had connection, and then abstained from coitus for three months. The period did not return. In November, 1892, the motion of the child was felt. It was born on 10th March, 1893, and apparently had reached term. Yet it had been born 243 days after the only connection which had occurred since the first confinement, or twenty-seven days, practically a lunar month, before the normal average duration of pregnancy, 270 to 275 days. It was over twenty inches in length and weighed seven pounds twelve ounces. Now, if, as is currently believed, ovulation is entirely suspended during pregnancy, and does not recommence until just before the first period, which in women who do not nurse their children is about six or eight weeks after parturition, how can this case be explained? Superfoetation cannot be relied on here. In Krönig's case, admitting the possible incorrectness that coitus did not again occur after the first period, the duration of pregnancy was much too short to allow of the formation of a well-formed child. Ovulation was independent of menstruation. As the glandular structures of pregnancy are often completely shed by the third or fourth day after parturition there is soon enough normal endometrium to lodge a fresh ovum. This case also shows that spermatozoa can live in the lochia.

Menstruation may occur independently. After oöphorectomy became a common procedure it was observed that the great majority of women whose ovaries had been removed ceased to menstruate. This was regarded as a clinical proof that the presence of functionally active ovaries determined menstruation. The removal of one ovary does not cause cessation of the menses. Nor does the complete removal of both ovaries always cause an artificial menopause. There are cases in which menstruation is continued regularly for months or years.

A patient, aged twenty-one, upon whom I performed double salpingo-oöphorectomy on 30th January, 1893, has continued to menstruate up to November, 1895. The periods were regular until she was twenty years of age. She then had a fall down stairs, and had an irregular blood loss. For the next two years she was irregular, periods recurring every two and a half weeks to every four weeks, and lasting five to six days. She attended my hospital as an out-patient in November, 1892, when she stated that in August, 1892, she had hæmorrhage from the vagina every three or four days; the blood came in gushes, and clots were passed. On admission to my service, a softish pear-shaped swelling was felt in the left iliac region, and a cyst the size of a hen's egg in the right lateral fornix. On operation an ectopic gestation was found on the

right side, and there was old-standing inflammation of the left Fallopian tube with a hydrosalpinx and degenerated ovary. After the operation there was no vaginal loss until May, 1893. She had what seemed a period on 18th July, but was married on 20th July. The hæmorrhage recurred in August. She was not regular, having sometimes recurrence of blood loss every ten days, sometimes an interval of two months. She continued this way during all the year of 1894, with the exception of a profuse blood loss on 5th August, which came on without evident cause. She attended in March, 1895, when she told me that she had continued having her "periods" regularly every month up to January, when a profuse bleeding happened, which continued ten days. From fifty to sixty large diapers were required, although she remained in bed most of the time. After a few doses of extract of cotton root bark the flow ceased. In February she had free leucorrhœa but no hæmorrhage. In March, at the time of the expected period, she suffered from violent palpitation, vertigo, breathlessness, cramps in the limbs, flushes and chills, irritability of temper, etc. She had now inclination to partial perspirations, had been sleeping badly, waking in a fright. I ordered her some nitrite of sodium and nitro-glycerine.

On 4th April she felt better; no perspirations, but had "dry heats". Has recently had a papular rash on vulva and vaginitis. 4th July.—Attended; she had "periods," 19th to 22nd April; 25th to 30th May; 18th to 24th June; was losing freely; had to change her diaper four or five times daily. 19th July.—Uterus dilated and curetted; application of pure carbolic acid; nothing important found; dismissed well in ten days. 20th August.—Feeling well; slight yellowish leucorrhœa. September.—Period began on 1st, and continued to 8th. 2nd to 11th October.—A white colourless discharge, having very bad smell; no blood loss. November.—Period on 6th; discharge is bright red and watery; considerable bladder irritation; the coloured discharge continued slightly till 21st, and was succeeded by the bad-smelling white discharge. On 21st April, 1896, she reported herself; she had no "period" since November, 1895, but once or twice had a slight pinkish discharge. After this, in May, 1896, there was again a free period.

It is quite true that this case cannot be instanced as one of normal menstruation after oöphorectomy, but that there has been a blood loss in very free quantity for nearly three years, and that it may continue after very thorough removal of both appendages, is clear. It may be that the youth of the patient and her married state have something to do with the prolonged symptoms. If her condition can

be regarded as the menopause, it is clearly a very stormy and prolonged one.

Another patient, a lady, aged thirty-one, from whom I removed the appendages on both sides for rapidly growing fibro-myoma uteri in July, 1891, has had irregular hæmorrhages as follows: There was very moderate metrostaxis after operation. 28th September, a period lasting two days. 3rd November, a period lasting three days. 6th December, and again on 15th January, 1892, periods of three days. February period, two days; March period (interval now five weeks), from 11th to 14th; recurred on 16th, and continued very slightly till 21st. No period again till 1st May, when a discharge appeared, and continued slightly for two days; again on 29th the hæmorrhage recurred for two days. 26th June, recurrence; 22nd July, recurrence; 27th August, period freely for three to four days; September, two days. Up till November, 1894, she was less and less regular, had had no period since February, 1893. In May, 1893, she had a thick yellowish endocervical discharge, but no vaginitis. Attended in 1895 on 18th April; in November and December, 1894, and in January, 1895, menstrual-like hæmorrhages, and none since.

This case was not a complete removal of the appendages, as a small part of one tube was left. But the tumour decreased rapidly after the operation. And in April, 1892, it was found that the tumour had become very much smaller than before operation. It is now still smaller, having almost disappeared, and causes no inconvenience. Here the surgical intervention arrested the tumour growth, but menstruation went on very regularly, as has been related, for a considerable time afterwards.

Such cases as I have narrated are by no means rare. In other instances, no period appears for several months after operations involving removal of both appendages; but it may then appear, and continue with fair regularity for one to three years. Other cases may resemble the first of the two I have mentioned, and be subjects of severe floodings.

At one time those who supported the ovulation theory could not account for such facts, and alleged that (*a*) the ovaries had not been wholly removed; a very small portion of ovary suffices for ovulation, and so it was believed that as long as the slightest shred of ovary was left the menstrual impulse might be provoked; (*b*) it was alleged that these cases might be explained by the presence of a supernumerary ovary. Both explanations are faulty. In mammals, the relations between ovulation and "rut" are clearly demonstrable. One or more Graafian follicles become mature and burst before the

œstrum begins. The ovum passes down the Fallopian tube into the uterus, where it may be arrested by the mucosa or pass out with the discharge. Should copulation happen, the spermatozoon encounters the ovum somewhere in the tube; and the impregnated ovum being larger, and the uterine mucosa more swollen, generally remains in the uterus and develops. But "rut," the analogue to menstruation, can occur in animals after complete removal of the ovary (29). This fact is well known to breeders of cattle.

As to the supernumerary ovary theory, it is very doubtful that this occurs; certainly not frequently enough to account for all the cases. It is equally doubtful whether a man who operates intelligently should not remove everything in any way resembling ovarian tissue if he aimed at complete removal of the appendages.

A refinement in casuistry is found in **The Tubal Theory of Menstruation**.—Lawson Tait recognised that removal of the ovaries did not always cause menstruation to cease; his large experience must have afforded many examples. Tait then fell back on the theory that the menstrual impulse resided in the Fallopian tubes and not in the ovary. He thought that the thorough removal of the tubes was far more essential in determining the menopause; and that cases of periodically recurring hæmorrhage after oöphorectomy were to be explained by the fact that the tubes had not been sufficiently removed. As an anatomical and surgical fact, the tubes can never be wholly excised unless the upper part of the uterus is also amputated. Furthermore, if my memory is correct, Tait himself has recorded a case in which he performed Porro's operation, removing the ovaries, tubes, and most of the uterus, and yet menstruation recurred regularly for years! Our present knowledge would regard this as *pseudo*, not true, menstruation, and we would seek to find an explanation in the existence of some pathological condition of the remaining uterine tissue.

Tubo-Uterine or Menstrual Nerve Theory.—We are indebted to Dr. Arthur W. Johnstone, of Cincinnati, for the discovery of "The Menstrual Nerve," which he believes to stand in the same relation to the uterus as does the chorda tympani to the sublingual gland, or the great sciatic nerve to the lower limb. Destruction of the chorda tympani results in paralysis of the sublingual, and excision of a piece of the sciatic will cause eventual shrinking if not sloughing of the limb. Dr. Johnstone's admirable and original work on menstruation entitles all his opinions to careful consideration, and therefore we think it right to quote directly from his own writings: "The closer you get to the uterine body with your excision (when performing oöphorectomy) the more sure you are to

stop menstruation; so also the more sure you are to extirpate the whole of the nerve plexus, embodied in the tube and broad ligament, thus completely isolating the endometrium from the trophic and vaso-motor centres, which control it, as they do every other organ. . . . From deep down in the pelvic tissue, branches of the sympathetic system radiate to the ovary and tube, and there is also a rich plexus which passes into the uterine tissue around or alongside the tube at either cornu. One large trunk I noticed, especially in many of Mr. Tait's excisions, lay close alongside the line of the cut, and if he had not been so careful to extirpate the whole of the tube, in many of his cases this trunk would have been left. It comes up at such an acute angle with the body of the uterus from deep down in the broad ligament that one must get his ligature around the very origin of the tube if he expects always to secure it. In two cases that had to be operated on for the second time for the production of the menopause, in which Mr. Tait removed the body of the uterus close down to the internal os, I found in the stumps of the tubes which had been left behind in the first operation, this nerve had not been removed on either side. The second operations were successful—some might say that it was because most of the menstrual organ itself had been removed; but there are far too many cases that have been successful, in which the endometrium is not touched, for this reasoning to be accepted" (30).

In 1894 (seven years later), Dr. Johnstone writes: "Just where the nerve-centre lies no man can say absolutely to-day. It is probably a mixed centre, being composed of cerebro-spinal and sympathetic nerves." He then refers to the nerve supply of the uterus and ovaries: "From the base of the broad ligament branches arise not only to the ovary, but to the tubes and uterus. The main ones to the uterus, the large trunks, which I have described, enter at an acute angle into the body of the uterus directly under the Fallopian tubes. To destroy all these nerves we have to take as much of the broad ligament as possible" (31).

Now there are several objections which occur. The primary objection lies in the fact that "the menstrual nerve" has not been found by other competent observers in cases which have required operation for uterine hæmorrhage. Christopher Martin, who is in other respects in agreement with Johnstone, writes: "I doubt if this be as constant a structure as he would have us believe. It is probable that the ovarian plexus contains some of the fibres governing menstruation" (32).

Further, it is difficult to accept Johnstone's nerve as a single

structure worthy of comparison in importance with the chorda tympani or the sciatic; for if a portion of the entire thickness of either of these nerves is excised, degenerative or destructive changes set in; whereas "it is not possible to arrest menstruation unless the whole nerve is excised". Besides this, we know from actual clinical experience, that following operations of Cæsarean section, in which definite portions have been excised from each Fallopian tube, and presumably also from the menstrual nerves, and both distal and proximal ends tightly ligated, menstruation has subsequently occurred regularly. In many cases of operations on the appendages the operator has included a considerable amount of broad ligament in his ligature, and has cut off the ovarian blood supply, and presumably also the ovarian nerve plexus; yet, despite this, menstruation has occurred regularly for a considerable time. In the Cæsarean sections I refer to, the patient, it is true, still possessed tubes and ovaries, but it is not likely that the divided and ligated tubes could be, as Mr. Tait claimed they were, normally "the starting-points of the menstrual process," any more than that ovulation could then cause menstruation. In the oöphorectomy cases there still remained the blood supply from the uterine arteries, and the nerve impulses from the utero-vaginal plexus. But let the ovarian and uterine sets of vessels and the ovarian and uterine plexuses be severed from the uterus, and then undoubtedly menstruation will cease, and not improbably degeneration of the organ will be rapid.

Finally, and this is not the least notable criticism, Dr. Johnstone himself is not so confident in a single governing menstrual nerve now as he was in 1887. "To destroy *all the nerves*, we must take up as much broad ligament as possible;" in place of, to destroy *the menstrual nerve*, "one must get his ligature around the very origin of the tube if he expects always to secure it".

Even if it were proved, which we need not discuss further, that there was invariably one large special nerve, we must, with Johnstone, fall back on a mixed centre composed of cerebro-spinal and sympathetic nerves as the dominating influence over this nerve.

The Nerve Theory of Menstruation.—The "nerve theory" of menstruation is more complex than "the special menstrual nerve" doctrine we have just discussed (33). It does not necessarily depend on the existence or non-existence of any one special structure. I, at the outset, express my adherence to the conclusions which have been arrived at respecting the large share the nervous system has in regulating and controlling the menstrual process. But I am unable to find a full explanation for certain facts involved

in the problem if the nerve theory, as it stands to-day, is alone relied on.

We are obliged to fall back on anatomical details to apprehend how important this nerve theory is. The nerve supply to the uterus is from two plexuses—(1) the ovarian, (2) the utero-vaginal.

The former is derived from the aortico-renal plexus, and has been traced from the last dorsal and upper four lumbar nerves. It gives branches to the ovaries and Fallopian tubes, communicates with the utero-vaginal plexus in the broad ligament, and terminates in the uterus.

The second plexus can be traced from the hypogastric plexus, with which are connected the sympathetic fibres from the second and third sacral nerves. Branches run up to the uterus between the layers of the broad ligament beside the branches of the uterine artery. One branch of the plexus is continued directly from the common hypogastric plexus, and passes to the posterior surface of the body of the uterus; another nerve from the same origin ascends to the Fallopian tube. Many ganglia are contained in the plexus. Nerve filaments have been traced directly into the mucous membrane of the uterus.

The pelvic splanchnics arise in the lumbar part of the cord, in the cells of the posterior vesicular column of Clark, and are also connected with the cells of the lateral horn of grey matter (Gaskell). They run in the nerve roots of the second and third sacral nerves and pass directly into the hypogastric plexus from which they are distributed to the generative organs, the bladder, and rectum.

Influence of Nerves on Uterus.—According to Obernier, Frankenhäuser, and Körner, the hypogastric plexus and the ovarian nerves arising from it appear to contain all, or almost all, the most important motor nerves of the female genitals. Körner and Obernier admit the existence of excito-motor fibres in the sacral nerves; Frankenhäuser, however, believes these fibres to be inhibitory, and considers the inferior mesenteric ganglion as the proper motor centre of the uterus. V. Basch and Hoffmann found that stimulation of the *nervi erigentes*, which are derived from the sacral plexus, caused movement. Spiegelberg and Schiff noted that stimulation of the lumbar and sacral parts of the cord caused powerful movements.

The uterus is believed to contain independent or parenchymatous nerve centres, which may be excited by suspension of respiration, anæmia, or rapid hæmorrhage (Körner, Spiegelberg). Automatic ganglia on the uterine mucosa connected with nerve filaments have been observed by Frankenhäuser. This observation

is supported by Rein's experiments on bitches, which show that although all the nerves going to the uterus be divided, practically all the functions connected with conception, pregnancy and parturition can take place, even if the uterus is separated from its cerebro-spinal connections.

Reflex uterine contraction may be caused by stimulation of the sciatic nerve (v. Basch and Hoffmann).

The uterus is supplied by vaso-motor nerves, which come from the splanchnic and pass into the uterus with the hypogastric plexus, and vaso-dilator fibres, through the *nervi erigentes* of the sacral plexus.

Uterine Nerve Centres.—The centre for parturition, according to Körner, lies at the first and second lumbar vertebræ; the afferent fibres come from the uterine plexus, to which also the motor fibres proceed. Goltz and Reusberg observed that a bitch became pregnant after its spinal cord was divided at the first lumbar vertebra.

All the centres lying in the lower part of the spinal cord, *e.g.*, those for defæcation, micturition, erection, ejaculation, must, like the parturition centre, be regarded, in the normal condition, as subject to the control of higher reflex centres in the medulla. The experiments of Oser and Schlesinger confirm these observations (34). The cerebrum also, partly by the production of perceptions, partly as the organ of volition, can excite or suppress the action of certain of these subordinate spinal centres (35).

The Menstrual Centre.—Reasoning from analogy, that the various pelvic functions are dominated by spinal centres, Mr. Christopher Martin (36), in a very able paper, argues for the existence of a menstrual centre situated in the lumbar enlargement of the cord. He pleads that as the parturition centre has been shown to exist in bitches there is in all probability also a parturition centre in women, situated (as I have already quoted from Körner) about the first and second lumbar vertebræ. "If," writes Martin, "the parturition centre be found there, the menstrual centre will not be far away. The centre is certainly not in the pelvis. There are ganglia in the substance of the uterus, ganglia in the nerve plexuses at the sides of the uterus between the layers of broad ligament, and on the cervix is situated a large ganglionic mass, developed in connection with the utero-vaginal plexus, called the *ganglion cervicale uteri*. If these ganglia have anything at all to do with menstruation they are certainly controlled by a higher centre."

Martin's interesting and suggestive paper concludes thus:—

(1) That menstruation is a process directly controlled by a nerve centre.

(2) That this centre is situated in the lumbar part of the spinal cord.

(3) That the (destructive) changes in the uterine mucosa during the period are brought about by katabolic nerves, and during the intervals by anabolic (constructive and repairing) nerves.

(4) That the menstrual impulses reach the uterus either through pelvic splanchnics or the ovarian plexus, possibly both.

(5) That removal of the uterine appendages arrests menstruation by severing the menstrual nerves.

Mr. Tenison Collins (37) has elaborated Martin's paper in a contribution given to the Obstetric and Gynæcological Section of the British Medical Association's annual meeting in 1894. Collins reviews the nerve theory of menstruation, and advances the theory "that uterine hæmorrhage, menstrual or metrorrhagic, is invariably caused by intrauterine irritation acting reflexly through a nervous centre". Martin has stated that the destructive nerves periodically exercise their influence in removing the superfluous surface "decidua" built up during the intermenstrual period. The capillaries burst and pour out the menstrual flow. "Here," says Collins, "the discharges of automatic nervous impulses are suggested as the cause of the cell destruction, not that the cells, having fulfilled their function, decay, and so become the irritating means by which the vessels are reflexly dilated." He concludes that (a) "hæmorrhage from the uterus is either the [reflex] result of a local uterine condition or of influences outside the uterus acting directly on the (uterine) centre; (b) menstruation is the [reflex] result of stimulation by the decaying decidual cells".

It is impossible to accept the second conclusion absolutely, for it is a clinical fact that irregular uterine hæmorrhages occur, and that normal uterine hæmorrhages are arrested by nervous impulses acting through the higher centres. For example, strong emotions may bring on or arrest menstruation independently of the exact stage of "decidual" cell growth or degeneration.

We may, however, accept the theory of a uterine nerve centre, and direct or indirect nerve impulse as the *final* exciting cause of menstruation.

To fully discuss the nerve theory of menstruation at present, would demand considerable repetition of what has already been touched on, and would also anticipate much I have to treat of, but it seems undesirable to leave the subject without summarising some

of the additional proofs in support of its probability ; and, on the other hand, pointing out its incompleteness.

During the past twenty years the marvellous additions to our knowledge regarding the nervous system generally, and especially concerning localisation of function in the brain and spinal cord, by such workers as Charcot, Wilks, Ferrier, Hitzig, Gowers, Buzzard, Brown-Sequard, Hughlings-Jackson, Fleischsig, and many others, have revolutionised our former theories of physiology. We have learned that, while the dominant human brain contains the high regulating centres, there exist stations for the storage of ordinary nerve energy which are sufficient to carry on and in many instances even independently control the ordinary functions of life. How much this may be due to evolution of types, to specialisation of function, to heredity, or to civilisation, must be left for the future to determine. This we have arrived at—that all those influences exercise a certain amount of importance in separating the highest from the lower animals. One cannot fail to grasp the weight of the argument that, if such functions as erection, ejaculation, and parturition have been shown to have spinal centres (and presumably also brain centres) for their control, menstruation, which is of so vital physiological importance, for the normal human female, cannot be otherwise governed. But it must be remembered that horses, cattle, deer, sheep, dogs, etc., are in possession of these other centres, and if they possessed the menstrual centre also why do we not find in them a nearer analogue to menstruation than rut? If certain apes menstruate in a state of freedom, and are less prone to do so in captivity, although brought into civilising associations by contact with man ; and if other species of monkeys have periods of "rut" resembling the domestic animals, how are we to explain the problem? Is it that the evolution of the human being has brought about certain necessities which the older rejected theories of Roussel and Auber (p. 4) might explain? Is it that the erect position of the human being renders a blood discharge a necessity during mature life? If so, the mechanical theory of Galen must be appealed to. But those apes that menstruate are not more erect than many of their near relations who only show signs of rut.

Is it that the function of menstruation depends on the development of brain centres which do not exist in lower animals? What again of our menstruating monkeys that, so far as we know, are not more "intellectual" than other monkeys, or horses, or dogs, or elephants?

Can the theory of centres of association advanced by Fleischsig (of Leipzig) be called in to our support? This is, briefly, "that

there exist within the brain certain complex centres which he holds to be centres of association, because they 'concentrate the activities of the organs of sense into higher units'. He describes four such centres; they do not exist in children at birth, but develop gradually. He contrasts those intellectual centres and the centres governing touch, taste, sight, hearing, and smelling. The sense centres receive the impressions which are conveyed to the brain by the external organs of sensation. Sensation originates in the centres of sense. It is only in the intellectual centres, with which, however, the sense centres are connected by innumerable nerve fibres, that their sensations or functional energies are changed into thoughts. The 'centres of association' establish 'the intellectual link' between the centres of sense; they elaborate the impressions of the senses; they are the bearers of all that we call experience, knowledge, cognisance, principles, higher feelings, and language." These revolutionary doctrines have not as yet been adopted. But if they were proved, we would not gain much in determining the nervous theory of menstruation. Beyond the influence of heredity, and the growth of the girl to a certain stage of nervous and general development (which we call puberty), and the implied sexual craving with procreative fitness, which we have already shown in great measure to be erroneous, the centres of association theory does not aid us. Still less would it explain the function of menstruation becoming arrested when the woman is in full intellectual vigour. Indeed, after the menopause many women become more intellectual. So that the female function ended does not mean the human intellect dimmed.

Nor can we accept the suggestion that during a certain period of woman's life automatic nerve discharges occur rhythmically without obtaining some fuller explanation. If the menstrual function was like that of respiration or circulation, continuing throughout life and practically never ceasing, it would be reasonable to regard it as a perpetual motion clock; but what complex machinery would not one require to guarantee that a clock would start going several years after it had been made, go for a few days every month, and then cease definitely after some years when the integral part of its best works still remained? "Periodicity," given as an explanation, is a confessed ignorance; the nervous control of the heart and lungs is clear and simple, because they are continuous, not periodic, in the ordinary sense. If we accept Mr. Collins' suggestion that the reflex uterine stimulus is to be found in decaying, decidua cells, we upset our general ideas of reflex physiological action altogether. The theory of reflex irritation is,

as I have long held, the correct explanation, but the decay of the decidua cannot any more determine the nervous stimulant, which must have in most cases preceded the condition of uterine engorgement and general genital vascularity, than any other effect can determine its cause. Still, as shall shortly be shown, Mr. Collins had very nearly arrived at what I venture to think the true explanation of the originating peripheral irritation, which, acting through the uterine nerves, reaches a special centre, and this being dominated by a still higher centre, and involving various special conditions, results in the periodic phenomenon known as menstruation.

SUMMARY.

(1) At a certain period of woman's life a function which, with the exception of certain apes, is peculiar to the human female occurs.

(2) At this time congestion of the genital organs is notable, but this must be regarded as the result, not the cause, of the beginning of the menstrual process.

(3) This congestion is more specially marked in woman than in the lower animals, partly on account of the erect posture, and probably also partly from her habits of life as distinguished from other animals.

(4) Chemical changes occur in the blood; and the menstrual fluid is a fluid *per se* consisting of altered blood, mucus, salts, and probably special extractive matters, etc.; these chemical changes are due to general and special metabolism, and cannot be regarded as the cause of the nervous irritation.

(5) Ovulation is not the cause of menstruation; it may, and does, occur independently. Women who have never menstruated may conceive. Conception may occur during lactation without the menses having returned since the past parturition. Children at birth have many ovules contained within the ovaries. After the menopause pregnancy may (although very rarely) occur. Ovulation may persist for a time after the menopause.

(6) Menstruation is not the cause of ovulation. The menses may continue regularly after the removal of the ovaries and Fallopian tubes. This is, however, exceptional, and generally the periods only last for two or three years at longest.

(7) Ovulation and menstruation are to some extent interdependent.

(8) It is not proved that menstruation depends on one special menstrual nerve.

(9) The uterus is highly endowed with nerves, and is greatly influenced by these nerves.

(10) A nerve centre governing menstruation is an essential factor for the process.

(11) The excitation of this centre is due to peripheral irritation.

- (1) Aristotle; see General Bibliography.
- (2) *Elementa Physiologiae*, viii., 24.
- (3) Chap. xv., 19; Chap. xx., 18; and Genesis, xxxi., 34.
- (4) *Du système physique et morale chez la femme*, 1803, p. 132. Edited by Cerise, Paris, 1860.
- (5) *Hygiène des femmes nerveuses, ou conseils aux femmes pour les époques critiques de leur vie*, xvi., 644 pp., 8vo, Paris, 1859.
- (6) Longet, *Traité de Physiologie*, tome ii., p. 723; et article "Menstruation chez les singes," *Archiv de Tocologie*, 1887.
- (7) Longet, tome ii., p. 718.
- (8) Neubert, Landois and Stirling's *Physiology*, vol. ii., p. 1113.
- (9) *Gravid Uterus*.
- (10) *Philos. Transact.*
- (11) Article "Ovary," *Cyclop. of Pract. Med.*, 1834.
- (12) *Exposition of Signs and Symptoms of Pregnancy*.
- (13) *Medical Gazette*, vol. xxxvi.
- (14) *Edin. Medical and Surgical Journal*, Nos. 142 and 145.
- (15) *Essays on Menstruation and Pract. Midwifery*.
- (16) *Recherches sur la Menstruation*, Paris, 1835.
- (17) *Beweiss der von der Begattung unabhängigen periodischen Reifung u. Loslösung der Eier, etc.*, 8vo, Giessen, 1844. Et *Annales des Sci. Nat. Zool.*, 3^e série, tom. ii.
- (18) *Comptes Rendus*. Et *De la Puberté et l'Age Critique chez la Femme, etc.*, 1844.
- (19) *Théorie Positive de l'Ovulation Spontanée*.
- (20) *Die Metamorphose des Thrombus*, Zürich, 4to, 1845.
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- (22) *Obstetrical Journal*, July, 1874.
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- (25) *Monatsberichte d. könig. Preussischen Akad. d. Wissenschaften*, Berlin, 1874, p. 108.
- (26) *Die Krankheiten des weiblichen Geschlechtes*, Stuttgart, 1857.
- (27) Leopold and Mironoff, *Arch. f. Gyn.*, xlv., No. 3.
- (28) *Centralblatt f. Gynäk.*, No. 19, 1893.
- (29) V. Barthelémy. *Fourn. de Méd. Vet.*; *Med. Record*, p. 368, 27th Sept., 1890.
- (30) *British Gynecological Journal*, vol. iii., p. 387, June, 1887.
- (31) *New York Journal of Gynecology and Obstetrics*, April, 1894.
- (32) *British Gynecol. Journ.*, vol. ix., p. 271, Oct., 1893.
- (33) Jas. Oliver, *Fourn. Anat. and Physiol.*, xxi., N.S. I., pt. iii., pp. 378-384, 1887.
- (34) *Phys. and Path. of the Sympathetic System of Nerves*. Eulenburg and Guttmann. Trans. by Napier, Lond., 1879, p. 33, etc.
- (35) Also v. Landois and Stirling's *Physiology*, vol. ii., p. 1162 (1st ed.).
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- (37) *Brit. Med. Journ.*, vol. i., 1895, p. 66, and Pamphlet. Bale and Sons, London, 1894.

CHAPTER II.

ANATOMICAL CONSIDERATIONS.

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(For other references see end of chapter.)

IN the summary at the end of the preceding chapter I have stated my belief that to fully accept the "nerve theory" of menstruation as a theory in accordance with what is generally applicable to human physiology, it is needful to find some cause of peripheral irritation whereby the reflex nerves of the uterus are excited and stimulated. I have previously mentioned the difficulty one has in accepting a theory of automatism of the nerves governing the uterus. The objections to such a theory are evident.

Menstruation is the result of nerve irritation and vascular congestion, and subsequent relief of these by hæmorrhagic discharges. If we accept the view that anabolic nerves are, during the intermenstrual period, engaged in a constructive metabolism, preparing a decidua which may serve as the decidua of pregnancy should impregnation occur at the favourable time; and that, failing impregnation, katabolic nerves then come into play, and by exercising a

rapid destructive metabolism cause turgescence of the vessels which burst and sweep away in front of their stream the imperfectly formed decidua, this affords no explanation of the normal regularity of menstrual recurrence.

The cardiac contractions and the movements of the lungs are regulated by vaso-motor nerves and nerve centres. But the emission of nerve discharges cannot be held to depend on the unknown entity named periodicity as a final cause. The rhythm of the heart's action depends on the peripheral irritation caused directly by the supply of sufficiently oxygenated blood to the viscus; this irritation, acting through the vaso-motor nerves and centres, then results in the normal muscular contraction. Artificial contractions may be induced for a time by electrical stimulation of the centre, but normal continuous action cannot be maintained without the usual peripheral irritation.

The respiratory centre ceases to act when the oxygenation of the blood falls below the amount required to cause peripheral irritation of the vagus and sympathetic.

And so, also, normal gastric digestion, while it may, like the menstrual function, be delayed or even arrested by violent bodily exercise, or mental exercise or excitement, unquestionably depends on the peripheral irritation of the vaso-motor nerves of the stomach caused by the ingested food.

And, in like manner, the actions of the liver, the spleen, and the kidneys—even the actions of the controller of all, the brain—can be shown to depend on peripheral irritation. Periodicity is merely an assumed, not a real, explanation for the various metabolic processes which are necessary for all physiological functions.

If we consider those functions which, while higher and more complex than menstruation, may from their periods of interrupted activity be compared with it, we can see how essential a factor peripheral irritation is. It is known that the spleen, which undergoes regular rhythmical contractions and dilatations, has periods of activity and of rest. The spleen is a large metabolic gland, which in great measure may be regarded as a blood-forming gland; it seems probable that its main use, like that of all glandular bodies, is metabolic, and that it destroys effete coloured blood corpuscles. The large amount of extractives found in its substance points clearly to its metabolic functions. Deprive the spleen of its supply of proteids, and the production of colourless corpuscles (and the probable transformation of these into coloured corpuscles) is interrupted. After a meal, when the digestive organs have finished their part of the duty, we find the spleen at its largest; and later,

when the peripheral irritation is withdrawn, it regains its normal size. The condition of the vaso-motor splenic nerves has been shown to greatly influence its action. Depression of spirits causes the volume of the spleen to become larger, joyful emotions diminish its size. But it is assumed that the splenic function, like that of the uterus, is so far independent of the external nervous supply; as after section of the splenic nerves modified rhythmical contractions continue for a longer or shorter time. So likewise after section of the menstrual nerves menstruation may continue in a modified manner for a considerable time. The function of the spleen is initiated by peripheral irritation. Sudden arrest of the menstrual discharge in a healthy woman causes splenic enlargement; although so also will any portal congestion, or even arrest of hæmorrhoidal bleeding.

After abdominal section, involving the uterus or appendages, the spleen is sometimes found unduly enlarged. Mrs. R., aged 24, upon whom I performed myomectomy, removing a fibroid the size of a small cocoanut, on 21st September, 1893, was found to have the appendages normal on both sides; they were therefore not interfered with. She progressed most favourably, having normal pulse and temperature throughout, and had permission to go home on 21st October. She had been sitting up in a chair on 20th October, when she suddenly felt very exhausted; the pulse quickly rose to 160, and the temperature to 105°. She had no swelling of the limbs, and no pelvic or hypogastric symptoms; there was no cough—in short, no definite symptoms of any sort. On 22nd, the pulse was 136, temperature 103°. On 23rd, pulse 108, temperature 101°; there was now very marked tenderness and sensitiveness in the left posterior lumbar region, which site was also subjectively painful. Splenic dulness was now found to be markedly increased, the spleen extending below the costal margin all round left side. On 24th, temperature 99°. On 25th, 98·6, pulse 80. On 26th, for the first time the urine showed a trace of albumen. There was *now no splenic tenderness or increase in size*. On 6th November, the patient had follicular tonsillitis. On 9th, she went home well. The explanation of this case could not be that septic embolism occurred and a splenic infarct happened more than four weeks after operation. But that the splenic metabolism must be held to explain the acute pyrexia seems plain.

The influence of the organs of sense on the intellect is another patent example of the great law that all nerve force is due to peripheral irritation.

In our waking life the actions of central nerve force are so

rapid as to seem almost automatic ; but how would it be possible to exercise the faculties of discrimination, of similarity, of impressions and retentiveness, if our sense organs had ceased to convey peripheral impressions ? Deprive an individual of sensations of sight, taste, touch, smell, hearing, and there will be neither incentive to intellectual thought, nor capability of retentiveness or memory ; the latter of which is due to powers of discrimination and of similarity (or consciousness of agreement) existing between former and present impressions.

When the brain is at rest in sleep, a draught of cold air, or a touch of the bedclothes, or an unusual unaccustomed sound, acting peripherally through the sense organs, almost immediately, if powerful enough, induces central nerve force, which expends itself in the disordered ideation of dreaming, or in the explosion of a complex set of efferent nerves, which causes awakening.

It might be argued that the power of retentiveness or memory is independent of the senses : for example, a person on falling asleep may determine to waken at a certain agreed-on time, and very frequently can do so. This is, however, partly due to the fact that the individual has so trained certain faculties of concentration that the desire to arouse forms a latent and partly dormant thought, which in dream-like manner ideates in a given time and causes him to awake. But if the sleeper were physically worn out and slept soundly, the brain would be in a less active condition, ideation would not occur, and he would sleep on indifferent to his resolution. Even in the phenomena of memory or retentiveness it is possible to accept the doctrine of peripheral impressions. But this takes us further in psychology than is necessary for our present purpose, which is merely to demonstrate that all nerve force is necessarily dependent on peripheral causation.

It must, however, be remembered that the power of nerve force which is thus set in action is regulated by a normal and healthy condition of all the organs involved. Action is initiated by anabolism or construction, not by katabolism or destruction of tissues. The wholly paralysed limb is insensible to irritative influences and lies motionless ; the inflamed limb is hypersensitive and winces at the least touch. So, also, in intellectual disorders, ideation is either wholly lost as in dementia, or is unduly exalted as in mania, or possibly it may be in some transitional condition between these ; the diseased mind is not subject to the control of the higher "balancing" faculties.

After this somewhat lengthy digression (which I hope my readers will bear with, inasmuch as a clear enunciation of guiding

principles is requisite for the due consideration of any dogma), I must return to the discussion of the theory that the wasted decidua *debris* acts as the irritating means by which the vessels are reflexly dilated. This assumes that the anabolic or constructive nerves have in *some way* been brought into action, so that the decidua, which may serve for the purposes of utero-gestation, or be shed as the menstrual decidua, has been formed; and that, the uterus not being occupied by a fertilised ovum, the cells of the endometrium are in consequence of automatic nerve impulses broken up and then act as reflex causes of irritation, causing the vessels to dilate and the menstrual flow to appear. Now, as I have stated on page 20, this is contrary to all ordinary physiological observation. Further, if the effete cells were the cause of the endometric reflex nerves being irritated and the vessels of the uterus becoming congested and dilated, what of all the other phenomena involved? If automatic nerve action has served to build up the decidua, why should not the same force, acting in an inverted manner through the complementary sympathetic fibres, suffice to break it down? What of the ovarian and tubal congestion which often, if not generally, accompanies, and in many instances precedes, the flow? What of the various alterations in the general economy of the woman rhythmically recurring before these cells have become effete, and, consequently, causes of peripheral irritation? What of the facts that impregnation may occur, as we have seen, without the menstrual process ever having been established; and, even during menstruation or the flow of the lochia, that a fertilised ovum may remain in the uterus? What of the irregular onset or arrest of menstruation from nerve influences, such as emotions of fear or grief or joy? Why, during ectopic gestation, is there formation of a decidua in the uterus which does not contain an ovum? Generally such a decidua is more fully developed than that of utero-gestation. This doctrine appears to me to be a retrogression from the simple "nervous" theory of the menstrual process. It rightly assumes that the cause of nerve irritation is peripheral, and that it is located in the uterus; but it altogether fails to explain what causes the original impulse that determines the process; what decides its regular recurrence in the healthy, non-pregnant woman; and why there is eventually cessation of the monthly flow.

Before submitting my interpretation of these phenomena it is essential that I should give an account of the anatomico-pathological considerations upon which my views are based.

Presuming that all my readers are familiar with the coarse

anatomy of the uterus, as described in anatomical and gynæcological text-books, I shall omit detailed reference to it.

The uterine wall consists of three elements :—

(1) The serous covering or peritoneum, which only partly covers the uterus in front where it dips down as far as the isthmus and then turns back to cover the posterior wall of the bladder.

(2) The muscular part, which consists of three layers of un-striped muscular fibres ; the outer of which is longitudinal and sends fibres to the round and ovarian ligaments, the sacro-uterine ligaments, and to the Fallopian tubes ; the middle layer is in connection with the muscular coat of the vagina, and has its fibres placed transversely and interlacing each other ; the internal layer is transverse and is especially developed in the upper lateral parts of the fundus, and at the os internum, at which latter place it forms a sort of sphincter ; it is also connected with the internal surface of the mucous membrane of the cervical canal, known as the *arbor vitæ* or *plicæ palmatæ*. The middle layer is the thickest, and the uterine vessels are contained in it. The inner muscular layer is directly in contact with the third element—the mucous membrane.

The mucous membrane, which lines the whole cavity, is closely connected with the inner muscular layer. Thin muscular bundles and fibrillated bundles of connective tissue extend from the one to the other. The mucous membrane is, in the adult, made up of ciliated columnar epithelium formed on a basis of fine threads of connective tissue, and round or ovate cells ; and is perforated by numerous gland tubules composed of a basement membrane and a layer of ciliated columnar epithelium ; these glands are named the **utricular** glands.

In the cervix the construction of the mucous membrane and glands differs from that of the body of the uterus. The mucous membrane may be described as consisting of fine fibrous connective tissue without adenoid structure, with columnar and imperfectly ciliated epithelium on the free surface of the body on the edges of the branches of the *arbor vitæ* and in the glands ; in the depression between the ridges the epithelium is goblet-shaped and non-ciliated (Arthur W. Johnstone). The glands are of the racemose type, are made up of many branches and extend deeply into the connective tissue, and are dilated at their extremities (Ruge and Veit) (2).

Garrigues (3) has succinctly summarised the relationship of menstruation to the mucous membrane, as follows : The anatomi-

cal basis of menstruation is a regularly recurrent development of the endometrium (Leopold) (4) (fig. 1).

About a week before menstruation sets in, the mucous membrane of the uterus begins to swell, so that from one-eighth of an inch (2 to 3 mm.) it becomes one quarter of an inch in thickness (6 to 7 mm.). It acquires the greatest thickness on the middle of the surfaces and fundus, and falls gradually off towards the edges. Its surface becomes wavy in consequence of the disproportion between it and the underlying muscular tissue. Its arteries become much enlarged and form spirals. There is like-



FIG. 1.—Vertical Section through the Mucous Membrane of the Human Uterus (Turner).
e, Columnar Epithelium; the Cilia are not represented. *gg*, Utricular Glands.
ct, Interglandular Connective Tissue. *vv*, Blood Vessels. *mm*, Muscular Layer.

wise so great a development of capillaries immediately under the epithelium that they form a plexus discernible to the naked eye. On the other hand, there are only few and small veins. The utricular glands become much wider and elongated, forming spiral and zigzag-shaped tubes. The tissue itself is composed of connective tissue-cells interspersed with an enormous number of round cells like lymph corpuscles, and giant cells with many nuclei. According to Leopold, these cells are only found in a condition of active proliferation, while according to Johnstone, who has worked with much more powerful lenses, the corpuscular elements are

formed from granules in the threads of tissue forming the bulk of the mucous membrane (fig. 2).

Before menstruation begins the blood pressure is increased (Stephenson). Some of the capillaries near the surface burst and the blood escapes, partly into the tissue, forming small extravasations, partly on the surface, lifting up and tearing off the epithelium. The epithelium is also shed in that part of the utricular glands that lies nearest to the cavity of the uterus. Five or six days after the beginning of menstruation the regeneration of the epithelium begins from the utricular glands. Eight or nine days after the beginning of menstruation the regeneration is already completed. The glands are no longer twisted into spirals, the arteries have

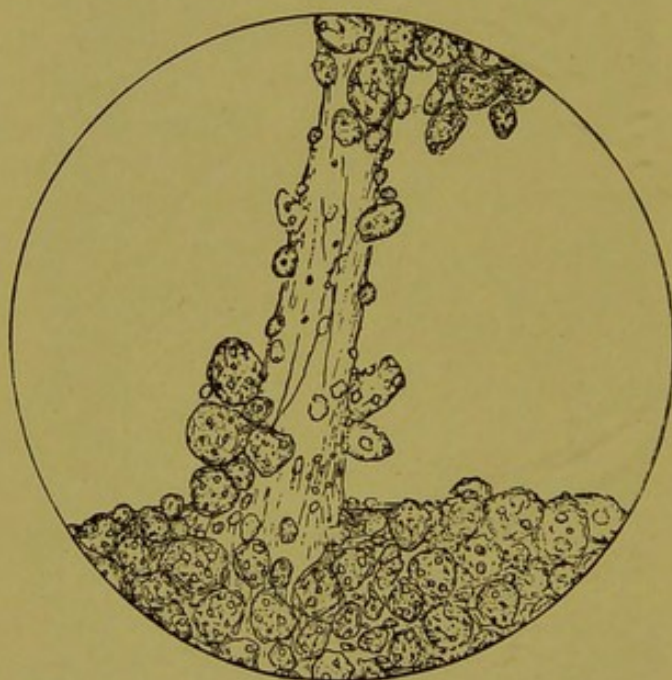


FIG. 2.—Fibre of Endometrium, showing different degrees of Corpuscular Development. Enlarged 3000 times (Johnstone).

become smaller, the capillary net shrinks, the scars in the capillaries heal, and the whole surface is covered with epithelium. Most of the corpuscular elements have disappeared. The tubes take some part in the process of menstruation; their mucous membrane is swollen, the epithelium is shed in some places (5) and they are filled with a thin bloody fluid containing blood corpuscles and cast-off epithelial cells.

My own ideas are mainly in harmony with those expressed by Garrigues, but I place more importance on the significant changes in the utricular glands than on the corpuscular formation, which seems to me only part of the process involved in the rapid growth of the menstrual decidua.

Arthur W. Johnstone, of Cincinnati, has made an exhaustive study of the uterine mucous membrane(6), and concludes that it ought to be regarded as an adenoid or glandular tissue like in structure to the thyroid, spleen, tonsil, thymus, lymph tissues in the wall of the intestine and lymphatic glands. He holds that in the *ordinary* acceptation of the term the endometrium is not a "mucous membrane" but "adenoid tissue," and that menstruation is for it exactly what the lymph stream is to the lymph gland or the blood current to the spleen. The essential particular of Johnstone's observations was that the fine connective tissue, "the sustentacular threads," are not homogeneous, but carry corpuscular bodies in all stages of development. The corpuscles, in health, do not bifurcate, but developmental generation is always present. He describes the different conditions of structure found, from childhood to old age, in uteri at different ages; and also points out that the exact stage, before or after menstruation, at which an adult uterus is examined will determine the varying conditions found in the constituent parts of the endometrium. According to Johnstone, menstruation is to be regarded as a periodic wasting away of those corpuscles that are too old to make a placenta. In several other papers he has elaborated these views. His contribution, "Zoological Position of the Human Endometrium" (7), deserves most careful study.

The uterine lymphatics are numerous; there are lymph sinuses and lymph clefts, forming an intercommunicating system, studded throughout the intermuscular connective tissue of the muscular layer of the uterus; they are in connection with the lymph sinuses of the endometrium, and, further, lead into a plexus of lymphatic vessels supplied with valves which are found in the subserous connective tissue. Johnstone finds that "the human uterus is very scantily supplied with lymphatics as compared with the uteri of many of the lower animals. In the lower animals, nature provides a regular normal escape for the rich lymphatic corpuscles into the general circulation, where they are in all probability used up like any other white blood cells." "In women no such lymphatic network can be used, and the only way to rid the uterus of this over-ripe and consequently useless tissue is to wash it out through the uterus by a blood stream." "The necessity for menstruation is brought into the animal kingdom when the individual habitually stands erect. As has been shown long ago, the monkey menstruates in an irregular sort of way, but just about in proportion to the amount of time it spends in the erect posture." As the human being is the only viviparous animal which constantly maintains the

erect posture, it is the only one which menstruates regularly. The wall of the human uterus has (from evolution) become tough and strong, so as to preserve its shape against the action of gravity ; whereas the original type of uterine mucous membrane, the loose lymphatic network, found in the lower animals can be used for the absorption of the useless lymphatic corpuscles ; the horizontal position does not cause the degree of blood pressure induced by the erect posture ; so that even structurally (apart from specialised nerve impulses) the uterine organisation partly explains the difference between menstruation in woman and *œstrum* or "rut" in the lower animals. I shall shortly return to this.

Johnstone is also responsible for the assertion that Remak's law, with reference to the construction of embryological tissues from the epiblast and hypoblast respectively, does not apply to the sustenance or continued existence of organs in adult life. "Cell division is not used in adult life except where some rapid process is being accomplished, for instance in an inflammation or the new growth of some diseased structure." "For the normal every-day repair of the natural waste, gemmation is the process by which nature accomplishes it ; it is the budding off of the little granule that lies within the mucous thread which accomplishes this normal repair." "Instead of being an exception to the general rule, the endometrium is only an exaggeration of what is going on all over the body." Putting Johnstone's deduction in a nutshell, he holds that the mucous structures of the endometrium are not produced from epithelium but from lymphatic or glandular cells. And there is a growing belief in the correctness of his views.

"The epithelial lining of the uterine cavity is derived directly from the superficial layer of corpuscles which underlie it, its growth over the whole of the subjacent adenoid structure is due entirely to the trophic nervous control."

The former idea that the whole of the mucous membrane of the uterus was shed at each menstrual period (*Kölliker*) is contradicted by all recent observers. Sir John Williams (8) adopted this view, and argued that the mucous membrane was regenerated from the bared muscular coat. Leopold (9), Kundrat and Engelmann (10), Johnstone (11), Bland Sutton (12), and Heape (13), hold that only the superficial layer of epithelium is shed. Möricke (14) goes so far as to deny that any is removed.

It has been pointed out that the difference of opinion can be explained from the facts that pathological appearances have been mistaken for physiological conditions ; that insufficient magnifying powers were used ; and that, even among those who agree that the

total disintegration of the mucous lining does not occur, differences of opinion may be accounted for by imperfect hardening of the tissues, and by the uteri having been examined at different stages of the normal menstrual process. As regards the regeneration of the epithelium, in distinction to the views now advanced by Johnstone and that suggested by Williams, Kundrat and Engelmann held that fatty degeneration took place in the cells of the interglandular tissue, blood-vessels, and glandular and surface epithelium, and that the superficial layer of epithelium was shed. Leopold denies the fatty degeneration, and believes that there is extravasation of red and white corpuscles from the superficial capillaries which raises the superficial layer of epithelium, then the increased blood pressure on the capillaries causes them to rupture, and the superficial effete epithelium is carried off in the discharge. The mucous membrane is renewed from the glandular epithelium. Möricke (15) holds that during menstruation the mucous membrane does not perish in whole or part, nor lose its ciliated cylindrical epithelium. According to him the interglandular cells are not increased in number nor in size, and no fatty degeneration whatever has been observed. The vessels are dilated and distended with blood; extravasation takes place in the upper layers of the mucous membrane. The homogeneous matrix is always more plentiful.

Wyder (16) believes that during childhood close up to the time of puberty the uterus is in a perfect condition of rest, and that its mucosa is nonciliated. He holds the occurrence of cilia to be a characteristic of impending puberty. Möricke (17) agrees with Wyder regarding the non-existence of cilia at birth; and their appearance after puberty, when the ciliation can be traced deep into the utricular glands; and states that in old age the cilia disappear.

The Utricular Glands (18).—There exists considerable difference of opinion as to the early condition of the uterus in respect to the presence or absence of utricular glands. Sir Wm. Turner asserts that there are no utricular glands during intra-uterine life; nor, according to Engelmann, do they exist at birth. Kundrat held that the development of glands begins during the first year of life, advances slowly up to puberty, when they develop quickly and increase markedly with menstruation. Wyder traverses Kundrat's statement, asserting that his deductions were drawn from too small an amount of material. Wyder states that very changeable pictures are seen in the uterine mucosa of children, and has found well-developed glands in preparations from quite young children. He

gives a table illustrative of this contention, which, however, appears to me to hardly warrant his general conclusion. The presence of cervical glands is not now discussed. We find, however, that nearly half of Wyder's cases had no cervical glandular development. In the table (*Archiv f. Gyn.*, Bd. xiii., S. 7) there are fourteen cases cited. Of these there were *no glands* of any sort in the corpus in four cases aged respectively two hours, five weeks, one year, and ten years; in another child three years of age *almost no glands*. There were isolated single ill-developed tubular glands in one infant of twelve days, in a child of two years, in another of nine years; and in a girl of fourteen, and in another girl of fifteen, there were single tubular glands of small development.

In one infant of eight days there was "abundance of tubular glands"; in children aged four and five there were "numerous tubular glands"; and in a girl of fourteen there were "perfectly developed very numerous tubular glands". From these cases it is difficult to agree with Wyder that there is no basis for the belief that there is a progressive glandular development in the corpus uteri up to puberty; it is not surprising that some eight-year-old children do not have glands. But that "in many cases" one finds in the corpus uteri "simple and branched glands in abundant formation, quite corresponding to the utricular glands of the adult, and indeed already present in new-born children," is neither in accordance with the observation of other workers, nor, so far as I can see, do his own cases in any measure warrant this conclusion. Simple tubular glands, even in abundance, in two children aged respectively four and five might be explained as a special development accounted for by precocity of glandular growth; and that the uteri of the girls of fourteen and fifteen had not well-developed glands only indicates that their period of puberty was likely to have been a late one. In the last case, a girl of fourteen with "perfectly developed very numerous glands," puberty was about to occur.

Möricke (19) says that at birth the mucous or goblet cells, which may be found between the cylindrical cells of the cervix, do not exist in the corpus. The corpus has tubular and ramifying glands, the latter at the fundus. This paper is, however, mostly a digest of the views of others, and is manifestly influenced by Wyder's publication just discussed, which is first and frequently referred to.

Wyder's and Möricke's views have not met with general acceptance as regards (1) the appearance of cilia at puberty, and (2) the view of the latter that neither in whole nor in part is the superficial epithelium shed. We must, therefore, regard their opinions of the

PLATE I,

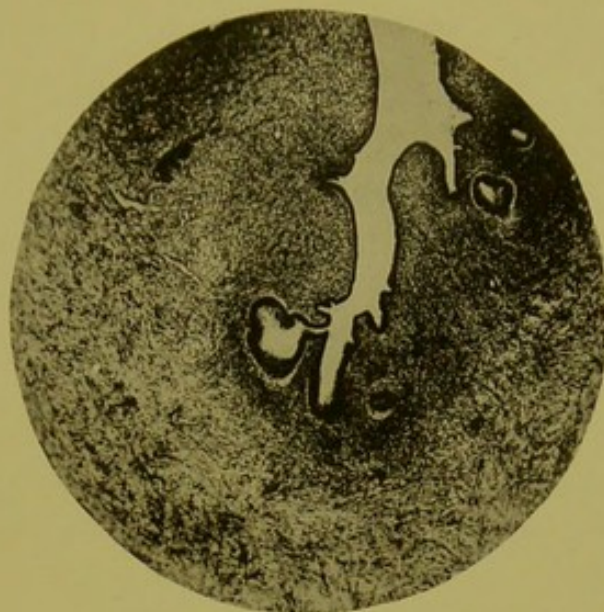


FIG. 3.

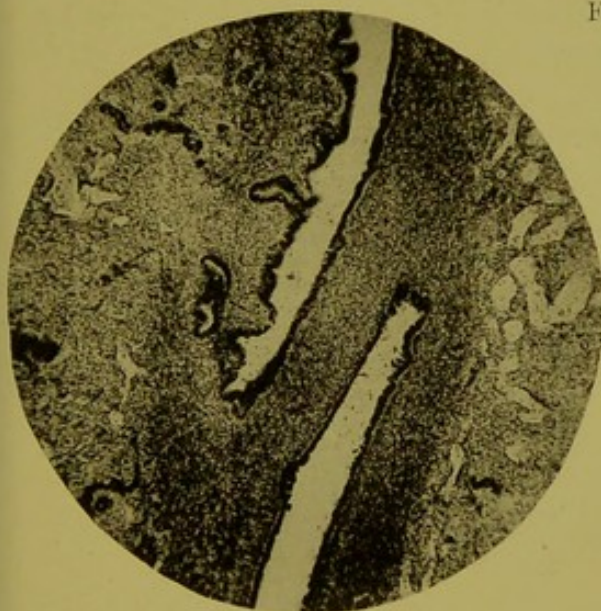


FIG. 4.

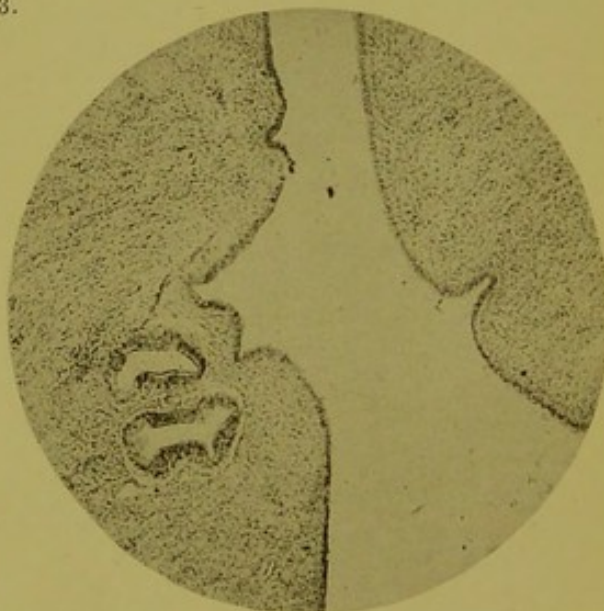


FIG. 5.

INFANTILE UTERI (low power).

PLATE I., FIG. 3.— $\times 30$.
PLATE II., FIG. 6.— $\times 400$. } From a child who died of asphyxia.

MR. TARGETT'S NOTE.—Apparently a little older specimen than the next two, as there are five or six well-defined follicles of m.m., and these are better developed. The bases of the follicles reach to two-thirds of thickness of the endometrium at most.

PLATE I., FIG. 4.— $\times 30$.
PLATE II., FIG. 7.— $\times 400$. } From a child who died of asphyxia.

MR. TARGETT'S NOTE.—Very few follicles, which do *not* extend through endometrium. Vessels beneath endometrium and in muscular coat are much dilated. One end of section shows obliquely-cut cervical canal.

PLATE I., FIG. 5.— $\times 30$.
PLATE II., FIG. 8.— $\times 400$.

MR. TARGETT'S NOTE.—Shows only three or four follicles of the m.m., but there are some small depressions of m.m. which are either due to wrinkling of m.m., or to early formation of follicles.

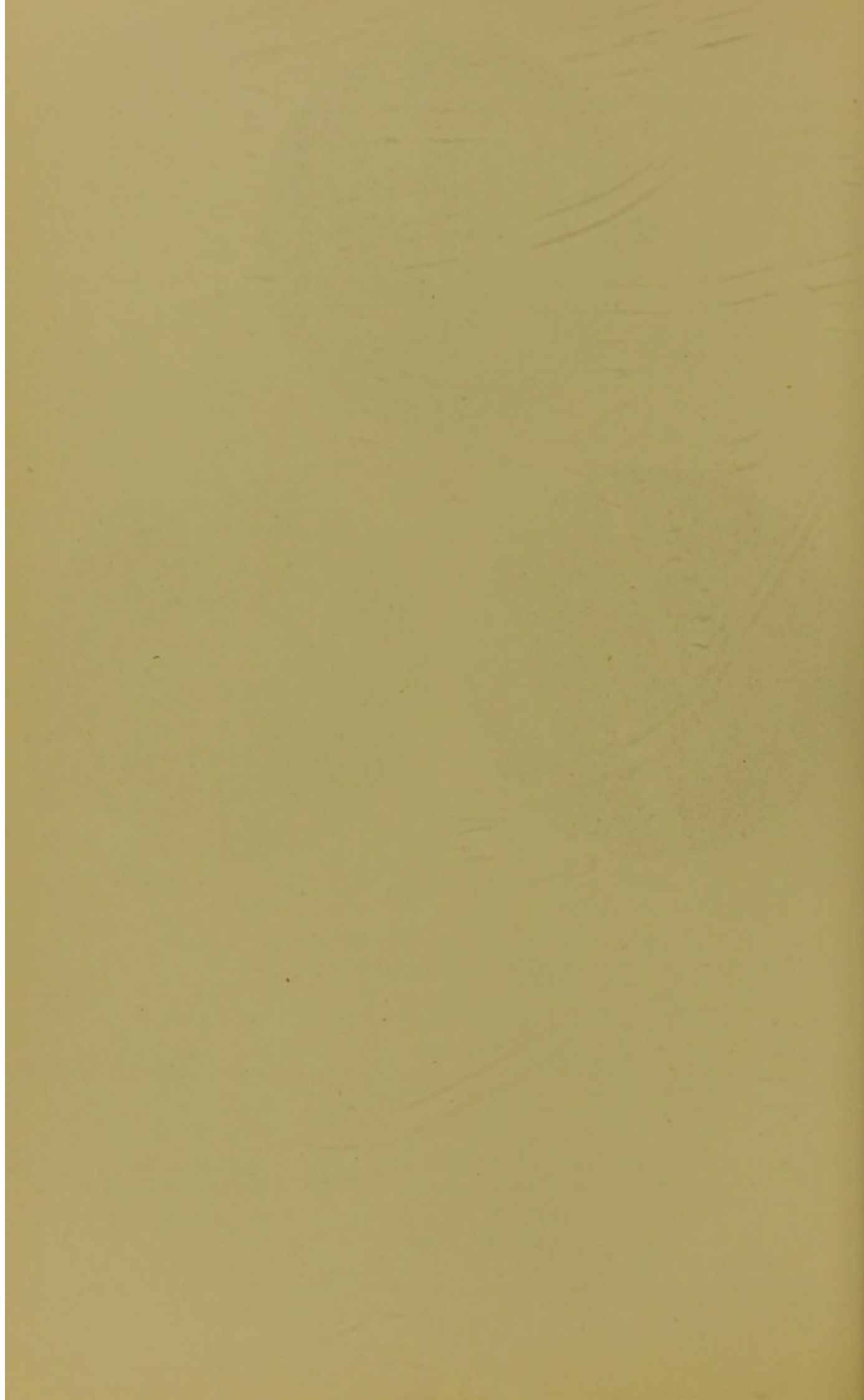


PLATE II.

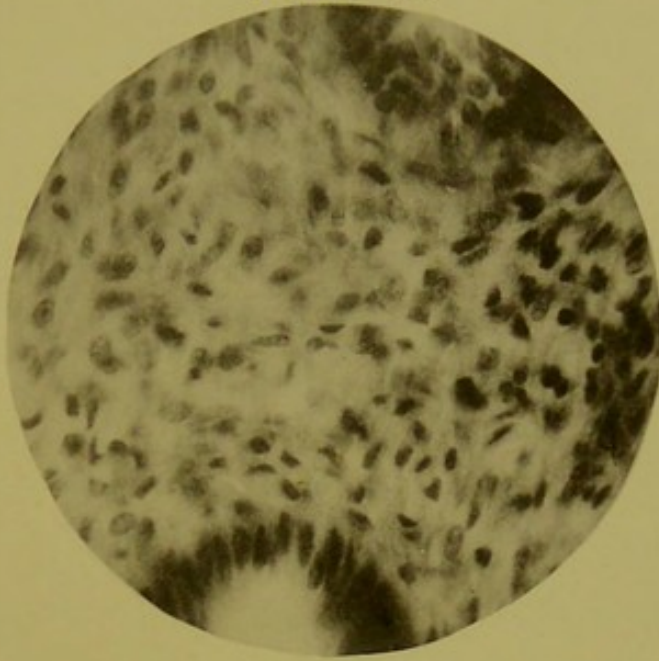


FIG. 6.

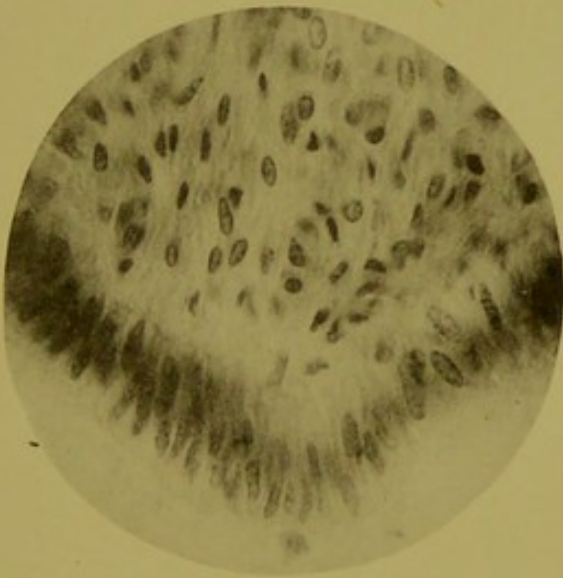


FIG. 7.

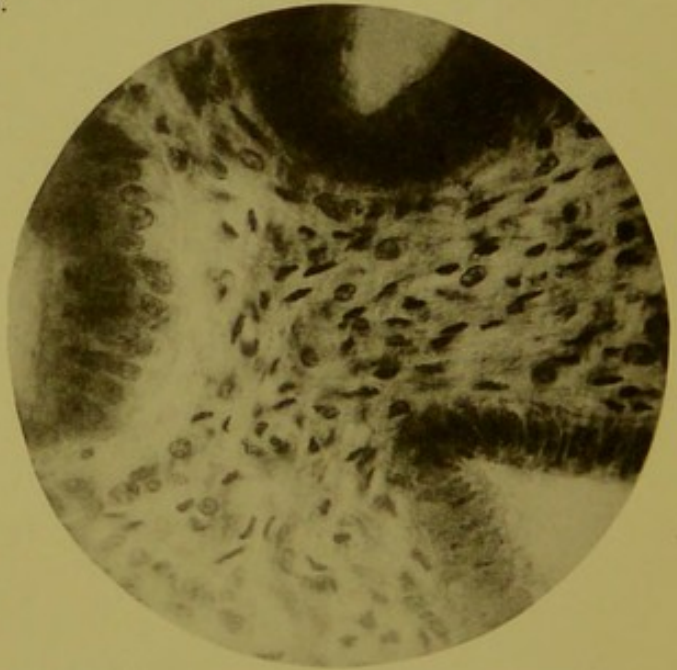
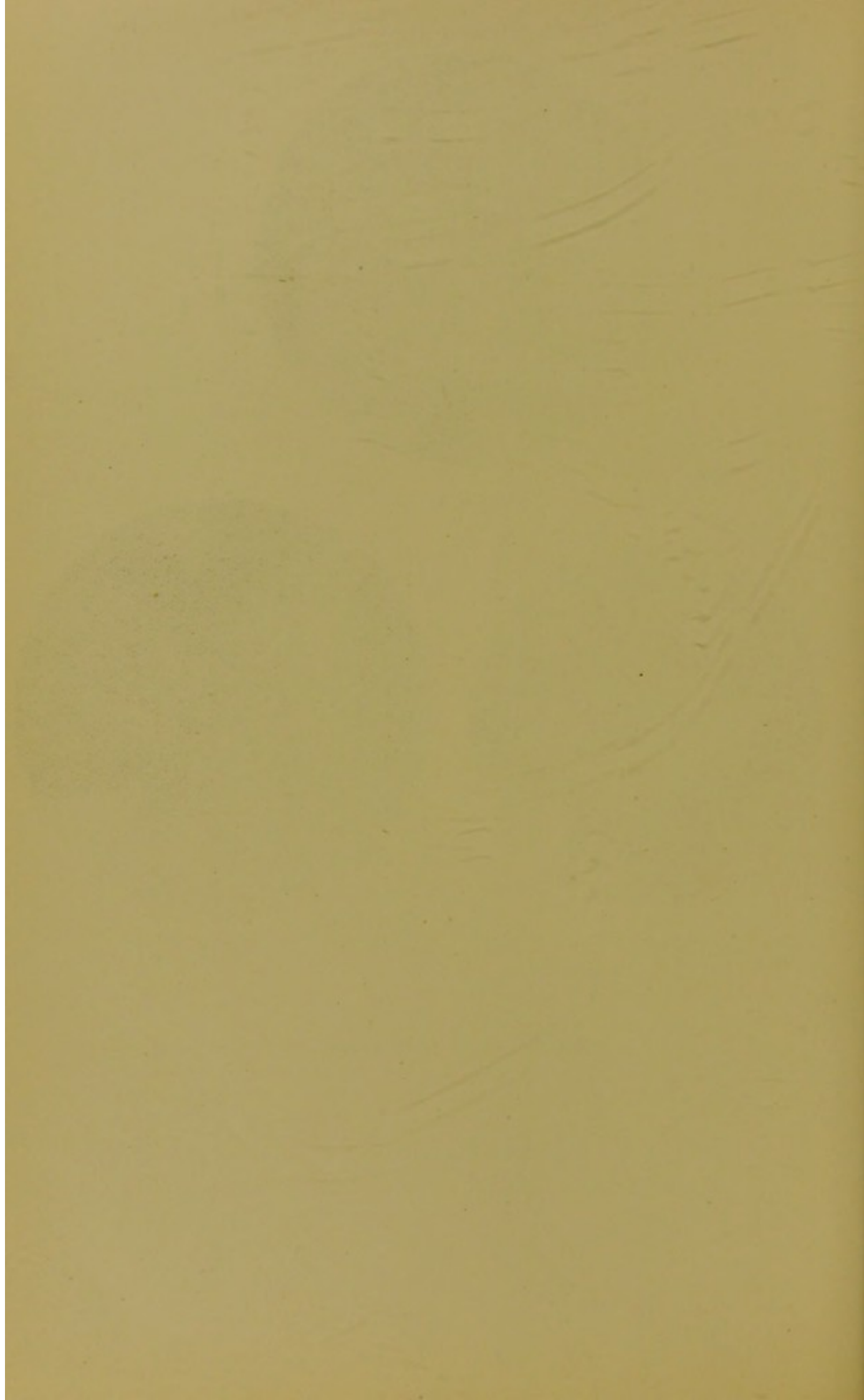


FIG. 8

INFANTILE UTERI (high power).

FOR DESCRIPTION, SEE PLATE I



glandular condition, in light of those of other observers, as open to some doubt. The true explanation may lie in the fact that there exist variations of structure in certain individual cases; and in some cases the existence of glands in the corpus uteri of an infant may be held to determine precocious uterine hæmorrhages.

Mr. C. H. James (20) showed at the London Obstetrical Society the uterus and appendages of a child aged five days, who on the day previous to her death had a sanguineous discharge from the vagina.

Dr. Wheaton, now of H.M.'s Local Government Board, in June, 1892, exhibited a microscopic section of the uterine mucous membrane from the same specimen. Wheaton found that there had been capillary uterine hæmorrhage, and that a few small uterine glands were to be seen in the mucous membrane. They were very short, and did not extend for any distance into the muscular layer. He stated that he had always found uterine glands to be present at the fundus at birth, although very short and barely extending to the muscular layer (21). Dr. Wheaton has been good enough to send me a private communication, in which, replying to some inquiries I made, he writes: "I have only examined six infantile uteri, within a short time of birth. The other organs were not examined microscopically, but there were no important lesions visible to the naked eye. I have made no observations as to the presence or absence of utricular glands during infantile life, in the case of infants born prematurely, but without any gross pathological lesions. I can only account for Engelmann's statement that there are no utricular glands at birth by his meaning 'perfectly developed' glands. I find that the glands are more highly developed, *i.e.*, penetrate more deeply into the muscular layer, the closer the specimen is taken to the fundus uteri. The glands are present, but they are of the simplest possible nature; simply short canals, not reaching to the muscular layer, and lined by a single layer of cells." Dr. Wheaton adds: "I cannot say that the children whose uteri I examined were perfectly healthy; it is very probable that if examined microscopically numerous capillary hæmorrhages would have been found in the organs, since, more or less, asphyxia preceded death".

Klein (22) is of opinion that glands are to be found in the uterus of the new-born child, "chiefly at the sides". This situation is in contradiction to the opinions previously quoted, and, so far as I know, stands alone, but it affords us an additional observation that glands are, at times at any rate, found in the new-born child's uterus.

From several specimens I have examined, some of which I figure here (*vide* plates i. and ii.), I am personally of opinion that utricular glands of imperfect structure are not infrequently found in the infantile uterus shortly after birth; in some cases there are no glands; in others they are sparsely and superficially placed on the mucous membrane; and in the majority of instances, when they are observed, will be found to be of the simplest possible structure. If the infant has had vaginal hæmorrhage before death, or has suffered from any blood or glandular disease, it is unwarranted to regard unusual glandular development as physiological. Even if indefinite utricular glands were found in all infants at birth, or in early life, we could only regard them as evidences of the future growth of more important adenoid structures. As they are, they exist as undeveloped, functionless rudiments.

The growth of the utricular glands at puberty is undisputed. They increase greatly not only in size but in number. So that the girl who has just entered on puberty has a uterine mucosa distinctly different from her who has not menstruated. Kundrat and Engelmann (23) held that new glands were formed by the surface epithelium growing inwards into the deep layers of the mucosa. Arthur Johnstone, on the other hand, refers the free epithelial development to the protoplasmic growth. The fine threads become granular, the corpuscles more numerous; but the dense bands, characteristic of the non-menstruating uterus, still remain. The endometrium is not yet perfect; the increase in glands is marked, and the ciliation of epithelium entering the glands is noticed—they have a *membrana propria* now much more distinct than in the simple little short-reaching tubules of the child; but the richness in structure pertaining to the uterine mucosa of a fully-grown woman is only indicated, not accomplished (*vide* figs. 9 to 12, plate iii.).

The appearance of the fully-developed endometrium is well known (figs. 13, 14, and 18, 19, plate iv.); in it we have bands, plates, threads, glands reaching deeply to the muscularis, and remaining, except in surface denudation after menstruation, as the most persistent structures of any. The protoplasmic out-growths, ever ready to form a placenta if called on, are rich and numerous.

Sections of uteri, just before menstruation, differ materially from sections just after the process. Microscopic sections from a uterus just before menstruation were shown by Dr. Griffith (24) at the London Obstetrical Society.

The history given was: Age twenty-nine; secundipara; cause of death hepatic abscess. The patient had been confined about five

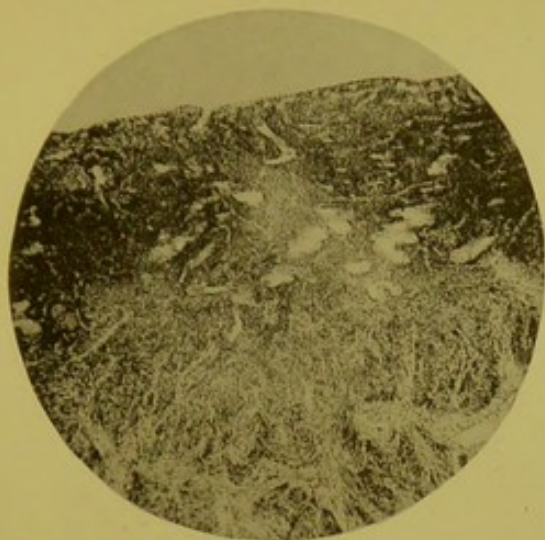


FIG. 9.

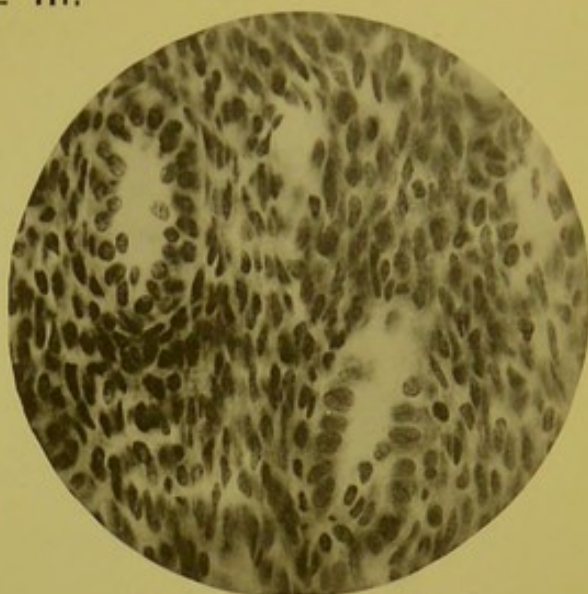


FIG. 10

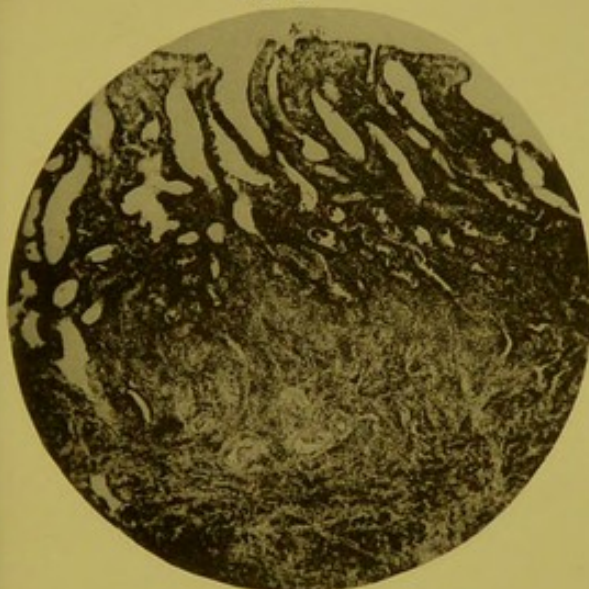


FIG. 11.



FIG. 12.

UTERI OF YOUNG GIRLS (low and high powers).

FIG. 9.— $\times 30$ diam. From a girl of $8\frac{1}{2}$ years. Haemorrhages and somewhat marked glandular development.

FIG. 10.— $\times 400$ diam. The same specimen as Fig. 9. Irregular arrangement of cells, but glands are distinct.

FIG. 11.— $\times 30$ diam. Uterus of girl of 13, just before puberty. Glands now reaching down to muscularis, and total change in mucosa.

FIG. 12.— $\times 400$ diam. The same specimen as Fig. 11. A gland is brought into the field: the epithelium is loosely arranged, and the tissue somewhat irregular.

MR. TARGETT'S NOTES.—No. 1. Figs. 11 and 12 differs from the preceding group in the possession of a great number of follicles, which penetrate the endometrium and reach the muscle, but scarcely, if at all, extend into it. The endometrium is thicker, denser, and composed of more spindle-celled tissue.—No. 2. Figs. 9 and 10. This is perhaps younger than No. 1. At all events the endometrium appears softer (less dense), and the follicles only just reach the muscle.



months before, and had not menstruated since her confinement, but thought she was about to do so. The uterus, externally, was normal; on section, the mucous membrane of the body was intensely red and thickened, but not detached at any part. Microscopic examination showed infiltration of almost the whole thickness of the mucous membrane by effused blood; no destructive or fatty changes were visible. The sub-endothelial layer of the internal coat of the arteries was enormously thickened.

The last-named condition might have been due partly to the previous pregnancy; yet it is hardly likely that the effects of the vas-

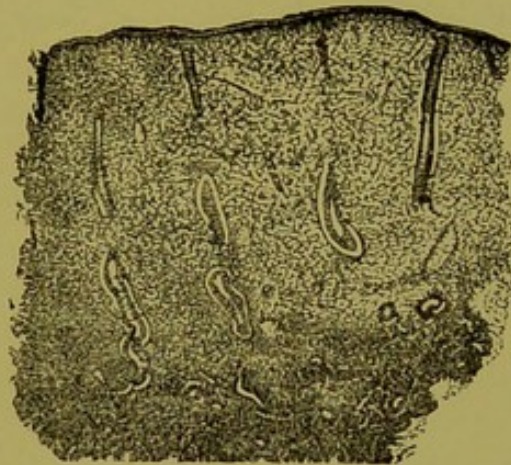


FIG. 13.—Normal Endometrium of Adult Woman (Winter).

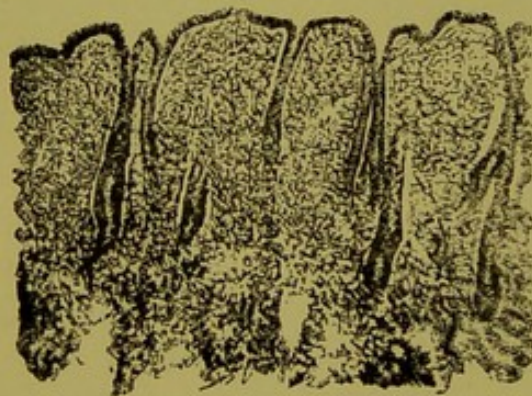


FIG. 14.—Normal Endometrium of Adult Woman (Winter).

cular hypertrophy of gestation would have still persisted in a healthy uterus five months after delivery. Possibly subinvolution, which is a form of endometritis, might explain this special thickening.

Observations based on comparative anatomy throw considerable light on what actually occurs normally in the human female. The varying histological conditions found make it difficult to appreciate what is normal until we realise that these should be regarded as different stages through which the endometrium passes in its preparation for the production of a decidua suitable for the reception of an ovum. Johnstone points out that the uterus of the cow and

sheep differ from the human in that the space between the glandular layer and the muscular layer is occupied by a rich layer of lymph canals and intercellular spaces, and that the vessels are richly supplied with lymph radicles and perivascular sheaths. In the sow the structure approximates to the human uterus more closely; the lymphatics are not nearly so abundant as in the sheep or cow; except that the epithelial coat is greatly thicker, the internal microscopy of a sow's uterus is not greatly different from that of a human uterus; but the striking fact is that its parenchyma resembles the child's, and not that of the adult condition. "The sow does not menstruate for the same reason that the child does not; the corpuscles are so slightly developed that they do not need rapid removal" (25). To the same enthusiastic worker we are indebted for the further observation that during rut in bitches the whole of the sub-epithelial endometrium is converted into an almost structureless mass, in which the nuclei of a few branching corpuscles are all that can distinctly be made out. *The utricular glands, however, are left intact* (26), and with the exception of slight swelling of each of their epithelial cells, there is no appreciable change in them. Like those of the human, these glands are lined by a single layer of epithelial structure; but the epithelium generally lining the cavity of the uterus is much thicker than in woman. The whole of the lining is not used up even in the manufacture of the placenta; the menstrual organ keeps its steady growth under the fully developed after-birth. In this renewed tissue *the uterine glands have not disappeared*, but show up their usual single layer of epithelium. "In animals that maintain the horizontal position, the sewers of the endometrium empty into the lymphatic circulation and not into the cavity of the body (of the uterus), as in the human being."

Why is it that women and monkeys are the only creatures that have a lochial discharge? Johnstone offers the explanation that it is the nature of the lymphatic tissue of the endometrium and the erect posture that explain it. The lymphatics being less developed cannot absorb the effete corpuscles, and their extravasation into the stroma causes capillary congestion and hæmorrhage; the continual erect posture increases the blood pressure and provokes frequently recurring re-building-up of tissues.

But, as I have already indicated, this is not sufficient to explain the rhythmical uterine flow in women and the less regular menstruation in certain monkeys. The nerve theory of menstruation has been adopted, at least in part, by Johnstone; a purely uterine theory of origin could not possibly satisfy his wide knowledge of the process.

PLATE IV.

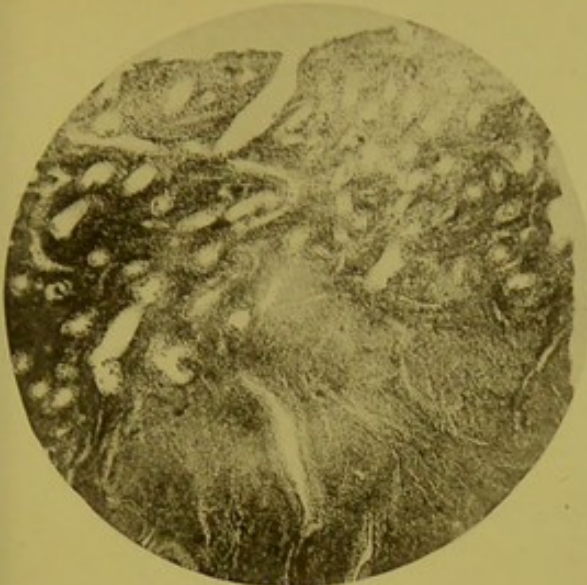


FIG. 15.



FIG. 16.



FIG. 18.

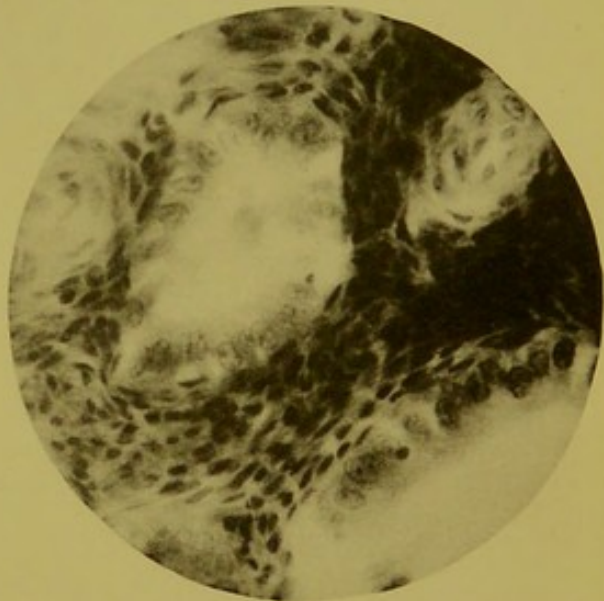


FIG. 19.

MIDDLE LIFE UTERI (low and high powers).

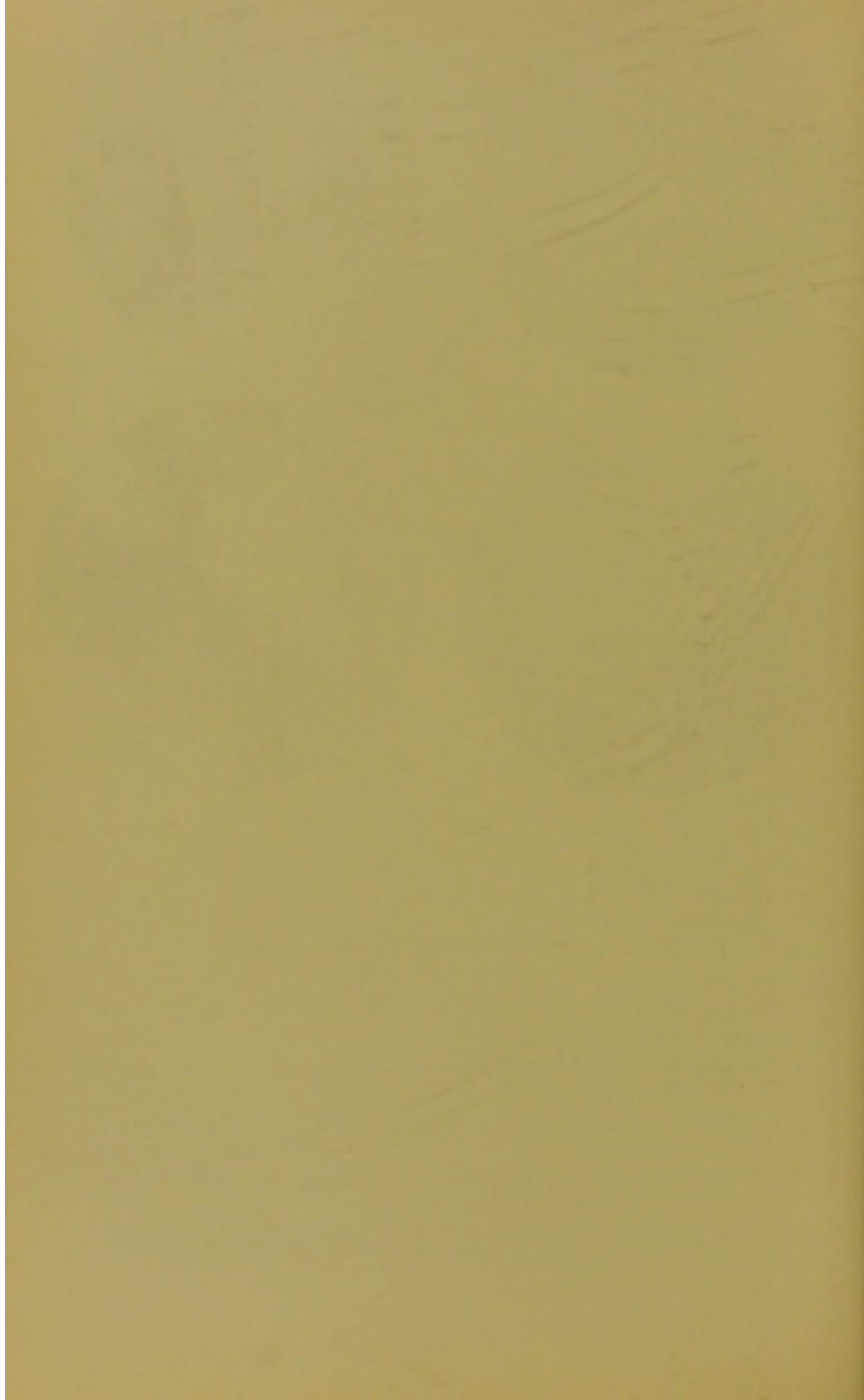
FIG. 15.— $\times 30$ diam. Mature Uterus. Marked glandular development, entering deeply into muscularis.

FIG. 16.—The same as FIG. 15— $\times 400$ diam. Glandular condition very much marked (after menstruation).

FIG. 18.— $\times 30$ diam. Uterus of fully matured young woman.

FIG. 19.—The same as FIG. 18— $\times 400$. Before menstruation. Glands packed with cells.

MR. TARGETT'S NOTES.—No important differences in these two slides. They both show a thick endometrium, with spindle-celled stroma, and many follicles, which have penetrated the muscular substance for a considerable distance.



Menstruation in Monkeys.—In certain monkeys there is a more or less regular menstruation. Bland Sutton (27), in his able paper on menstruation in monkeys, concludes: 1. Macaque monkeys and baboons suffer a periodical loss of blood from the uterus. 2. Unlike the human female, there is no shedding of the mucous membrane of the uterus and utricular glands. 3. The amount of blood which escapes is very small in quantity. Sutton's investigations of the uteri of young females dying during menstruation convinced him that if the specimens are properly hardened only a slight shedding of the superficial and glandular epithelium occurs. He defines human menstruation as "the periodical discharge of blood from the uterus, accompanied by the shedding of the epithelium of the body and fundus, as well as of that lining the utricular glands near their orifices".

Sutton holds that "the Fallopian tubes remain passive so far as their mucous membrane is concerned," the epithelium is intact, and the cilia preserved. He strongly combats the idea advanced originally by Kölliker, and maintained by Williams, that the whole mucous membrane is shed at each period. Regarding women, Sutton maintains: "1, That the uterine mucous membrane is normally not shed during menstruation, only the surface epithelium; 2, the sanguineous discharge is due partly to oozing from the surface denuded of epithelium, and in part to active congestion; 3, the discharge from the uterus is largely augmented by mucus secreted in increased quantity at this time from the *enlarged utricular glands*" (28).

In Macaque monkeys the utricular glands very closely resemble those of the human female. In the baboons the glands are wider, and diverticulated at their extremities, and are lined by columnar ciliated epithelium.

The appearances presented by the adult uterus during menstruation and also during early pregnancy further suggest to us the important physiological functions of the uterine glands. Dr. Chas. Sedgewick Minot (29) has contributed some valuable confirmations of the observations previously made by Leopold (30) and Kölliker (31).

Minot writes: "I have little to add to the descriptions of Leopold and Kölliker. It is, however, worth while to present the accompanying illustration since there is a lack of figures (cut 28). This represents a transverse section of the corpus uteri of a fine specimen. The woman died of acute miliary tuberculosis. Autopsy was made almost immediately after death, and within four hours from death the complete genitalia were placed in Müller's fluid, the

uterus having been first carefully opened by a single median ventral incision. Death is said to have occurred on the day of the regular period. The hymen was intact. There was no sign of any pathological change in any of the genitalia. In one ovary, the right, there was a fresh *corpus hæmorrhagicum*. These data afford a sufficient basis for the belief that the uterus was well preserved in a perfectly normal position."

The mucous membrane is from 1.1 m. to 1.3 mm. thick; its surface is irregularly tumefied—the gland openings lie for the most part in the depressions. In the cavity of the uterus there was a small blood clot. The mucosa is sharply limited against the muscularis. In transverse sections one sees that the upper fourth of the mucosa is very much broken down and disintegrated; the cells stain less than those of the deep portions of the membrane; the tissue is divided into numerous more or less separate small masses; some of the blood-vessels appear torn through, but it is difficult to make sure observation. Overlach (32) considers it probable that the infiltration of blood takes place by diapedesis, not by rupture of the capillaries. The superficial epithelium is loosened everywhere; in places fragments of it have fallen off, and in some parts it is gone altogether; it stains readily with cochineal, and its nuclei colour well, the epithelium differing in this respect from the underlying connective tissue, which does not stain well; the blood-vessels in the disintegrated layer are for the most part small.

The deeper layer of the mucosa is dense with crowded well-stained cells, which lie in groups separated by clearer lines; in the cut this grouping shows less plainly than in the preparation; the lighter channels are perhaps lymph vessels. The cells appear to be the proliferated interglandular tissue; there are very few leucocytes; the cells have small, oval, or elongated, darkly stained nuclei, with a very small granular protoplasmatic body each; there is certainly *no noticeable enlargement of the cells*, but only a remarkable multiplication.

"In another specimen in my possession of a normal uterus at the close of menstruation, the condition of the mucous membrane agrees with that of the specimen we have considered, except, of course, that the disintegrated upper layer is lost, and that the superficial layers stain poorly. In this second specimen, also, the interglandular cells are small and very crowded. There are few leucocytes. In neither specimen is there appearance of decidual cells. The two specimens further agree in having *the glands distended and contorted*; each gland is surrounded by a distinct basement membrane or layer of

connective tissue cells closely investing the epithelium, as has been observed by Leopold."

Minot's general considerations are (33): "We are now in a position to compare the uterus during menstruation and gestation. In both cases the processes begin with tumefaction and hyperæmia of the mucosa; these continue with hyperplasia of the connective tissue of the decidual cells (being regarded as modified connective tissue corpuscles), and with hypertrophy, accompanied by *distention* and *contortion of the glands*; they both close with casting off of the superficial layers of the mucosa, after which follows the regeneration of the membrane. The essential steps, then, are the same in both cases. The difference is, that during the long life of the *decidua graviditatis* (nine months), changes supervene in the tissues which do not take place during the rapid menstrual cycle; the *mucosa* of gestation is distinguished by the loss of both its surface and glandular epithelium, and by the enlargement of its connective tissue cells into so-called decidual cells."

As we have learned from Sutton's investigation on the menstruation of monkeys, the process in them is very like that in humans. A recent original investigation has been made by Mr. Heape regarding the menstrual process in "*Semnopithecus Entellus*" and "*Macacus Rhesus*"; fifty of the former and twenty-five of the latter monkeys, none of which were breeding, were killed, and the uteri examined. The observations made in this paper refer only to the former variety; and from the careful histological researches, the deduction may be regarded as in every way accurate.

According to Mr. Heape (34) there are four distinct periods of local condition during each menstrual cycle, and these may be divided into eight stages in all, *viz.*:—

- (a) Period of rest—
 - Stage I.—The resting stage.
- (b) Period of growth—(35)
 - Stage II.—The growth of the stroma.
 - Stage III.—The increase of vessels.
- (c) Period of degeneration—
 - Stage IV.—The breaking down of vessels.
 - Stage V.—The formation of lacunæ.
 - Stage VI.—The rupture of lacunæ.
 - Stage VII.—The formation of menstrual clot.
- (d) Period of recuperation—
 - Stage VIII.—The recuperation stage.

In his valuable paper Mr. Heape has brought additional evi-

dence to show, 1, that ovulation is not the cause of menstruation, and, 2, that a certain amount of denudation takes place (which conclusion Mr. Lawson Tait (36) says has been arrived at from faulty methods of hardening the sections), and, 3, that there are great vascular changes at each period, and, 4, gradual, but considerable, changes in the stroma. The changes in the glands did not evidently awaken Mr. Heape's interest sufficiently to cause him to devote special attention to the part they play in the function of menstruation. We have, however, several observations which, although made from examinations of the uteri of monkeys, are so like in other respects to the statements made by Engelmann, Minot and Leopold regarding the glands of the human uterus that we shall do well to note them. "The glands consist solely of columnar epithelium, which may be one or two rows deep, the cells are much elongated and their nuclei large, exhibiting a nuclear network. The superficial edge of the cells is very evenly disposed, and attached to a non-nucleated basement membrane, which becomes thinner near the mouth of the gland and disappears altogether where the uterine epithelium joins the epithelium of the gland at its mouth." In the human uterus Engelmann (37) says the glands of the fully-developed uterus have no basement membrane; Minot (38) and Leopold (39), however, state that a basement membrane is present.

That the histology of the glands is a distinct thing is evident—"close round the glands the nuclei of the stroma are more flattened than they are elsewhere during this stage, *i.e.*, the resting stage". The protoplasm of the stroma does not form definite sheaths, nor is it continuous with the protoplasm of the glands, as it obviously is with the uterine epithelial cells. The glands secrete a clear viscid material in the monkey. The glands during the stage of rest are generally short and their lumen is narrow. During the period of growth there is an interglandular increase of the *mucosa* into the lumen of the uterus—the lumen of the glands becomes wider; the width of the lumen increases and excretive action is apparent during Heape's Stage III.

During the period of degeneration the nuclei of the glandular epithelium are not changed in the same degree as that of the stroma, "the cells of the glands are the same as before, and the basement membrane is present". When the flow occurs the size of the glands is increased; they become longer from the superficial swelling of the *mucosa*.

In Stage V., the formation of lacunæ, there is no change in the glands; when the lacunæ rupture they are still the same.

At the period of formation of the menstrual clot some of the glands, which remain deeply embedded, seem to be in a condition of activity, but they also usually contain blood and cast-off cells, which have been washed into them through their mouths. The necks of the remaining glands project into the uterine cavity often unsupported by any other tissue.

In "the stage of recuperation" we find "the so-called glands of the uterus are specialised portions of the epithelium which lines the uterus, and the deeper portions remain firmly fixed in the mucosa and are not cast away with the menstrual mucosa. A certain part of the new epithelium has its origin from the torn (superficial) edges of the glands. The glands fold in their walls; it is believed that portions of such glands as are lost in the mucosa menstrualis are replaced by the newly formed surface epithelium, as well as from epithelium which already functions as glandular epithelium."

These observations have been cited at length, as the work done has been directed without any "glandular-nervous theory" of the origin of menstruation to inspire it.

The view that the glands are re-formed from the newly-formed epithelium cannot with our present knowledge be accepted.

One cannot wholly believe the process to be identical in humans and monkeys, inasmuch as the reproductive functions differ in several respects. It is apparent that menstruation is less frequent in and more irregular in monkeys than in humans. It is also probable that the reproductive process is different. *S. Entellus* is believed to breed twice yearly, in April and October, but there is no certainty of this. *M. Rhesus* has one or more definite breeding seasons. It is probable that different varieties breed at different seasons. Cuvier calculated the duration of its uterogestation at seven months. Dr. Aitchison holds that nine or ten months is the usual duration (40).

Accepting the general accuracy of Heape's anatomico-physiological work, we direct attention to his stage "*b*" that of growth. In the stages "*d*" (that of recuperation) and "*a*" (that of rest) the utricular glands have served the purpose of rebuilding the uterine mucosa. These glands have remained practically unaffected; they have been seen to become larger, and later seemed restored to their normal size. But during these stages ("*d*" and "*a*") a general consideration of the various observations referred to shows that glandular increase begins as soon as the tension has been relieved by the flow.

In the period of growth "*b*," which we now consider, there is growth of the stroma, and later increase of the vessels.

What impels the stroma to grow so rapidly that in a few days the phenomena of menstruation occur? Eight days after the beginning of menstruation the regeneration of epithelium is complete; but a further period of three weeks may be required before the uterine process required for menstruation is complete.

It is admitted that the utricular glands are constant in the regularly menstruating woman, and that they undergo distinct changes in size prior to the advent of the flow. The whole mucous membrane of the uterus is practically a cytogenic or glandular-like structure, but it is not a defined and constant structure physiologically like the specialised utricular glands.

Theory of Menstruation.—During this period of growth, or immediately prior to it, the **utricular glands** have increased so that, partly directly, by pressure on the fine terminal nerve filaments and ganglia (?) in the uterine tissue; partly indirectly, by filling up the stroma and pressing on the vascular radicles, possibly also by the influence of some special glandular secretions, they become factors of **peripheral nerve irritation**. This irritation conveyed by the uterine sympathetic reaches the nerve centres in the cord and cerebellum, and discharges of nerve force being directed to the uterus, growth of the stroma and vessels results. These nerve impulses therefore are, if this view is correct, directly the result of increased glandular growth. No doubt periodicity may be, to some extent, regarded as an acquired physiological factor. Further, it is possible that there may be a limited automatic nerve action from the uterine ganglia. Yet these could not be held to determine rhythmical returns of menstruation. The time necessary for the growth of glands to such a size, and probably with such functional activity that they will act as peripheral irritant factors, corresponds to the time during which the uterus is functionally at rest so far as menstruation is concerned. As a result of the efferent nerve impulses, awakened or increased muscular action of the involuntary uterine fibres occurs; this also aids in determining the congestion which results in the breaking down of vessels.

It must not be forgotten that menstruation is not simply a uterine shedding of blood. Professor Stephenson, of Aberdeen (41), whose well-known observations on the "menstrual wave" were based on a careful examination of facts, although his cases were few in number, has shown that continual metabolic changes take place during menstrual life. About a week before the appearance of the menstrual flow, we find the maximum of increased excretion of

urea and carbonic acid, increased temperature, increased pulse rate and vascular tension. A week after menstruation the minimum is reached. As an explanation of the menstrual flow, Stephenson's observations were nullified by the fact that the phenomena referred to were found by him to occur in men as well as in women, and that lower animals also seemed to show the same periodic variations. In a postscript to a reprint of his original paper (42), at page 10, he writes: "It is therefore evident that the phenomena belong not to the function of menstruation but to a general law of vital energy".

But although the "menstrual wave" is only the "vital wave," we shall fail to appreciate the phenomena of menstruation if we do not recognise that there is a recurring disturbance of the nervous system and of the blood glands generally, in consequence of the menstrual process. We shall revert to this again.

Menstruation in the great majority of cases does not occur after impregnation. When uterine hæmorrhage does show itself it is only during the earlier months, before there is close approximation of the decidua, or in consequence of some unusual structural condition—*e.g.*, duplication of the uterus—or as the result of some uterine or embryonal disease. Yet we know that during pregnancy the utricular glands grow enormously. If the theory of menstruation being the result of peripheral irritation from gland increase is correct, why does not hæmorrhage occur more frequently in pregnancy? The explanation is not difficult. The surface of the uterus is greatly strengthened; the decidua of pregnancy and the embryonic membranes and the glandular increase are only part of the hypertrophic process which causes muscular, vascular and nervous growth. Rhythmical uterine contractions occur throughout gestation; these are most marked at the times corresponding with the usual periodic discharges. Peripheral irritation is not arrested, but the altered uterine conditions of pregnancy permit accommodation between the increased glandular growth, the nervous impulses and blood determination. The energy which would have caused menstruation in the non-pregnant woman is now directed to building up the fœtus. After the lapse of a given period, sufficient for the full development of the fœtus, the glands reach their acme of growth and are enormously enlarged. But the fœtus is now mature, and has no further need for the special forces upon which its growth has depended. Reasoning from analogy, it is very probable that the **glandular irritation**, acting on the uterine nerve centres, determines, or **aids** in determining, the **onset of parturition**.

Other pertinent questions will suggest themselves to the clinician. Among many which we shall consider hereafter we may be permitted to refer now to the beneficial effect of curetting the endometrium for metrorrhagia due to endometritis, or for menorrhagia and metrorrhagia arising in connection with uterine fibro-myoma. In these conditions, by removing superfluous and diseased glands we lessen the abnormal sources of nerve irritation which determine extreme vascular congestions; and by so doing we allow the ordinary amount of glandular tissue to act as a due excitor of the regulating menstrual centre. Of course this is not all that is accomplished by the removal of an inflamed endometrium; but it seems to me to scientifically explain the exceedingly favourable results obtained in some cases by curetting.

Furthermore, while cutting off a great part of the blood supply and nerve supply to the uterus, as in the removal of the uterine appendages, generally arrests menstruation, several cases continue to have regular hæmorrhages for a time. Various explanations have been offered. Not the least likely one is, that there is some remaining glandular hypertrophy which determines these appearances.

I will now briefly recapitulate my beliefs as to the originating cause of menstruation:—

I. The regular normal recurrence of the menstrual flow depends on the fact that the female has attained puberty, at which period there is a distinct development of the nervous system and of the glandular system.

II. The utricular glands are specialised glands which undergo modifications of size and functional activity; and by their acting as causes of peripheral uterine irritation cause afferent impulses to be conveyed to the nerve centre regulating menstruation.

III. The sympathetic nerves of the uterus are normally excited by the functional action of the utricular glands and excite the regulating nerve centre. Other influences acting through the nervous system may have the effect of excitors or inhibitors of nerve action.

IV. The nerve centre acting through efferent nerves determines the continued gland growth, the growth of uterine stroma and vessels.

V. The menstrual flow results from the breaking down of the congested uterine capillaries, and the probable shedding of the superficial epithelium.

VI. The glands play the principal part in the regeneration of the uterine mucosa.

VII. The rhythm or regularity of menstruation is due to various influences: (a) Metabolic changes, anabolic of the blood glands, including the endometrium with its utricular glands, followed by katabolic changes for the removal of effete matters; (b) to the periodic enlargement of the uterine glands, which, in accordance with the constitution of the individual, varies in the time required to attain their full functional activity; (c) periodicity and automatic nerve actions probably have some influence.

- (1) *Manuel pratique de Gynécologie*, p. 239, Paris, 1879.
- (2) *Zur Pathologie der Vaginal Portion*, Stuttgart, 1878.
- (3) *Diseases of Women*, Philadelphia, 1894.
- (4) *Archiv f. Gyn.*, 1877, Bd. xi., S. 110 (quoted by Garrigues).
- (5) This is denied by Bland Sutton, v. p. 39.
- (6) "The Menstrual Organ," *Brit. Gynaecol. Journal*, vol. ii., p. 296, June, 1886.
- (7) *British Gynaecological Journal*, vol. vii., No. 27, p. 322, 1891.
- (8) *Obstetrical Journal of Gt. Britain*, vol. ii., p. 686, and vol. iii., p. 496.
- (9) *Archiv f. Gynäk.*, Bd. xi., S. 1091.
- (10) *Amer. Journ. of Obstet.*, vol. viii., p. 30.
- (11) *Brit. Gyn. Journ.*, vol. ii., p. 298.
- (12) *Ibid.*, p. 286.
- (13) *Transact. Royal Society*, vol. 185.
- (14) *Zeitsch. f. Geburt. u. Gyn.*, Bd. vii., S. 84 (1881).
- (15) *Loc. cit.*, p. 136.
- (16) *Archiv f. Gynäk.*, Bd. xiii., S. 1-55, 1878.
- (17) *Loc. cit.*, S. 101, 112, and 119.
- (18) General bibliography at beginning of chapter.
- (19) *Zeit. f. Geb. u. Gyn.*, Bd. vii., p. 102.
- (20) *Transact. London Obstet. Soc.*, vol. xxxii., p. 66.
- (21) *Ibid.*, vol. xxxiii., p. 191.
- (22) *Elements of Physiology*, p. 267.
- (23) *Stricker's Med. Jahrbuch*, 1873, S. 135, 177, and Translation in *Amer. Journ. Obstet.*, *loc. cit.*
- (24) *Transact. Lond. Obstet. Soc.*, vol. xxiv., p. 138.
- (25) Johnstone, *The Menstrual Organ*, *loc. cit.*
- (26) The italics are mine, not Johnstone's.
- (27) *British Gynaecological Journal*, vol. ii., p. 285, June, 1886. Sutton's view was probably influenced to some extent by Williams' papers, which were then considered important.
- (28) The italics are mine.
- (29) *Journal of Morphology*, vol. ii., No. 3, p. 413.
- (30) "Studien über die Uterusschleimhaut," etc., *Arch. f. Gyn.*, Bd. xi. and xii.
- (31) *Handbuch der Gewebelehre*, p. 562 (5te Aufl.), Leipzig, 1863.
- (32) "Die pseudo-menstruierende mucosa uteri nach akuter Phosphorvergiftung," *Archiv f. Mikr. Anat.*, xxv., 191-235, 1885.
- (33) *Ibid.* (29), p. 431.
- (34) *Philosophical Trans. Royal Society* (vol. clxxxv. (1894), B., pp. 411, 471).
- (35) Nerve impulse after stroma and gland growth.
- (36) *Provincial Medical Journal*, p. 7, Jan., 1895.
- (37) *Amer. Journal of Obstetrics*, vol. viii.
- (38) *Journal of Morphology*, vol. ii., 1889.

(39) *Archiv f. Gynäkologie*, Bd. xi. and xii., 1877.

(40) Heape, *loc. cit.* V. (34) *supra*.

(41) *American Journal of Obstetrics and Dis. of Women*, vol. xv., No. 2, April, 1882. Also refer to *The Cyclical Theory of Menstruation*, by Dr. Goodman; *Ibid.*, October, 1878; and *The Question of Rest for Women during Menstruation*, by Dr. Mary P. Jacobi (London, Smith, Elder, 1878).

(42) May, 1882. New York: Wm. Wood.

CHAPTER III.

PHYSIOLOGICAL CONSIDERATIONS.

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(For other references see end of chapter.)

A GENERAL consideration of the physiology of menstruation requires mention of much that is now usually accepted as indisputable. These topics are only referred to in this and the following chapter so that what follows may be rendered more clear without constant contrasts being made between physiological and pathological conditions. Other matters here dealt with are less commonly appreciated. I know of no text-book which treats these subjects with sufficient fulness, and have, therefore, considered it advisable to attempt to do so.

At the beginning of the process the appearance of the flow is not

uncommonly preceded by considerable constitutional disturbance. It is manifest to the most casual observer that this, the entrance of the child into early womanhood, is a complex process. It is not simply that there is a changing of the figure from the lankiness, or it may be the chubbiness, of childhood to the lissomness of maidenhood with its budding charms. There is increased rapidity of blood formation, and of general growth, especially glandular growth; but most particularly there is noticeable alteration of the nervous system.

Every mother can recall the inertness, the lassitude, the vague little nervousness or irritability which are so common in girls just before the establishment of menstruation. This nervous disturbance is, indeed, by no means dissimilar to a slight manifestation of the condition found during the termination of menstrual life. "There is," writes Christopher Martin, "a remarkable transformation in the psychical, emotional, and mental life of the girl. The current of her thoughts is mysteriously changed. Hopes and yearnings unknown before thrill and agitate her, and life acquires a new and deeper meaning. These profound and subtle changes are not so difficult to understand if we accept the view that puberty means the sudden bursting into activity in the midst of the nervous system of a hitherto dormant centre" (1).

Now, it may be that the spontaneous liberation of a menstrual centre at puberty would of itself determine many of these changes, but when we come to consider the other end of the menstrual process, the cessation of menstruation will demand some further explanation. Besides, we find all through menstrual life a less or greater periodic disturbance of the nervous system recurring at each menstrual epoch. From what I have previously written, it will be apparent that this cyclical condition depends on the local peripheral uterine irritation evoked by the conditions of the uterus. Fresh nerve centres are not developed every month, but fresh gland growth sufficient to cause sympathetic nerve irritation takes place with regularity. At puberty it is found that mammary development is practically always contemporaneous with the periodic establishment of menstruation. The examination of the uterine mucosa in young girls at puberty demonstrates the full development of the utricular glands. The constitutional symptoms are present, and often very troublesome before the flow, but after its appearance there is distinct relief of tension and amelioration of the abnormal irritations of the nervous and vascular systems.

Even in the lower animals, in which the process is not quite analogous, one finds that the manifestation of sexual activities is

attended with peculiar "nervous" conditions. Every one who has driven a mare during her period of rut or "horsing" must know that it is most unusual to find that the animal's disposition is unaltered during this time. She may become dull and apathetic, or cross and uncertain in temper. This recurs every three weeks, or sometimes at longer or shorter intervals, during the spring especially. Mares vary in their regularity of "coming into season," some continuing longer, some a shorter time, than three months every year. The same observation applies to dogs and cats.

In the human the **menstrual flow recurs** about every twenty-eight days; in some the interval is shorter, in others longer; thus we speak of a twenty-eight days' type and of a twenty-one days' type. Exceptionally, menstruation may recur without appreciable disease every fourteen days. In others recurrence only takes place every six weeks. Auvard (2) has analysed 250 cases, from which he derives the following observations:—

Menstruation occurred every 30 or 31 days in 50 per cent.
„ every 28 days in 14 per cent.
„ irregularly in 26 per cent.
„ uncertainly in 10 per cent.

The **duration of the flow** averages four days. There is, however, considerable variation, some women being only two days, others more than a week, "unwell". Auvard's cases afforded the undernoted facts:—

Duration of flow, 3 to 6 days inclusive, 71 per cent.
„ less than 3 days, 12 per cent.
„ more than 6 days, 11 per cent.
„ variable, 6 per cent.

In the last line is comprised those who menstruated as long as two, as long as four, or six days, etc.

Other observers have drawn somewhat different conclusions. Summarising various opinions, Hart and Barbour (3) write: "When once established it recurs with great regularity every 28 days in 71 per cent., every 30 days in 14 per cent., every 21 days in 12 per cent., or every 27 days in 11 per cent. It lasts for a number of days, varying from 2 to 8. If below 2 or above 8, it is abnormal.

The **amount of blood lost** at each period is somewhat variable. Some authorities mention four to five ounces as the average amount; from three to eight ounces is more correct. Normally menstrual blood is liquid, and does not coagulate either in the genital canal or when passed. This non-coagulation is due to admixture of the

blood with mucous secretions. But clotting occurs, both in the uterus and of the voided discharge, when from any cause there is excessive menstrual blood; presumably the mucous secretions are in these cases insufficient to prevent coagulation. Therefore, the appearance of clots may signify nothing more than a superabundant secretion of blood; on the other hand, clots are one of the indications of pathological conditions.

Menstruation usually **begins** in England from about the thirteenth to the fifteenth year. It may be as early as ten or eleven years of age. I have known one case at nine, one at ten, two or three at eleven, and many at twelve and thirteen. Some girls do not begin to menstruate until they are seventeen, eighteen, or nineteen years old.

The statistics of Roberton (4) gave the mean age of puberty at 15·2 years. Of 450 cases:—

10 menstruated for the first time at 11 years of age.

19	"	"	12	"
53	"	"	13	"
85	"	"	14	"
97	"	"	15	"
76	"	"	16	"
57	"	"	17	"
26	"	"	18	"
23	"	"	19	"
4	"	"	20	"

Whitehead (5) gave the following figures, founded on statements of 4000 women in Manchester:—

9 menstruated first at 10 years of age.

26	"	11	"
136	"	12	"
332	"	13	"
638	"	14	"
761	"	15	"
967	"	16	"
499	"	17	"
393	"	18	"
148	"	19	"
71	"	20	"
9	"	21	"
6	"	22	"
2	"	23	"
1	"	24	"
1	"	25	"
1	"	26	"

It must be remembered that a considerable proportion of these cases were of the class of factory operatives, a grade of society not well cared for fifty years ago, and presumably of low vitality.

In a total of 2330 girls in America, Dr. T. A. Emmet (6) found the average age of the first menstruation to be 14'23. Raciborski (7) believed that the mean age of puberty in Paris was 14 $\frac{7}{12}$. Brierre de Boismont (8) found that among the upper classes in Paris puberty occurred at 13 $\frac{8}{12}$; among the poorer classes at 14 $\frac{10}{12}$.

The influence of climate in determining the early advent of puberty is more apparent than real. In warm climates, such as India, menstruation may be established at eight and nine years of age, but from ten to eleven seems more usual.

Race is more important in determining the age of puberty.

It has been known for many years that children born in India of European parents do not attain puberty at so early an age as children of native parents. A recent pamphlet of Professor Joubert's, of Calcutta, on *The Supposed Influence of Tropical Climate on Menstruation* (9), supports the opinion just expressed. Joubert finds that of 3194 girls, of whom 179 were Europeans, 387 Europeans, country-born; 795 Eurasians, 1752 natives, 73 Jewesses, and 8 Chinese, menstruation occurred between 10 and 11 years of age in 2'7 per cent. of Europeans; in 0'7 of Europeans, country-born; in the same proportion of Eurasians; in 2 per cent. of natives. Between 11 and 12, the Europeans give 6'1 per cent.; the country-born Europeans, 3'6 per cent.; the Eurasians, 6'2 per cent.; the natives, 10'4 per cent. Between 12 and 13, the percentages are for Europeans, 13'4; for country-born Europeans, 10'8; Eurasians, 22; natives, 36. And between 13 and 14 years of age, 23'4 per cent. of Europeans, 25'8 per cent. of country-born Europeans, 31'8 per cent. of Eurasians, and 29'3 per cent. of natives attained puberty.

Joubert believes that the differences of social customs in the natives of India are important influences in causing earlier puberty. He mentions the absolute want of privacy in the inner mode of life of an Indian native household. Undue sexual precocity results. The marriage customs, in accordance with which a child is married at ten years of age, and is subjected to considerable sexual excitement, if not actual coitus, are presumable causes of early puberty. With reference to the effect of sexual intercourse previous to menstruation, Dr. Joubert relates the following facts on the authority of Dr. Jagendra Nath Ghose. In forty cases, the first menses appeared in the tenth year in two; in the eleventh in more than half; in the twelfth in rather less than half; and in the thirteenth year in only one case.

Station in life and special occupations are of some influence. Houzel, who records the menstrual life-histories of 123 French

fisherwomen, finds that the average age of puberty was $13\frac{1}{2}$ years (10).

The variations due to race, etc., can be well realised by reference to Grösdeff's statistics (11). Among 10,000 women in Russia, the average age of puberty all over Russia was 15.75 years; in the rich classes, the age was 14.87; in the middle classes, 15.33; and in the poorest peasants, 16.15.

As extreme examples, he found menstruation established at nine in one case, at ten in four, at eleven in thirty-one, and in 244 cases at twelve years of age.

Delayed puberty was observed in several. In three cases the first menstruation was at twenty-one, and in one case at thirty-two years of age.

As to race—in girls of Teutonic race, the mean age of puberty was 15.14; in those of Polish race, 15.40; in Russians, 15.75; Ethiopians and Lapps, 16.19; in true Finns, 16.27.

"Precocious" Menstruation is the term applied to indicate menstruation occurring in very young children. Infants, within a few days, or even hours, after their birth, have been subjects of a pseudo-menstruation. These cases are probably less rare than is generally believed. Within recent years two examples have occurred in my own private practice. Delivery on 15th March, 1891, was instrumental; the mother was a small primipara, and the labour was one of more than average difficulty. The infant had a cephal-hæmatoma on the left parietal bone extending from behind the anterior fontanelle to a point on a level with the posterior fontanelle. There was a smaller rounded swelling of the same nature on the right parietal bone just behind the coronal suture. The child was vigorous and lively. On 20th March, when five days old, she had a dark reddish grumous vaginal discharge. The mammae were swollen and secreted milk. The discharge continued during 21st; became bright after an aperient on 22nd March; afterwards it assumed the former appearance; there was no discharge on 23rd, but a little recurred on the 25th. On the 26th, the vaginal discharge had quite ceased, and the milk was disappearing from the breasts. I regret I have been unable to obtain the subsequent history.

Another example occurred in December, 1895. This child, also the offspring of a primipara, was delivered by forceps. There was slight pelvic contraction in the mother, but there was no injury to the child's head, no cephal-hæmatoma. On 4th December, when the infant was three days old, the nurse observed a menstrual-like vaginal discharge; the flow continued four days. The breasts

were considerably enlarged, and secreted milk. In neither case was there any abnormal appearance of the genitals. C. J. Cullingworth (12) collected a series of thirty-two cases some years ago.

Many of these cases are of very ancient date. Twenty have been tabulated by Cullingworth as having been recorded during this century (1819 to 1875). Two days was the earliest date of the first appearance, six weeks the latest. The duration varied from three to six days; except in one (case 15), in which the flow persisted ten days, and in another (case 32) eleven days: in the former the pudenda, clitoris and nymphæ were enlarged and prominent; no mention is made of abnormalities in the latter. Recurrence of vaginal discharge was "regular at periods of three weeks and two or three days until death at age of four years" in case 20; in case 21 "there was an appearance every one, two, or three months, to the age of four, then menstruated regularly"; the child was "seven years of age, a fine healthy girl," at time of writing. In case 24 menstruation first appeared at six weeks, and is recorded to have recurred monthly.

In twelve instances there was no recurrence, and in four others no recurrence is mentioned, and one instance was published before the child was a month old. The earlier cases include one case of alleged monthly recurrence up to the twelfth year (Bohnius, 1686).

Other instances may doubtless be found in the literature of the past fifteen years (13), but the condition is sufficiently rare to have no notice given to it in such works as either the 1891 or 1895 editions of Neale's *Digest* (14).

Camerer thought that these hæmorrhages might be explained by the ligation of the umbilical cord being made while the vessels were still pulsating, and the pulmonary circulation consequently not thoroughly established. The blood would be driven down into the pelvis, and owing to the circulation not being established, local pelvic plethora would result. The blood being in the pelvis in abnormal quantity, would seek an outlet, which in the female was furnished by the escape of a certain quantity from the genitals. In males the hæmorrhage took place from the bowels. It seems that male infants are more subject to melæna than females, and that these discharges occur in males shortly after birth. Of twenty cases recorded by Rilliet and Barthez (15), nine had bleeding within thirty hours. Of the thirty-two female infants, only two had vaginal discharge before the second day; seven cases commenced on the fourth day, five on the fifth, and four on the third. The theory of Camerer therefore hardly explains the majority of the cases; for in girls the hæmorrhage is later; and in the cases,

three in number, where the flow did not commence till the children were two, three and six weeks old, the tying of the cord and pelvic local blood congestion therefrom could have had no influence. Nor can we accept the explanation of Camerer in those cases in which there was a recurrence of the hæmorrhage at regular intervals, lasting over several years.

Another class of early or premature (one might properly name them also "precocious") menstrual cases is attended with the concurrent signs of puberty. The following is an illustrative example. G. E. Rein (16) showed at the Kieff Obstetrical and Gynæcological Society a girl, aged six, who had commenced to menstruate regularly about a twelvemonth previously. The catamenia recurred every three or four weeks, and lasted on each occasion from four to ten days. The breasts, external genitals and pubic hair-growth resembled those of a girl thirteen or fourteen years old. The abdomen proved to be considerably enlarged, the circumference amounting to 85 centimetres. The examination revealed the presence of a fluctuating thick-walled ovarian cyst.

Precocious Fecundity is exemplified by the following: A correspondent, in a recent number of the *New York Medical Record*, (16, xi., 1895), records the case of a young child, who was born on 15th July, 1885, and gave birth to a female infant on 10th September, 1895. The child-mother was thus only ten years and nearly two months old. The girl had none of the developmental features of a woman; for example, the mammæ were undeveloped, and there was no secretion of milk. She had menstruated regularly since she was five years of age. The labour was a short and uneventful one, and the infant, well formed, weighed at birth five pounds. It lived for about a week, during which time it was nursed by its grandmother, who had a child only a few months old. The child-mother made a good recovery, and has since played about with her companions as if nothing remarkable had happened.

In such a case the abnormal development of glandular structures may justifiably be held to have determined the beginning of menstruation. Other premature cases of menstrual flow are unattended with any discoverable lesion, and "Heredity" has been assigned as the cause.

Another interesting clinical observation has been made by Fischel (17), who has shown that in the child at birth pseudo-erosions of the *os tincae* are occasionally found, due to the fact that at the level of the *os externum* the epithelium is then cylindrical over a certain zone to the outer side. Later, this epithelium becomes covered with layers of pavement epithelium; but should these be

thrown off from any cause, the original condition re-appears. In that way a very curious congenital predisposition to erosions would be created. If in addition to this we recollect the fact that considerable development of glands is found in the cervix of some newly-born infants, and exceptionally also in the corpus uteri (instances of which have been cited by Wyder, Wheaton and others, as we have mentioned in the preceding chapter, and have also figured, plates i. and ii.), it is not difficult to understand that hæmorrhage from the vagina at birth may occur in a certain proportion of cases.

If there exists a congenital glandular erosion of the cervix, the extra blood pressure, as suggested by Camerer, from the disturbance of the circulation due to ligation of the cord and consequent pelvic vascular stasis would readily cause escape of blood from the weakest point of resistance. If there should be abnormal development of the utricular glands, it is not difficult to comprehend that there would be a raising up of the endometrium, and a similar escape of blood from the vessels of the uterus itself. In the rare instances in which a menstrual recurrence happens in infants, without the concurrent signs of puberty, one must look upon the flow as due rather to a pseudo-menstruation, a metrostaxis which may be attributed to the abnormal growth of the utricular glands. In the other cases in which there is actually a premature puberty, we must hold that the menstrual nerve centres have been called into activity by abnormal glandular increase causing peripheral nerve irritation.

In the majority of infantile or very early cases we must attribute "precocious menstruation" to congenital cervical erosions with which is associated a general tendency to capillary hæmorrhages.

Urethrocele is also a cause for hæmorrhages resembling menstruation during early life. Broca, in February, 1896, examined a girl, aged six, who had the appearance of a discharge of blood at the vulva for three days. It was naturally taken for menstruation. The child had been kept in bed for a fortnight on account of severe bronchitis, with violent coughing. On the day that she got up for the first time the bleeding began. On examination of the parts, a little red protuberance at the meatus, caused by prolapse of the urethral mucous membrane, was noted. Broca directed that the everted mucosa should be touched with a two per cent. solution of nitrate of silver. The bleeding ceased permanently after the first application. At the end of three days the cure was complete.

We cannot hold that the growth of an ovarian cyst of itself will determine uterine hæmorrhages. Many cases of ovariectomy on young children and girls before puberty are on record in whom there was no molimen, or appearance of vaginal hæmorrhage; and,

conversely, many cases of premature menstruation have been observed with which no ovarian disease was associated, and in which it could only be said that the sexual characteristics became established before adolescence was reached.

Absence of menstruation or true amenorrhœa must be distinguished from what is known clinically as amenorrhœa in the conventional sense. True amenorrhœa is the condition in which menstruation does not occur, although the individual has reached the full age of puberty. There may or may not be signs of impending menstruation from time to time. Amenorrhœa, in the conventional sense, *i.e.*, acquired amenorrhœa, signifies suppression of menstruation which has occurred previously. It may be due to imperfect sexual development, as at the beginning of puberty; physiological conditions, such as pregnancy or the menopause; constitutional states, such as anæmia, chlorosis, phthisis; individual hygienic conditions, *e.g.*, change of climate and habits, over-study, over-work, anxiety, improper or insufficient food; or to local affections of the uterus or ovaries, *e.g.*, superinvolution or simple uterine atrophy, ovarian cystic disease, inflammations of the endometrium and ovaries involving glandular destruction, etc. Section of the uterine nerves may cause acquired amenorrhœa.

Absence of menstruation, or true or congenital amenorrhœa, is not a very common condition. It depends on absence, or imperfect development of the uterus or adnexa; atresia of the genital canal into which menstrual blood may be poured, but from which, owing to the local state of parts, it cannot be excreted; and it may also be due to a condition of cretinism, in which there is general lack of normal nervous and glandular development.

An illustration of the first-mentioned cause is afforded by the following cases: One young lady, aged twenty-two, had never menstruated. The mammæ were undeveloped, but the pubic hair was present. Examination under an anæsthetic showed the uterus to be infantile; no ovaries were felt. No treatment was advised.

A good many years ago I had under my care a young married woman, aged twenty-four, who had never menstruated. Her womb was imperfectly developed. She had previously been under the treatment of Professor A. R. Simpson of Edinburgh. On examination it was found that she was of good physical development with a well-formed figure. Her sexual instincts were said to be fully present. An examination of the pelvic organs discovered the certain existence of one small ovary, and the possible existence of the other; the womb was infantile in size, being in all one and a half inches in length; the vagina was normal. As the result of treatment she menstruated

once, or at any rate had a uterine discharge in some way resembling menstrual fluid. But she would not persevere with the treatment suggested, and her menstrual period never reappeared.

Absence of menstruation may be due to congenital closure or imperfect formation of the vagina. In these cases of atresia the onset of menstrual symptoms is generally rather late. Operative interference is often required. If an imperforate hymen or a closed vagina is opened up with antiseptic care, the danger of operation is slight. In some rare cases it has been found necessary to remove the tubes and ovaries to prevent the menstrual flow accumulating within the uterus, from which it could not escape, owing to the entire absence of a vagina. One case which I saw in the practice of a colleague had been operated upon by this surgeon twice with the object of forming a vagina; on each occasion the attempt proved futile. He therefore opened the abdomen and removed the uterine appendages. Only very grave symptoms of local and constitutional distress would of course justify such a proceeding.

I cite two cases from my own practice: (1) illustrative of closure of the vagina from imperforate hymen; and (2) absence of the vagina. Both suffered from symptoms of catamenial distress; neither had ever menstruated; both were much benefited by operation.

Laura P., aged nineteen, single, a healthy-looking girl, admitted 19th October, 1892. History: Has never menstruated, and felt no inconvenience until six weeks ago, when she suffered greatly from a feeling of pelvic fulness and pressure, and from acute pains in the loins, in the back, and in the lower abdomen. The bowels were regular; she had no bladder trouble. There had been no bleeding from the nose, gums, stomach, lungs, or elsewhere, nothing which might be regarded as so-called "vicarious menstruation".

20th October, examined: Heart and lungs found normal and healthy. Vaginal examination: Hymen complete; is thick, but does not feel hard; no bulging, no undue sensitiveness. By combined rectal and abdominal examination a small uterus with the cervix high up was felt, and also a small ovary. Under ether I incised and in part dissected out the thickened hymen—a well-developed vagina was found. The cervix uteri was fairly developed; the uterus was in normal position, and measured two inches. Two days after the operation the menstrual discharge began, and continued for two days. She went home well on 2nd November.

In other cases of *atresia hymenalis*, a large accumulation of blood is found in the vagina (*hæmato-colpos*) or in the uterus and

vagina (*hæmato-metra* with *hæmato-colpos*). Degenerative changes take place in rare instances when *pyocolpos* and *pyometra*, that is, purulent fluids, are found in the vagina and uterus. The purulent changes are commoner in cases of acquired atresia, which sometimes happens after severe inflammations of the vagina following obstetric operations. Old women may develop pyometra from senile changes causing closure of the cervix or os uteri. In young women, if effusion of fluid into the Fallopian tubes has occurred, the fluid may be either blood or pus. If the effusion could be certainly diagnosed as purulent, the ovaries and tubes should be removed before, or at the same time as, the contained fluid is evacuated from the vagina and uterus. If, however, there is only blood (*hæmato-salpinx*) present, although some authorities advise removal of the tubes by laparotomy before opening the vagina, I doubt if this is always advisable. My own practice teaches me to treat such cases tentatively; most cases of *hæmato-salpinx* due to this condition will become well spontaneously.

The former plan of puncturing the vagina through the rectum as practised by Oldham, West, and others for vaginal and hymeneal atresia is to be strongly condemned. Nor do I believe that the more recent method of evacuating the fluid contained behind an imperforate hymen by a trocar and slow drainage is likely to be attended with such good results as a more surgical and thoroughly antiseptic operation. If the hymen is removed it is advisable to stitch the edges of the raw surfaces. The uterus should be douched with a hot alkaline solution, which dissolves the thickened blood, and then an antiseptic douche should be given.

The other case, which was one of vaginal malformation, presents several differences. Annie M., aged twenty, had never menstruated, but had latterly had symptoms like those of impending menstruation. Admitted to hospital, 31st October, 1892.

Examined same day. Heart showed a systolic anæmic bruit at the base. Lungs normal. The anterior superior iliac spines were six and a half inches apart. The external genitals were normal, the pubic hair well grown. The vaginal opening only extended inwards for about three-quarters of an inch. By the rectum a thickened line was felt running in the direction of the normal situation of the vagina. Neither uterus nor uterine appendages could be clearly defined. The rigidity of the parts made the examination difficult.

Ether having been administered, the membrane lining the sulcus was incised; posterior to this a vaginal narrow ridge was found which with considerable trouble, partly by dissection, partly by

tearing of its adherent surfaces, was opened up, forming a narrow canal of about two inches in depth. One could not then fully expose the neck of the uterus. Small ovaries were felt on either side of the uterus. After opening up the new canal a Sims' glass vaginal rest was introduced. On 2nd Nov. this glass rest was removed; but re-introduced on the 4th. The temperature and pulse remained normal till 5th Nov., when the temperature reached 100°. On the 8th a larger glass dilator was introduced. On the 12th some freshly formed adhesions in the upper part of the canal were separated by the finger and a still larger dilator placed in the vagina. On 21st Nov. the uterine sound was passed through an ill-developed cervix. The uterus was small and acutely anteflexed; it measured one inch and an eighth. The anterior vaginal wall was one and three-quarters to two inches, the posterior wall two and a half inches in length.

She continued to wear the glass vaginal dilators. On 10th Dec. she was examined. The vagina freely admits one finger, its surface feels smooth all over, except one small patch to the right side of the *os uteri*. The *os* can be felt distinctly. A small uterus can now be readily differentiated by bimanual examination. The patient went home feeling well on 13th Dec.

In such cases no precise rules can be laid down (18).

The subject of surgical interference or non-interference must always depend on the presence or absence of symptoms.

The present feeling seems to be that when there is entire absence of the vagina, removal of the uterus and appendages, should these be well developed, is likely to give better results than attempts at forming, or in certain cases restoring, the vagina; for such efforts often result in the formation of little more than a fistulous tract. I would not, however, counsel removal of the uterus itself unless there was some special reason. Removal of the appendages low down and close to the uterus, with ligation of the vessels and nerves as deeply in the broad ligament as possible, will probably in most instances arrest the molimina.

Besides, every case of atresia vaginæ met with at puberty must not be regarded as congenital. Acquired atresia results as the sequela of measles, small-pox, or diphtheria in childhood. In these cases surgical intervention may often prove successful.

We must carefully consider not only the individual operative necessities of a case we have examined; but also previously determine the question whether an examination is really necessary. If the symptoms complained of are apparently slight in character, before proceeding to a vaginal examination in a young unmarried

woman, we should try to treat her general condition. If the symptoms are those of anæmia, constipation, indigestion, emotional excitement, or neurasthenia, appropriate medical treatment may suffice. Should the symptoms not improve, a local pelvic examination is then demanded.

If, however, the symptoms seem from the first to indicate congenital deformity or acquired local organic disease, there need be no hesitation in making an examination. In many cases I find a recto-abdominal bimanual examination gives even better scope for exploring the pelvic organs than a vagino-abdominal bimanual. In young children and in sensitive virgins this method should be preferred. When we have to determine the nature and situation of an atresia in a young virgin, an anæsthetic should be given. In one of my cases the imperforate hymen was so distended and thinned out that a simple digital examination caused it to rupture and a large quantity of dark altered blood escaped.

One possible source of error in diagnosis may be mentioned. Should the hymen be very thick and its orifice small, with the vagina only imperfectly developed, and the uterus small and high in the pelvis, there will be difficulty in reaching the os and cervix; now if a pyriform or rounded semi-elastic swelling be felt rising up into the abdomen from the pelvis, and if there is a history of absence of menstruation, a diagnosis of retained menses filling the closed uterus might be made, whereas the tumour might prove to be a cyst of the ovary or a dermoid. Examine the hymen visually, pass in a fine probe through it into the cervix and into the uterus, and the diagnosis will be established.

We must not risk the consequences of delaying our interference too long. If a case of retention of menses from atresia is not treated as soon as it is diagnosed, we may have effusion of altered and infective blood through the fimbriated end of the tube, or rupture of the Fallopian tube, or rupture of the uterus. It is by no means improbable that many cases which have been recorded as developing septicæmia after the evacuation of retained menses from the vagina were septic on account of pre-operation pelvic effusions.

Retarded or **delayed** puberty may depend on constitutional dyscrasias, such as chlorosis, tuberculosis, or plethora, or be due to some congenital uterine condition which, while insufficient to produce absence of menstruation, postpones its appearance. Several instances might be quoted in which the first menstrual appearance took place as late as the twentieth or twenty-first year.

Some girls never menstruate until after marriage, even although they have reached their twenty-fifth year; others do not menstruate

until after child-birth. In many of these cases, menstruation may be regular after it has once become established. It would be easy to understand the rationale of these cases if one could invariably associate them with imperfect ovaries or infantile uteri, but this is not so. Some fine, handsome, well-formed girls, with normal genitalia, have a late establishment of menstruation. It is not unlikely that "the new woman," who is ambitious of vying with man as a brain-worker, will evolve a race of girls who may prove that active brain-work about the time of puberty is likely to delay the normal beginning of menstruation.

Medical literature contains many instances of women who have given birth to several children without ever having menstruated.

If there should be no discoverable cause for delayed menstruation, and if the health does not seem affected, the exercise of a little patience and changing the environment of the girl may prove sufficient. In married women who bear children without any prior or subsequent menstrual appearance, nothing is to be gained by trying to provoke the flow, unless there should be some local uterine condition demanding interference.

Congenital absence of the ovaries will always be associated with absolute amenorrhœa. This does not, however, prove that menstruation is due to ovulation. For artificial removal of the ovaries does not always cause arrest of menstruation. Absence of the uterus is also, naturally, a cause of absolute amenorrhœa. So-called "vicarious menstruation," which I shall refer to later, is not menstruation, and if it does occur, may be looked on as due to other—to pathological—causes.

It is the imperfectly formed uterus and ovaries that afford us the principal local causes of retarded menstruation. In some examples we find evidence of a normal uterus, one normal or even a slightly enlarged ovary, but that the second ovary is very small, or that it cannot be felt. Now, in such a case, it is not the imperfection in size or absence of one ovary to which we attribute retarded puberty; for we know from clinical experience that one ovary, nay, even a little bit of an ovary, will not only suffice for ovulation and permit menstruation, but also that pregnancy may follow coition.

The sort of patient we often see corresponds in her condition and history with the following: Miss R., aged twenty-three, began to menstruate at seventeen; at first the periods were only present every four or five months, occasionally they recurred every six weeks, but the appearance was always uncertain. After attaining her twenty-first year the periods became more regular; during the

past year she, in all, menstruated ten times. She always suffered intense pain, especially the day before the flow and the first day. She now complains of almost constant dragging pain in the left iliac region, which becomes acute before the period and continues severe several days after its completion. As to the degree of pain at the period, her mother states that the girl's sufferings are greater than those of many women in childbed. Two years ago she was very anæmic. In appearance she is tall and well-formed, but her complexion is pale and waxy, her pulse is feeble. She is troubled with dyspepsia and constipation, is always tired and unfit to do anything; of late she has been much more nervous. Recently the quantity lost at the periods is considerably increased; she has to wear about sixteen diapers; the flow has also continued for eight days. Her doctor told me he had treated her with Bland's pills and general tonic and analgesic remedies as required. An examination showed the uterus to be in a somewhat exaggerated position of anteflexion and that it was hardened anteriorly. It was a smallish, "comma-shaped" uterus. The left ovary was slightly enlarged, but not tender; I could not feel the right ovary. On adjusting the curve of the sound it could be passed, through the small os and narrow cervix, almost a normal distance. In this case, dysmenorrhœa had supervened on amenorrhœa; the imperfect uterus had contracted some endometritic congestion, and the dysmenorrhœa and menorrhagia were due partly to this, partly to ovarian causes. I have not referred to this case on account of any special clinical interest, or from its being unusual, but because it clearly illustrates how congenital imperfection results in physiological imperfection, and that this is eventually succeeded by pathological conditions.

I have said something of "ovarian causes," I shall revert to this again.

Meantime I would direct attention to another important class of cases, *viz.*: That of young women who have retained their virginity until twenty-eight or thirty years of age, and then develop various neurotic symptoms. I have seen a considerable number of these, and on referring to my private note-books find that, in the majority, there was some congenital uterine imperfection, such as conical cervix with pinhole os, etc. The past histories of these ladies nearly all record irregularity and scantiness of menstruation, which in some instances became altered as a consequence of supervening inflammations, and was succeeded by much pain and increased losses. In some of the cases erotism had become a prominent feature; and in others the nervous condition was melancholic. It

might be cynical to state the inference, but, as a physician, one cannot help regretting that it is impossible to speculate on how far the uterine condition influenced the menstrual history, and the continued content with spinsterhood up to thirty, and then the full maturity of the nervous system, striving to arouse the essential womanhood, revenged itself by irregular discharges of nerve force, or by actual organic changes.

It is beyond the aim of this book to fully discuss the disorders of menstruation. Modern gynæcological text-books must be referred to for this, and the adequate treatment; so that I shall not now say anything of dysmenorrhœa, menorrhagia, or metrorrhagia. Nor is it necessary that at present I should dwell on the relations of blood dyscrasias or constitutional diatheses to menstruation.

This, however, seems to me to be the proper place to remark on certain broad physiological and clinical facts which relate to the menstrual process during maturity, and which serve to introduce the more exhaustive considerations about to be submitted with respect to the menopause or cessation of the flow.

The age at which puberty is attained and the absence of marked pain during the early years of menstruation in some degree determine the number of years the periods will continue, and unless morbid influences arise incidentally, the genital well-being of the woman. But, even with a large number of facts and figures to guide us, we can only arrive at an approximation of the true deductions.

Differences of race, of climate, of social custom, of general hygiene, of individual environment, all require to be estimated; manifestly this is only to some extent a practicable task.

Girls who arrive at puberty early, but not prematurely, say at twelve or thirteen years of age, will continue to menstruate over a longer period of years, both relative and actual, than those who do not have the first menstruation until they attain eighteen or nineteen—in the former the menopause may not be reached before forty-eight or fifty; in the latter, forty-three to forty-five will be more usual. Women who have remained virginal, unless they develop some uterine disease (and the tendency to uterine neoplasms is, if not greater, at least as great as in married women), do not continue to menstruate so long as those who have given birth to children.

Women who have not nursed their children have a shorter menstrual life than those who have fulfilled every function of maternity. The artificial existence led by fashionable women, the inexorable demands of society, late hours, excitements, not always of the healthiest kind, and such like influences perhaps more than justify the desirability of such women not nursing their offspring. Mothers

who wish to nurse their babies, but who, from individual physical causes, are unable to do so, are usually physiologically deficient. In all such, as one would expect, menstruation is shorter.

There are many popular beliefs regarding lactation and menstruation which both ancient and modern medical observations do not support. Women believe that impregnation cannot take place before menstruation, and that during lactation impregnation is very rare. Hippocrates knew better; but without going quite so far back we may cite Fabricius Hildanus, who in his *Opera Observationum omnia* (1646) speaks of a woman who became pregnant and was delivered seven times without any appearance of menstruation. These cases might be quoted by the score if not by the hundred; Roderic de Castro, Vieussens, Roussel, Baudelocque, Aran, Négrier, Courty, and many modern writers have recorded instances. I have had a patient who married at twenty-two, had only menstruated once before marriage and once after it, then became pregnant, nursed her child, while nursing became pregnant again, nursed the second child a short time, had a period, ceased nursing, again conceived, and bore her third child within thirty-four months of the first, and although she nursed this child again fell pregnant without any menstrual appearance, and was again able to nurse her baby.

Gendrin in 1839 pointed out the bad effects on the mother if she continued to nurse her infant during regular menstruation or during pregnancy. Raciborski in his work *Du rôle de la Menstruation* (1860), and later in his *Traité de la Menstruation*, has devoted much attention to the subject. He deduces the following: That the milk of menstruating women does not differ sensibly from that of non-menstruating nurses. The milk seems somewhat poorer in quality during the flow than during the inter-menstrual periods. The continuance of the periods does not seem to affect the child. He thinks nurses who menstruate are quite as able to nourish the children as those who do not. He warns the woman against the nervous and excitable symptoms which "generally" accompany menstruation. Finally, he states that since 1851 (he is writing in 1868) his acquired experience only strengthens these views.

As the result of observations on several hundred cases, Dr. Remfry (20) concluded that of nursing women 57 per cent. only have absolute amenorrhœa; 43 per cent. menstruate more or less, but 20 per cent. have absolute regularity; impregnation does not take place so readily during lactation as at other times; but this is not true to such an extent as has been imagined; if absolute amenorrhœa is present during lactation the chances of impregnation

are about 6 per cent. ; if menstruation occurs during lactation the chances are 60 per cent. ; the more regular a woman is during lactation the more likely she is to become pregnant.

Professor Japp Sinclair concludes that :—

(1) Lactation tends to prevent conception by its influence on the ovaries in retarding their return to the state in which ovulation is perfect.

(2) After weaning, the evolution of the ovaries becomes more rapid than it is during any period of lactation.

(3) After long-continued lactation its sudden cessation is apt to be followed by a rapid evolution of the ovaries and uterus, giving rise to symptoms of ovarian and uterine hyperæmia.

(4) Long-continued lactation may cause super-involution of the ovaries and uterus, resulting, under favourable circumstances, in complete or partial prolapse of the ovaries (21).

It is perhaps difficult to reconcile all these observations with formerly held views. The practical application to be made is that ordinary sexual vigour does not admit of lactation involving special glandular changes in the mammary glands and menstruation involving special glandular changes in the utricular glands simultaneously ; extraordinary sexual vigour does ; and in some of these instances pregnancy occurs during lactation.

Women who have lived in matrimony without conceiving are less likely to continue menstruating over as long a period of years as fertile healthy women. Prolonged menstrual life is certainly met with in some of these, and an average duration is by no means uncommon. In the former there is probably some existent local pelvic affection which explains the sterility, and the longer persistence of the monthly recurrence ; in the latter, it is probable that the non-fruitful union is owing to the husband's lack of procreancy, or to certain sexual antipathies which are well recognised.

Premature sexual congress, while it may hasten puberty by stimulation of the genitals, shortens both the period of fertility and the menstrual process.

As we have already mentioned, puberty is arrived at earlier in some races than others.

In cold countries it is believed that puberty and the menopause are both late. According to Vogt (22) puberty is late among the Lapps (23). The menopause is also late. Of thirty-four women the average age of cessation was 49·4 as compared with 44 years in 178 Parisians and 46·1 in 500 Londoners. Esquimaux women are said to have a suspension of menstruation during the dark and prolonged winter, and to have definite seasons for coitus. In Eastern

countries, and among certain aboriginal races, such as those of Australia and Africa, menstruation begins earlier, but does not continue over so long a period of life as in civilisation. The sexual instincts of the semi-civilised or savage races are gratified at a much earlier age than among civilised nations.

Early maternity is attended with less danger among savages; the foetal head is smaller owing to lower brain development, and the dolicho-cephalic shaped skull adapts itself more readily to the pelvis. The pelvis of the negress is comparatively large in proportion to the size of the child's head (24). Sexual selection among savages will depend on attractions of physical fitness; and the graces of mind and charms of character and bank book (which have such subtle influences among civilised peoples in determining the choice of mates) will not be esteemed in comparison with size and muscularity. Thus it is that, while the best savages are selected as wives, their premature sexual relations and their inferior hygienic conditions of life determine a shorter period of fertility and menstrual continuance than among women of other races and better environment.

Turning to civilised races, we find that precocious sexuality is not often attended with high fertility. Premature marriage is a hindrance to fruitful unions. Women who marry between twenty-five and twenty-nine years of age are more likely to become pregnant earlier after union than those married from fifteen to nineteen years; those married from twenty to twenty-four are most likely of all to conceive soon (25).

Women who have been fertile and who have nursed their children have a longer menstrual life than sterile women—by sterile I mean both women who have been of themselves actually barren and also those who have acquired sterility (relative sterility) from disease, etc. Relative sterility signifies interrupted fertility, or fertility which has produced less than the average number of children. Of course this varies considerably in individual pairs; the age and health of the couple, especially of the female, the habits of the race or country to which they belong, etc. Precautions taken to prevent pregnancy must be counted as a factor of some importance. In the United Kingdom the birth-rate has steadily decreased during the last twenty-five years, but in spite of this the average menstrual life is longer. From the returns of the Registrar-General of England we see that in 1871 the birth-rate was 35 per 1000; in 1890, it was only 29·5 per 1000. The number of children born as the product of each marriage during a series of years must, however, be taken as showing actual or relative sterility. In statis-

tics prepared by Mr. Hayter, and referred to by Dr. Balls Headley (26), we notice that the number of children to each married couple in Ireland was 5.46; in Italy, the number to each couple averaged 4.56; yet the actual births per 1000 of the population bore a wholly different proportion, being 37.6 for Italy and only 22.8 in Ireland. From these figures one would expect what we actually find to be the case, *viz.*, that the menstrual life in Italy is shorter than in Ireland. In the latter country the beginning of menstruation is later, but the longer continued fertility, as shown by larger numbers of children to each married couple, counterbalances this, and the menopause is delayed till later in life.

Acquired sterility may be due to diseases following child-birth—*e.g.*, sub-involution—or to infective disease, such as gonorrhœa, or to constitutional affections, such as phthisis, which injuriously affect the reproductive organs; or, as I have said before, preventatives against impregnation may account for a proportion of cases. These precautions are in some measure due to the marital usages of certain countries, in part due to the care taken to avoid conception in consequence of individual circumstances.

In France the number of children born to each married couple only averages 2.98. This may be explained by the two facts that for the most part the average age of the husband at marriage is considerably greater than in most other countries, and the frugal, thrifty nature of the people recognises the necessity for avoiding the responsibility and expense of large families. Yet we find that of every 100 children born in France, the percentage of illegitimacy is 8.1—little short of Scotland, where the percentage is 8.2. But the average birth-rate to each married couple in Scotland is 4.43 children.

As a curious illustration of how such figures may seem contradictory, I may cite those of Denmark, assuredly regarded as a more moral country than France; one finds in Denmark the number of children to each marriage to be 3.55, and the proportion of illegitimacy to be 11.2 per 100! I have previously quoted the figures furnished by Grösdeff, showing that the average age for puberty in Russia was 15.75 years; whether the low illegitimacy rate in this country of 3.1 per cent. may be attributed partly to later sexual development of the race, or principally to the poverty of the peasantry, combined with their undoubtedly strong religious predilections, is perhaps more a question of ethnography or political economy than one of medical physiology.

Another factor which must not be lost sight of is that aggregation of people, and probably the less robust constitutions engendered from the customs of civilisation, render women more apt to

contract disease after child-birth, which undoubtedly shortens the entire duration of menstruation.

There is a clear difference between the continuance of menstruation in women living in great cities and those living in smaller towns or the country. City dwellers, presumably being more subject to deleterious and depressing hygienic and mental conditions, have a shorter menstrual life than their rural sisters—for example, of 1586 women living in Manchester the mean climacteric age was 47·5, while of 190 women living in a small provincial French town the mean age was 48·7, while of those living in England in the country the mean age of 200 cases was 48·9. I shall have occasion to recur to this when I enter on the chapter treating of the menopause.

A large proportion of miscarriages is, as I have shown elsewhere (27), due to local uterine affections. Fecundity or productive power must not be confused with fertility or production. A woman may remain with impaired fecundity, and consequently be afertile or sterile, and in these cases we find that the menopause is hastened by the frequent attempts at production; that is to say, by repeated early abortions. Chronic inflammation of the pelvic organs has the same effect.

On the other hand, ease and luxurious surroundings not only are attended by earlier establishment of the monthly periods, but with a longer continuance.

Of 100 women of the working classes, the total average duration of menstruation was 33·4 years; of 100 women gently nurtured and living in easy circumstances, the average was 35·9 years. These last figures suggest that the total duration of menstrual life is greater than was formerly believed. This I am prepared to affirm.

Raciborski estimated the duration of menstrual life at about thirty-one years and nine months. According to him the mean age of puberty in Paris at that time was fourteen years and seven months, therefore the average age of the menopause, some thirty years ago, was forty-six and a half years.

So that we may be able to compare the present with the past more fairly, we turn to Houzel's (28) recent observations already mentioned. In these fisherwomen puberty was reached at thirteen years and ten months, and menstruation continued on an average thirty-five years and nine months, giving the average menopausal age as forty-nine years and seven months.

Again referring to Raciborski, we find that he states the average duration of menstruation in Spain at only twenty-nine years: "En Espagne d'après les documents fournis par M. le Professeur Séco.

Baldor sur les femmes de Madrid et des provinces Septentrionales la periode menstruelle n'aurait que vingt-neuf ans dix-sept jours de durée" (29).

Either the professor was mistaken or there is now considerable alteration, as I understand from Spanish physicians that menstruation now may be said to be continued in Madrid and the central districts over thirty-two years. In Catalonia there seems to be a still more vigorous sexuality.

Race does unquestionably influence the duration, but given a sound, healthy race, which is not too much enervated with civilisation, and the menstrual process will, equally with the total physical vigour and vitality, be increased.

In Africa menstruation seems to be of three or four years' shorter continuance than in England.

Dr. Faye stated in his returns published by Dr. Hannover that the average duration in Norway was thirty-two years; in Denmark at that time it was only 27·9 years (?); in England, 31·8 years for London, 31·2 years for Manchester (30). From reliable observations of over 700 women I am justified in stating that the mean duration of the menstrual epoch in England is now from 33·5 to 34 years.

I find further that a considerable proportion of hospital cases do not cease menstruating till forty-nine or fifty years of age.

Many years ago Dr. Robert Cowie made some most valuable reports on the connection between the duration of menstruation and longevity as exemplified in the Shetland Islanders. He showed that these hardy islanders arrived at puberty at the same age as the other inhabitants of the British Isles; but that the then accepted menopastic age, *viz.*, forty-five to forty-six years, ordinary to the other inhabitants of Great Britain, did not apply to the Shetlanders—in them fifty to fifty-one was the mean age for the climacteric. Struck with this fact, Cowie next compared the longevity of the Shetlanders with that of the other inhabitants of Scotland. From the official returns for 1861 and 1862 he found that in Shetland the death roll above seventy was 33·55 per cent., in Scotland, 18·25 per cent.; above eighty the Shetlanders had 20 per cent., Scotland, 7·05 per cent.; above ninety there were 5·03 per cent. Shetlanders to 1 per cent. Scots; and from ninety-five to one hundred and five, 2·68 Shetlanders to 0·29 Scots. Further research confirmed the general accuracy of these returns.

The inference to be deduced is that the vigorous vitality of the Shetlander caused prolongation of the menstrual process, and of the actual age.

In the present day we find that the mean mortality age in England is increased. I need not cite figures to support the statement, which is generally admitted. In like manner we have an increased sexual vitality, which shows itself in the fact we have stated, *viz.*, that the duration of the menstrual life has been increased by some three or four years during the past generation.

I have previously referred to the fact that the ovaries seem to exercise a special part in the production of menstruation. It is true that menstruation may occur with more or less regularity after the ovaries have been removed; but normal menstruation cannot be expected to continue in the vast majority of cases if both ovaries have been completely removed.

I have also asserted my belief that those who hold that menstruation does not depend on ovulation, have excellent grounds for their contention.

How then is it that the presence of healthy ovaries aids in promoting normal menstruation?

I must be permitted to state my contention, for I can hardly as yet claim a stronger name for what I advance, and then briefly adduce the reasons from which I have formed my belief. In the child the ovaries and utricular glands are imperfectly developed, and from what is known of their physiology we are justified in holding them to be functionally imperfect. When puberty arrives, the essential phenomena are development of specialised glands, and exaltation of nerve functions. Ovulation does not begin at puberty, nor end at the climacteric, for impregnation may occur before the one, and some time subsequently to the other. But we find glandular growth at puberty antecedent to menstruation; we know that the essential function of glands is secretion. The specialised glands such as the spleen, the ovaries, and the utricular glands are held to increase and decrease in functional activity in direct correspondence with the absolute vitality or vigour or the non-vitality and weakness of the general and local bodily condition. I contend that, at least so far as the specialised functions of these glands are concerned, their secretions, acting on the vital economy, determine or aid in determining the inauguration and persistence of the activity of the physiological conditions they govern.

Or to state the matter otherwise, the ovaries secrete certain specialised substances which aid in determining menstruation; in a less degree the utricular glands, and the glands of the Fallopian tubes share in this action. This is probably secondary to the chain of peripheral irritation from the uterine glands, and the resulting afferent nerve impulses, and efferent nerve currents; but this

secretion is not the less an essential feature of the menstrual process.

In the non-menstruating woman, both in physiological amenorrhœa (pregnancy) and in pathological suppression (*e.g.*, chlorosis), pigmentation of the skin occurs, showing that the absence of the catamenia, whether from one cause or the other, results in the retention in the blood, due to non-elimination (non-secretion governing this) of some substance which would normally be excreted at the period.

The first line of argument supporting my contention is to be found in the relationship proved to exist between Basedow's disease and diseases of the female genitalia. An excellent and concise summary has been drawn by Theilhaber (31) from a study of the literature of the subject and his personal observations. He states:—

Basedow's disease may be caused by pregnancy, or, if already existing, it may be aggravated.

On the contrary, pregnancy may have a favourable influence.

It may also be produced by the puerperium or lactation.

On the contrary, the lying-in period may have a favourable action.

Atrophy of the genitals is frequently noted in this affection. This atrophic change is not the cause but the result of the disease, and it does not always prevent conception.

It is dependent upon vaso-motor influences and not upon anæmia nor cachexia. The appearance of uterine atrophy is by no means a sign that the case is grave, for it accompanies both slight and severe forms. Its appearance is not fixed by any rule.

A complete restoration of this atrophic process to the normal is possible.

Genital affections outside of the puerperium and pregnancy rarely play an important part. Here and there a gynæcological affection may, by severe hæmorrhages, so weaken a subject that she is thereby predisposed to Basedow's disease. As a rule, special gynæcological treatment is unnecessary, for the uterine atrophy disappears with improvement of the primary disease.

Now if we recognise each menstrual period as a little pregnancy, we will apprehend that the glandular system has a profound modifying influence on the process. Jouin (32) has pointed out that exophthalmic goitre is intimately related to the menopause. In an interesting paper, founded on forty-three personal observations, he shows that Basedow's disease is not only connected with the menopause, but with pathological affections of the uterus. It should be considered as the consequence and not as the cause of the uterine

trouble. Improvement in the uterine condition causes amelioration of the goitre symptoms, and eventual cure is not uncommon.

A knowledge of the connection between goitre and the menopause, and of the irregular forms of Basedow's disease, explains many of the morbid phenomena of the climacteric.

An acquaintance with these facts affords us valuable indications for treatment.

The second line of argument supporting my contention is derived from our comparatively recently acquired knowledge of the therapeutic action of thyroid and other gland extracts (33). This is too long a subject to treat adequately here ; only a short reference can be made. The researches of Mr. Victor Horsley on the pathology of myxœdema, suggested to Dr. George Murray, of Newcastle, the employment of thyroid extract prepared from healthy animals as a curative agency. Dr. Byrom Bramwell, of Edinburgh, contributed a valuable record showing the importance of Murray's observation, and many other physicians have studied the effect. So that now it may be said that thyroid extract is pre-eminently the recognised remedy for myxœdema.

Independently of the work above mentioned, and some considerable time before, the late Brown-Sequard advocated the employment of organic extracts as a means of re-invigorating wasted and debilitated patients. His suggestion was that there was a certain substance or principle derived from the testicles of animals which, after being properly prepared, on being subcutaneously injected, exercises a marked recuperative action on human beings affected with loss of mental and bodily vigour. The testicular extract was named spermin. Similar substances obtained from other glands are named ovarine, nephrin, nuclein, cerebrin, etc. Chemically, all may be said to resemble each other. The insoluble crystals obtained are phosphatic in nature, and have been named in France "Charcot-Leyden" crystals ; they are regarded as a leucomaine, the product of a deterioration or metamorphosis of albumens. An exhaustive study of the subject has been recorded in an instructive paper by Poehl (33). Dr. C. H. F. Routh has also written an interesting paper, in which he refers to the subject (34).

Organic extracts have been used in almost every conceivable circumstance. And although prescribed very irrationally and foolishly at times, the results on the whole are such that we have not only sometimes seen patients benefited, but our scientific knowledge of disease and therapeutics has been increased.

These references bring us to the thesis that gland secretions

given in certain morbid conditions act in restoring what is lacking in the system, and that in health these secretions are naturally produced in the economy.

The ovaries are glands which secrete a special substance, and exercise a special metabolic influence by aiding the periodic flow.

- (1) "The Nerve Theory of Menstruation," *Brit. Gynæcol. Journal*, *loc. cit.*
- (2) *Travaux d'obstétrique*, t. iii., p. 520.
- (3) *Manual of Gynæcology*, p. 80, Edinburgh, 1882.
- (4) *Physiology and Diseases of Women and Midwifery*, p. 29, 8vo, London, 1851.
- (5) *Causes and Treatment of Abortion*, 1847.
- (6) *Principles and Practice of Gynæcology*, p. 153, *et seq.*, 1880.
- (7) *Traité de la Menstruation*, pp. 200-248, 1868.
- (8) Depaul and Guèniot, *Diction. Dechambre*, t. lxviii., p. 170.
- (9) Reprint of a paper read before the Indian Medical Congress, December, 1894.
- (10) *Annales de Gynécologie et d'Obstétrique*, t. xlii., p. 170, 1895.
- (11) *Centralblatt f. Gynäkologie*, No. 23, 1894.
- (12) Reprint from *Liverpool and Manchester Medical and Surgical Reports*, vol. iv. Quoted by Cullingworth, *loc. cit.* Cornish, Manchester, 1876.
- (13) *Vide* F. Churchill's *Theory and Practice of Midwifery*, 4th ed., p. 54, 1860.
- (14) *Ein Beitrag. zur Physio-Pathologie der Blutungen aus den Geschlechtstheilen neugeborner Mädchen. M. Corrsp. Bl. des Württmbg.*, Bd. iv., p. 88, Stuttgart, 1835.
- (15) Rilliet and Barthez, *Traité Clin. et Prat. des Malad. des Enfants*. Quoted by Cullingworth, *loc. cit.* Paris, 1853.
- (16) *Vratch*, No. 44, 1894; 2 B., 16th Nov., 1895.
- (17) *Ein Beitrag. z. Histol. d. Erosio d. Portio. Vag. Arch. f. Gy.*, B. xv., S. 76, and B. xvi., S. 191. Quoted by Pozzi, *Traité de Gyn.*, p. 156.
- (18) *Vide* papers by Küstner, *Central. f. Gynäk.*, No. 23, p. 533, 10th June, 1893.
- (19) J. C. Webster, *American Journal of Obstetrics*, October, 1895.
- (20) *Transact. London Obstetrical Society*, 1st January, 1896; *British Medical Journal*, 11th January, 1896, p. 86.
- (21) Reprint from *Medical Times and Gazette*, London, 1880.
- (22) Hannom Report to Paris Medical Congress of 1867.
- (23) Robertson (*Physiol. and Dis. of Women and Midwifery*) denies the accuracy of Vogt's observation, but Grüsdeff's figures support it.
- (24) Tropinard's *Anthropology*, pp. 242, 305.
- (25) Matthews Duncan, *Fecundity, Fertility, Sterility*, pp. 34, etc.
- (26) *The Evolution of the Diseases of Women*, pp. 16-17, 1894.
- (27) Article "Habitual Abortion," *Transactions Obstetrical Society of London*, v. xxxii., p. 389, 1890.
- (28) *Loc. cit.*
- (29) *Traité de la Menstruation*, p. 250.
- (30) *Vide* Tilt, *loc. cit.*, p. 53.
- (31) *Münchener Medicinische Wochensch.*, No. 7, 1895.
- (32) *Annal. de Gynéc.*, June, 1895, p. 509.
- (33) *Berliner Klin. Wochensch.*, No. 36, 1893.
- (34) "Conservat. Treat. of Dis. of Uterine Appendages," *Brit. Gynæcol. Journal*, Pt. xxxviii., p. 51.

CHAPTER IV.

NORMAL CHANGE OF LIFE.

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(For other references see end of chapter.)

IT is not easy to precisely define what is to be regarded as normal in relation to the menopause. To ascertain with exactitude what one is really entitled to classify as normal, it would be necessary to obtain not only a *reliable* account of their subjective symptoms or sensations from a very large number of seemingly healthy women, but also to make an extended series of examinations of such persons.

Obviously, women only consult a medical practitioner when they have, or believe they have, some definite reason for doing so. Consequently, it is probable that some women who are less liable to complain than others may never consult a doctor for comparatively slight ailments or inconveniences, and may therefore be held, erroneously, to have a painless and "normal" change of life.

Figures founded on the life-histories of a few hundred individuals cannot be regarded as more than approximately correct.

Undue importance should not be given to all coincidental ill-

nesses of the menopause. It is quite possible to exaggerate the influence of change of life, and to attribute to this cause many evils which investigation proves to be only co-existent and not due to the cessation of the periods.

On the other hand, there is no doubt that the term "change of life" has been, nay, still is, an *Asylum Ignorantiæ*, employed as a convenient cloak for hiding the laziness of the physician, or as a vague description likely to prove useful for allaying the anxieties of the patient or of her relatives. The dictum, "All the symptoms are merely arising from change of life," has often been pronounced with easy cheerfulness, and without any attempt at diagnosis or careful consideration, on numerous cases of serious disease. We must therefore guard against too hasty generalisation, and acquaint ourselves as perfectly as we can with the exact circumstances of each individual case.

The Special Anatomy and Physiology of the Menopause.—

The anatomic-physiological changes of the climacteric may be considered most conveniently together. For, indeed, the alterations of the system are in certain instances so subtle that it is by no means easy to differentiate between some that are probably functional and others that are organic.

As a general rule, after physiological life has become passive, pathological life becomes active.

As in the preceding chapters we have considered the developmental changes which occur in the child and young girl, fitting them for maturity with its powers and capabilities, so must we now regard the post-mature woman as descending the other side of the hill, until she arrives at the slopes of senility or the common plateau of devolution and death.

During the climacteric we must recognise a great transitional epoch in the woman's existence. It is, indeed, true that this is too often somewhat lightly regarded by clients and doctors alike. Practitioners speak glibly and write freely about "the ripening of the reproductive system, the maturation of the generative organs, the decay of the generative organs which have no further functions to fulfil," of "the changes in the vitality of the tissues, and then of the atrophy of the genital organs". They regard with equanimity the vaso-motor disturbances evidenced by chills and flushes, the aberrant powers of mind and body, the tension, if nothing worse, of the whole nervous organisation, and placidly state: "It will be all right after the periods have ceased". So it often is; but surely woman is something more than a reproductive machine, whose principal functions are to attain puberty and reproduce her species,

to slowly wear out her bodily and nervous capabilities, and then be comforted by such philosophy as this.

We may conclude that during the whole continuance of menstrual life there is a variable yet cumulative specialised nervous vitality.

As we have said, it is usual for the pubescent girl to show certain little but definite symptoms of neurosal character just before menstruation is established. With the normal climacteric we have a return and exaggeration of the same symptoms of nervous disturbance.

The developmental changes between infancy and puberty are more gradual, and therefore less marked than those we are now considering. It is now the retrogressive change between full vigorous maturity and commencing senility which is taking place. Certain functions have been in active existence for nearly four-fifths of the whole lifetime. For a variable period, usually about two years, the physiological economy is preparing for this pre-pathological change. The nervous rhythms which have all through life determined the action of the vital organs, such as the heart, the lungs, the liver and the kidneys, and that which for so many years has dominated the great menstrual function, and the mass of ganglia and nerve structures involved in it, must now adjust the balance. The relief of nervous, and consequent vascular, tension obtained from time to time by the blood losses of menstruation, is now to be discontinued. The building up of new materials in part throughout the whole system, and almost wholly in the reproductive organs, has for the future to be restricted. Little wonder that the central nervous system, the great controller of the whole, suffers more or less during such a change.

Before discussing the changes which are pertinent to the climacteric, it will be helpful to touch briefly on those which are more properly senile. For it must again be repeated that in the menopause we must recognise a general physiological alteration of structures and functions which are actually the beginning of old age and devolution.

I do not purpose to consider the subject of senile pathology at length, but will briefly refer to such special points as seem important to the present topic. Many valuable treatises have been written on senility, such as Bean's (1), Gillette's (2), Geist's (3), Mettenheimer's (4), and Day's (5).

One of the most suitable for present reference is Charcot's *Lectures on Senile Disease* (6). This great neurologist writes: "The brain, the spinal cord, the nerve trunks, the lungs, the liver, and

lastly all the blood-forming organs participate in the atrophic process". "It is firstly and principally a process of simple atrophy. At a more advanced stage it is accompanied by a degenerative process. According to Virchow, while the neuroglia tends to predominate in the encephalon over the nervous elements, it usually becomes permeated by a greater or less number of amylaceous bodies. The tissues of the brain then undergo a chemical change according to the researches of von Bibra (7), which have been confirmed by Schlossberger (8). Paget (9) and Robin (10) have noticed that the coats of the cerebral arterioles are often filled with granules."

Between the periods of metabolic activity and degeneration (that is to say, between maturity with all its physiological functions in full vigour and commencing senility with all its special pathological tendencies) there is a stage in woman, linking these two together, which is known popularly as the "change of life". Menstruation therefore may be held to begin with vigorous nervous and glandular evolution, and end with nervous and glandular devolution or commencing decay.

It is in great part in the development of the nervous system of the girl that we find the explanation of many of the phenomena of puberty, and so in the post-mature woman it is partly in the early senile changes that we must look for a solution of the climacteric.

In addition to these nervous changes, we must not forget the growth of glandular structures and the influences of certain gland secretions at puberty; nor glandular retrogression and consequent incapability for normal secretion of essential products which constitute one of the factors of menstruation.

Changes in the glands of the uterus are an essential feature of the menopause. As has been previously shown, in infancy, without glands, or at most with imperfectly developed and functionless glands, there is no menstruation; at puberty, with increasing glandular and nervous growth, there is a commencement of the function, often at first irregular and uncertain; during mature adult life, with fully developed glands, normal physiological conditions, and a healthy state of the nervous system, menstruation becomes a regular, rhythmical, well-controlled process.

It has also been postulated that in the recurrent growth of the utricular glands one finds the necessary source of peripheral irritation, which determines the nerve impulses originating the process.

We are now prepared to solve the question of the definite termination of menstruation. We find that the periods cease owing to the degeneration and disappearance of the glandular tissues of the

uterus ; and, secondarily, to similar changes in the ovaries and other glands.

In consequence of the removal of these factors of peripheral irritation the nerve centres cease to receive afferent stimulation, and after a given period, longer or shorter, and attended with more or less functional disturbance, cease to functionate.

The Uterus of Advanced Life.—Any one who examines the uterus of a woman advanced in life can easily see that it is structurally greatly modified from that of the normal adult uterus. Prior to menstruation, the essential condition is one of imperfect development ; immediately after the function has commenced the changed structure is remarkable. Suddenly one sees the endometrium, the delicately reticulated meshes of tissue springing from the connective tissue of the muscle layer, and placed closely round the vessels, assume a new appearance. Multitudes of granular nucleated, round, or oval corpuscles, something like white blood corpuscles but varying greatly in size, lie between the bundles of connective tissue, crowd the interfibrillar spaces, and seem attached to the fibres. Down deeply through the retiform tissue run the glandular crypts burrowing into the muscular layer ; here single, there branched, but everywhere abundant. All through the tissue between these crypts we see lymph spaces which become distinct cavities in the muscle. Vessels, especially arteries, and nerves are numerous, and what seem to be ganglia may be traced (Johnstone). As a short summary, we would repeat—the endometrium of the mature woman is rich in stroma, in glands, in vessels, in plates, in nuclei, and lymph spaces.

The distinguishing feature of the menopastic uterus is atrophy of the endometrium. The large bundles of tissue are lacking, the whole membrane is thinned and wasted, the fibrillar structure is disappearing, the corpuscles are few, and the utricular glands are lessened in size and number (plate v., figs. 20-23).

The post-climacteric uterus is only an advanced stage of that which we have described. The utricular glands are now shrunk and withered, or in some parts form little retention cysts ; the whole membrane is markedly atrophied, and in many examples little but thinned connective tissue and the remains of vessels may be seen (plate vi., figs. 24, 25, 26 ; figs. 24, 25 ; and contrast fig. 26).

I need hardly mention that menopastic endometritis or any other pathological influence modifies the appearances just referred to.

It might be argued that these structural changes were the effect rather than the cause of the climacteric. But the atrophy of the uter-

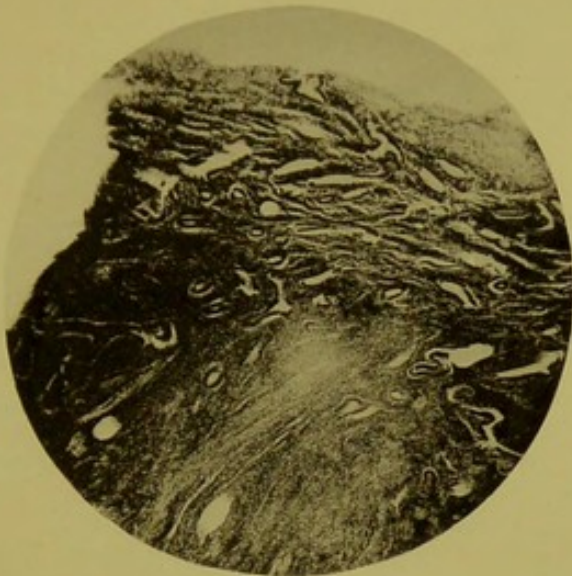


FIG. 20.

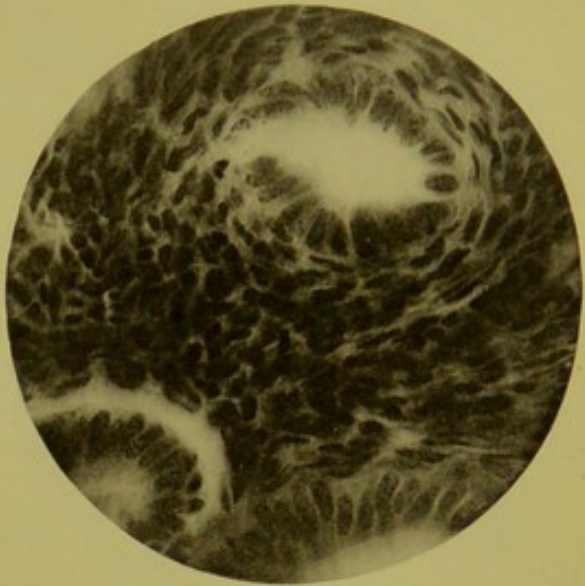


FIG. 21.

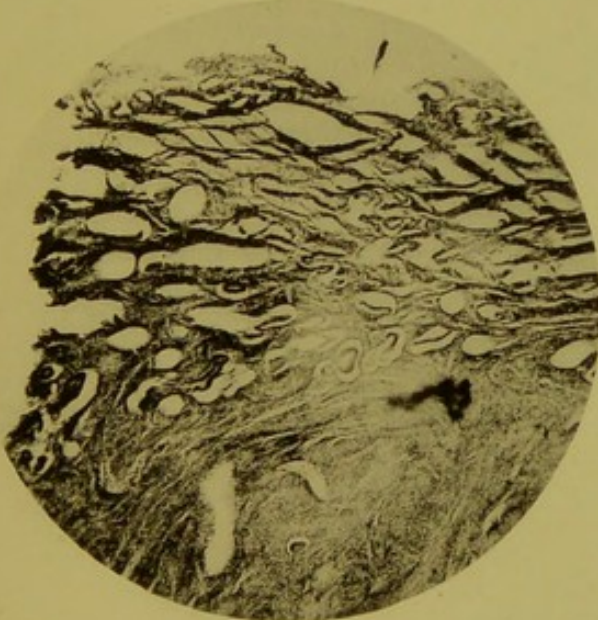


FIG. 22.

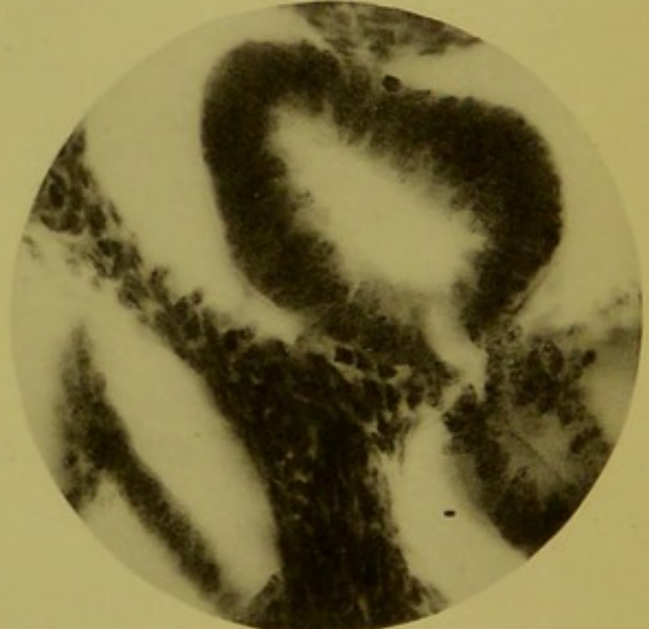


FIG. 23.

SENILE OR POST CLIMACTERIC UTERI (low and high powers).

FIG. 20.— $\times 30$ diam. Uterus of woman who has ceased menstruation. Tissue has become dense, and glands are greatly lessened in size. (Compare with Figs. 9, 11, 15, and 18.)

FIG. 21.—The same as Fig. 20— $\times 400$. A portion containing scanty and small glands in field. (Compare with Figs. 10, 12, 16, and 19.)

FIG. 22.— $\times 30$ diam. Post-Climacteric Uterus. The glands have undergone Cystic degeneration, and for most part have disappeared, except on surface.

FIG. 23.—The same as Fig. 22— $\times 400$. A portion of glandular tissue, showing the absence of epithelial cells and of leucocytes, and showing the blackened walls of cystic glands.

MR. TARGETT'S NOTES.—These two specimens are alike, and it would seem doubtful whether the appearances presented by them are quite normal. The stroma of the endometrium is arranged in bands of spindle-shaped cells, and most of the follicles are lying parallel with the surface. Some follicles are dilated.



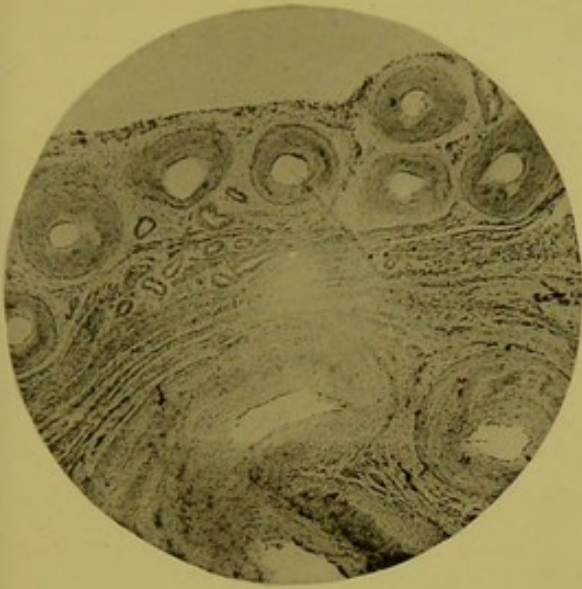


FIG. 24.

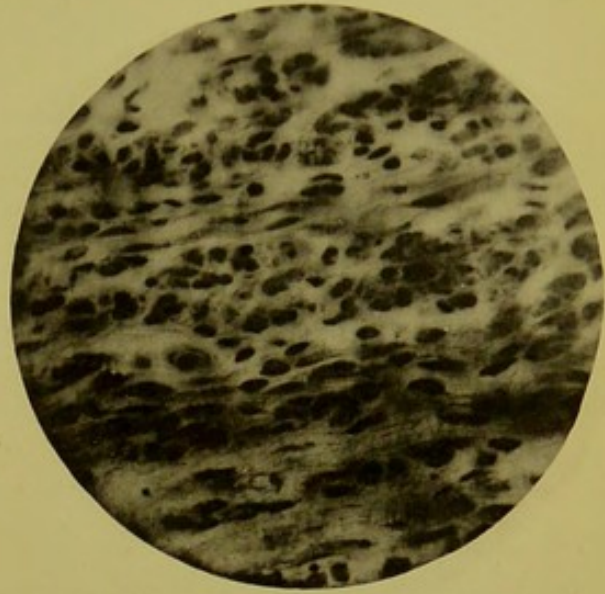


FIG. 25.



FIG. 26.

SENILE UTERUS (low and high powers).

FIG. 24.— $\times 30$ diam. Uterus from woman aged 65. Removed on account of procidentia and hæmorrhages. There are practically no glands, but there are enormous blood vessels. The tissue was not malignant.

FIG. 25.—The same as Fig. 24— $\times 400$. Taken from general structure. There are no glands, and the cells are small and scanty. Connective tissue predominates.

MR. TARGETT'S NOTE.—Is pathological probably. Perhaps a kind of arterio-capillary fibrosis occurring in old age. No endometrium to be seen.

HÆMORRHAGIC ENDOMETRITIS.

FIG. 26.— $\times 30$ diam. From Uterine Curellage. Non-malignant (but probably pre-malignant) glandular endometritis. Compare with Fig. 24.

MR. TARGETT'S NOTE.—Certainly pathological. Catarrhal endometritis.



ine glands is not the only instance of gland disappearance with advancing age. The spleen and the lymphatic glands undergo a remarkable diminution of weight and volume with the advance of age (11). The ovaries, the thyroid, the tonsils, Peyer's patches, the suprarenals all are subject at the same time to like changes. As Arthur Johnstone (12) has pointed out, the life-history of the uterine lining is analogous to that of the thymus gland. The thymus is present at birth in a state of activity; it is the first of the glandular tissues to sink into obscurity and finish its physiological course. But it may certainly be regarded as typical of the whole class. Glands, like systems, have "their little day".

Glandular secretions have already been referred to in the last chapter, and it is only necessary to repeat here that there is every probability that the ovaries and the utricular glands will ere long be proved to be organs with specialised secretions which may be regarded as mainly metabolic in function.

One clinical proof of this is afforded by what is now widely known concerning the effect of oöphorectomy in osteomalacia. In osteomalacia the skeletal affection undoubtedly depends on some perversion of metabolism. Removal of the ovaries has, in many cases, been followed by the almost immediate improvement and speedy cure of the patient. In such cases the women had ovaries which were capable of ovulation, as shown by repeated pregnancies; but the disease having been cured by their removal, the logical inference is, that there is some special ovarian condition which favours osteomalacia, and this cannot be other than a depraved physiological one. I have no desire to suggest theories unsupported by facts, but cannot refrain from again mentioning that the artificial restoration of certain gland substances to the system cures some pathological conditions, *e.g.*, thyroid extract in myxœdema; and the removal of analogous glands seems to effect no less striking cures when other parts of the economy are morbidly affected as I have just stated.

Further, as I shall hereafter have occasion to mention (13), it is now therapeutically ascertained that certain uterine neoplasms are favourably influenced by administering thyroid extract.

It is advisable before discussing matters of clinical interest to briefly summarise certain points which have already been partly described.

The normal menopause involves three distinct classes of changes—anatomical, physiological and pathological.

Anatomical changes consisting of a retrogression or involution of the whole of the glandular structures of the body; especially of

the glands, and secondarily of the whole structures of the genitalia. The changes in the uterus and Fallopian tubes are earlier than those in the ovaries, so that ovulation, though lessened in activity, may persist for a considerable time after menstruation has ceased. Ovarian atrophy has been referred to senile rather than menopausal changes; but, holding the views already expressed, that the normal menopause is usually the entrance gate of senility, this seems to me an unnecessary distinction.

Unfortunately there has been a disposition to confuse the physiological and pathological sexual alterations of the post-climacteric period with those of the climacteric. So far as the anatomical alterations are concerned, this confusion, if it exists, is important.

The anatomical changes therefore consist of atrophic shrinking of the genital organs firstly, and of other glandular structures secondly. Finally, there are, as yet imperfectly apprehended, changes in the cord and cerebral centres.

The atrophy may affect the whole of an organ, or may involve its essential elements, and be accompanied by hyperplasia of its connective tissue or other parts, *e.g.*, menopausal sclerosis of the ovary, kraurosis or shrivelling of the vulva, with prolapse of the vagina or uterus from relaxation of the ligaments, and loss of the natural support afforded by the changed perineal body.

Anatomical changes lead up to pathological conditions. Shrinkage and wasting of the cervical epithelium may occasion cervical atresia, and at a later stage, generally in the post-climacterium, pyometra may occur.

So in like manner anatomical changes in the glands and in the substance of the uterus favour the irritation or development of malignant and benign neoplasms, *e.g.*, cancer, fibro-myomata, etc.

In addition to these, the anatomical changes favour various functional disturbances, such as neuralgias, found associated with œdema of the face or in the joints, glycosuria, hyperæsthesia, and alterations in blood pressure give rise to symptoms partly referred to functional, partly to organic, causes.

Physiological changes may be nutritive or nervous; and from their special importance we may name vaso-motor disturbances as a sub-class.

Hence arise obesities, nervous irritability, vertigo, flushings, profuse localised or general perspirations; alterations in special senses, especially those of smelling and hearing; arterial pulsations, palpitations and tachycardia; various obstinate, especially gastric, neuroses; certain cutaneous affections, etc. It is evident that the line of demarcation between several of the physiological changes

mentioned and pathological conditions is a very narrow one. Here, as always in living matter, uncontrolled physiological conditions must be looked on as pathological.

So the term climacteric is properly applied to a well-defined period of life in woman, which is characterised anatomically by a series of processes of atrophic involution in the genital organs; physiologically, not only by the arrest of procreative adaptability (except in very rare instances), but also by the abolition of the periodicity in the activity of all the functions of the female system; pathologically, by a series of nutritive and vaso-motor disorders, exhibited in the field of general pathology; and shown in that of sexual pathology by a number of maladies connected with the atrophic processes proper to that age; and also in all probability by a predisposition to the development of malignant disease (14).

The pathological conditions special to the normal change may be shortly generalised thus: there is a focus of irritation in the genitals causing disturbance in the sympathetic system; owing to the altered anatomical conditions, etc., relief cannot be afforded by menstruation; bizarre nerve currents are set in action, the hypo-gastric plexus is partly inert, but the gastric ganglia are practically as before, indigestion results; then follow malnutrition, anæmia, vaso-motor disturbances, neurosis.

The alteration in the ganglionic system is shown by debility, that in the cerebro-spinal system by irritability; at least temporarily the whole nervous system becomes unstable and badly balanced.

General Physiology of the Menopause.—In the preceding chapter several points of interest have been referred to concerning the causes which govern the duration of menstruation. It is only necessary now to recapitulate the headings: Age at which puberty is reached; normal sexual activity, evidenced by impregnation and reasonable lactation; maturity before sexual congress; race; individual health or illness and physical vigour; favourable hygienic conditions, etc.

Age of Cessation of Menstruation.—The term menopause is used in a different sense by some writers to that attached to it by others. For some it signifies the entire cessation of the menses; for others it means the period during which the menstrual function becomes irregular until it finally ceases. The terms, "irregular time," or the expressive, but vulgar one, "the dodging period," are used to signify the time between normal menstruation and cessation or "change of life". The change, however, begins with the irregularity; and the symptoms presented during this irregular

period are often more troublesome than after the process of menstruation has wholly ceased. It is, therefore, this transition period which ought to be regarded as the menopause or climacteric. So that I use the expression, age of cessation, to clearly indicate when the period ceases.

From my personal investigation of over 700 cases, I find that the average age for definite cessation is forty-seven years and eight months. In arriving at this, I have excluded any cases which might have been influenced by constitutional or local disease ; more than 50 per cent. were women in good circumstances of life.

Krieger (15) has collected statistics dealing with 2291 women, and arrives at the following conclusions :—

Menstruation ceased between

36 and 40 years in 272 women	= 11.87 per cent.
41 and 45 years in 595 women	= 25.97 „
46 and 50 years in 940 women	= 41.03 „
51 and 55 years in 334 women	= 14.58 „
Before 35 and after 55 years in 150 women	= 6.54 per cent.

We note that, leaving out the exceptional cases in the last line, the menopause was reached in 37.84 per cent. of women between thirty-six and forty-five years of age, and in 55.61 per cent. from forty-six to fifty-five years.

These figures are in close agreement with the following table.

Taking the figures of Mayer, Tilt, Guy, Brierre de Boismont, Courty, and Puech (16), the following results are obtained :—

Cessation between	36 and 40	in 12 per cent.
„ „	41 and 45	in 26 „
„ „	46 and 50	in 41 „
„ „	51 and 55	in 15 „
Before 35 and after	55	in 6 „

Excluding the last line, we find that 56 per cent. ceased to menstruate from forty-six to fifty-five, and 38 per cent. between thirty-six and forty-five. It is by no means improbable that the cases which form these older statistics would, with our modern knowledge of gynæcology, have been found affected by morbid conditions in many instances, and this may explain cessation having been reached in more than a third of the women before forty-five years of age. For this reason, I think it unprofitable to cite the numerous tables of average ages which have been published, as I consider the great majority of them are open to the same criticism.

I find, however, that the observations of Robertson (17) on

seventy-seven cases are in substantial agreement with my own. Of Robertson's cases, fourteen or 18·3 per cent. ceased to menstruate before forty-five; forty-six or 59·5 per cent. ceased from forty-seven to fifty years of age; thirteen or 16·6 per cent. ceased from fifty-one to fifty-four years of age; one woman ceased at fifty-seven, two at sixty, and one at seventy!

A recent paper by Dr. Homer C. Bloom (18), of Philadelphia, recounting his observations founded on a study of "over 400 cases," states that the average age when menstruation ceased in this series was forty-three years and eight months. The oldest woman was fifty-four; the youngest twenty-nine. The average menstrual life was twenty-nine years and three months. Average age of puberty, fourteen years and three months; youngest, ten; oldest, eighteen.

I find so wide a difference between the climacteric age in these cases and my own that I can only attribute the difference to racial influences. The type of American woman undoubtedly differs from that of her English cousin, although conditions of life and climate may also explain the earlier menopause in America.

Of Mayer's 824 cases (in Germany), the average age of cessation was forty-seven years; Whitehead's (of Manchester) 1586 cases gave 47·5; Leudet's 190 cases (Rouen) show 48·7; Faye and Vagt's 391 cases (Norway) gave 48·9; Vagt's 39 (Lapland) cases, 49·4 years. I have previously mentioned Cowie's (Shetland) cases, which show fifty to fifty-one years as the mean climacteric age.

Heinrich Kisch (19), of Prague, has compiled a long number of tables bearing on this question which appear in the first chapter of his monograph. He considers the statistics to be greatly affected by nationality, age of attaining puberty, sexual activity (*Thätigkeit*), personal and social conditions of life (*Äussern Lebensverhältnisse*), constitutional conditions and disease. Many of these points have already been alluded to in the preceding chapter; others will occupy our attention later. Meantime I would direct attention to certain further possible sources of error in arriving at a mean climacteric age.

Alleged average of climacteric age of different countries:—

Norway, according to Faye,	-	-	-	-	-	-	48·7
Poland, according to Lebrun,	-	-	-	-	-	-	47·05
France, according to Raciborski and Brierre de Boismont,	-	-	-	-	-	-	45·46
Indies, according to Cerise,	-	-	-	-	-	-	32·50
Java, according to Gerard,	-	-	-	-	-	-	30
Portugal, according to Roderic,	-	-	-	-	-	-	50

(EMILE BERTON) (20).

This table bears contradictions on the face of it, and cannot be accepted as reliable ; in fact, it does not agree with the actual figures given by some of the authors quoted from.

The age of attaining puberty is, as we have shown, to be regarded as evidence of racial or personal sexual capacity. It is again worthy of remark that early commencement is not, at least in temperate climates and with the Caucasian races, associated with an early menopause, rather the reverse. Within certain limits, the primary condition or primitive vitality of the procreative functions, shown by glandular and nervous developments affecting the genitalia, will determine the beginning and duration of the process.

Sexual activity, also within due limits, for hyperactivity of reproductive functions favours constitutional weakness and localised disease, is, as has been already referred to, associated with a long duration of menstruation.

Personal and social conditions do undoubtedly affect individuals, and to a less certain degree, classes.

It has been remarked that the climacteric age is much more variable among operatives living in large cities than among ladies of the higher classes, or peasants living under favourable conditions in the country. This is true, but only partially so ; the conditions of life pertaining to many operatives predispose to certain diseases affecting the general and sexual health, and, therefore, it is not normal but abnormal influences which must be estimated in this relation.

Houzel (21), of Boulogne, from observations on 123 fisherwomen, found the mean age of their menopause to be forty-nine years and six months ; their menstrual life averaged thirty-five years and three months, which is undoubtedly beyond the general average. This writer claims that it is the excellent bracing effect of constantly wading in the sea at all seasons (and whether they are menstruating or pregnant, or nursing their children, there is no interruption) that causes a great activity of the circulation, and a "prolongation of ovulation". The facts cannot be disputed as they are so clearly and circumstantially put, but the interpretation of the facts is quite another matter. These women, as I know personally, are a race distinct and separate from the town dwellers of Boulogne ; many of them are very fine specimens of humanity, nearly all of them are above the average even of the peasant women in physical vigour. And ovulation has only a doubtful and indirect influence on menstruation.

Mayer's statistics (22), founded on observations in 282 women of the higher classes and 542 women of the poorer classes, show a mean

climacteric age for the higher classes of 47·13 years, and for the poorer of 46·97 years, which is only a difference of one month and twenty-eight days.

This table (which corresponds with my own beliefs) is as follows:—

Higher Classes (282).			Poorer Classes (542).		
Climacteric at 45 in	4·965	per cent.	5·166	per cent.	
„ 46 in	8·165	„	6·642	„	
„ 47 in	7·092	„	9·410	„	
„ 48 in	5·674	„	10·517	„	
„ 49 in	10·638	„	8·303	„	
„ 50 in	18·085	„	11·070	„	

The most notable lines are the fourth and last. At forty-eight years of age only 5 per cent. of the higher classes and 10 per cent. of the poorer, respectively, are found to have reached the menopause; but as late as fifty years of age the figures show the relative proportions to be 18 per cent. and 11 per cent., so that the less delicate condition of some of the poorer women causes the proportions to be relatively less. Various other explanations might be suggested, but it seems to be reasonable to assume that in both classes there are healthy women who will be but slightly affected by extraneous conditions.

Certain personal or individual peculiarities are popularly believed to affect the duration of the menstrual process. Fat women have an earlier menopause than those who are thin; brunettes have a later menopause than blondes. And, as is natural, women who are physically strong have a later climacteric than delicate women. I have no figures bearing with precision on these statements, but my general impression is that all are warranted.

Sudden arrest of the menses may be of complex causation, and, therefore, falls under another set of considerations.

Heredity may, to some inappreciable extent, affect the climacteric age. Both parents share in the production of the offspring; it is seldom that husband and wife are nearly related; when a daughter assimilates most of the physical characteristics of her mother, that is, to some degree, accidental, and anyhow cannot as yet be explained physiologically. So that to attempt to assign a definite and reasonable explanation as to how heredity acts in such circumstances is beyond our present knowledge.

Early arrest of the menses must be distinguished from premature menopause—for example, if menstruation ceases at from thirty-seven to forty-two, it is early arrest; if at or before thirty-two or thirty-three, it is premature climacteric.

Premature Climacteric.—A premature climacteric is rather a

contradiction; for the establishment of the menopause in the vast majority of cases depends on commencing senility or on disease. Pelvic disease, especially ovarian septic disease, chronic diseases of the appendages, and also some cases of metritis, result in early climacteric (23). Attlee records four instances of women of thirty the subjects of ovarian tumours, who had ceased to menstruate. Many other examples might be quoted (23), but the influence of pelvic disease is now so generally admitted by all practical gynaecologists, that it is needless to adduce additional cases.

But there is a small number of cases in which one finds total cessation of the periods at an early, or comparatively early, age, and in which no organic changes can be found.

Nerve Shocks.—Some cases of sudden arrest of the menses from nerve shocks, *e.g.*, railway accidents, sudden grief, fright, etc., may result in a permanent menopastic change. One can offer no further explanation for such cases than the vague one of some bizarre central action, which affects the menstrual centre in the brain or spinal cord. A highly illustrative case is recorded by Tilt: A woman had been quite regular up to the age of thirty, when she threw a dead rat on the fire, thinking it was a coal; she retched for hours; for four years there was no menstrual flow, and after that an occasional show at irregular intervals. Another woman, aged thirty, who had nursed her child sixteen months, saw her husband fall dead at her feet; the periods never returned, having been last seen at twenty-eight. In this case hyper-lactation might partly explain the cessation; but she was living and healthy at seventy-one, so that nerve action, not general loss of vitality of tissues, was probably the dominant cause.

Mental Affections may be said to be associated with an early menopause, but cannot be shown to predispose to a "premature" menopause, if we restrict the definition to cases in which the periods cease definitely at or before thirty. Taking a series of cases of 1808 female patients of the West Riding Asylum (24), one finds that the total number from twenty-five to thirty years of age was 232; from thirty to thirty-five, 255; the single women of the first class were 111, the single women of the second, ninety-nine; the married women of the first class, 115, the married women of the second, 145; widows furnished six and eleven respectively.

But, as can be readily proved by an examination of figures, menstruation as a rule ceases earlier in patients confined to asylums than in sane persons; from thirty-five to forty years of age is not an unusual period for the climacteric in those who are inmates of asylums. I am not now referring to insanity caused by the climac-

teric, which will be considered later, but to the effect of neuroses on the menstrual function. There is a general deterioration of all the nervous functions, allied with retrograde changes in the great vital functions, which sufficiently explains an early change of life.

Prolonged anxiety, or undue mental strain, as in working for the higher examinations, etc., is favourable to menstrual irregularities. I am not prepared to write dogmatically on the subject of premature menopastic changes arising from over-study, but I have known many examples of suppressed and irregular menstruation, which were evidently due to this cause.

Severe constitutional affections such as cholera and typhus fever, and less commonly variola, may be followed by a premature menopause. In the greater proportion of such cases the arrest is only temporary; it may be for six or twelve months, or more, after convalescence; in a few cases the periods do not return.

Indefinite neuroses, which cannot well be regarded by the general physician as insanity, in the ordinary acceptance of the term, are frequently co-existent with early arrest of the menses and conversely. I have met with several examples. One woman, aged over forty, had, in consequence of a love disappointment, taken to bed when she was twenty; she believed that she had spinal weakness. She remained in bed over twenty-five years. Her menses ceased when she was thirty-one. Another woman, aged forty-six, had been wholly in bed over twenty years; except a badly ulcerated varicose leg, which had remained practically untreated for many years, she had no ascertainable disease. Menstruation had ceased at thirty-two. When I had occasion, being then in general practice in Scotland, to visit her sister and brother, both seriously ill, I found one day, to my surprise, that she had left her bed to look after the affairs of her brother's farm. On their recovery she promptly returned to bed, and probably remains there if still living.

Exhausted fertility may be classed with *endometritis atrophica*, and affords us another class of cases in which there is very little, if any, palpable cause; but for the most part these are cases of *early*, not of premature, climacteric.

Obesity has been mentioned as a cause of premature cessation. Relatively this may be so, but I am unable to confirm Kisch's beliefs, who regards fatness as the cause; it is, in my opinion, the consequence of arrested menstruation. Kisch gives one instance of a girl of twenty-one who first menstruated at fifteen, she always had pain; for five years menstruation was irregular and then ceased. After cessation she became very fat. Another girl of seventeen

first menstruated at nine ; the menses became scanty, and for eighteen months there had been practically nothing seen. But on examination, there was a pathological explanation—the uterus was displaced and the cervix contracted.

Sexual incapacity may be relative or positive, and some cases of early menopause ought properly to be attributed to this. Montgomery (25) relates the following example : A girl of twenty-seven years of age, who had been married four years, never conceived. First menstruated at fourteen ; recurrence every five weeks, regular ; duration three days, painful. Continued regular for about three years, but quantity decreased. Menstruation ceased at twenty-six. When married she weighed ninety-eight pounds, now weighs 170 pounds. Health good ; no aches or pains.

My own experience has only afforded me two clear examples of premature menopause, in which there was no discoverable constitutional or local disease. Both these women attended my out-patient department at hospital. One patient had become irregular at twenty-eight. She had been married at twenty-five and had one child when twenty-six, which survived. She did not nurse her child, and menstruation returned within three months of her parturition. During the latter part of the following year it became scanty and irregular, and ceased definitely at thirty. Her first menstruation was at fourteen, and she had been quite regular every twenty-seven or twenty-eight days from the age of fifteen until marriage. She had never suffered undue pain. She had no climacteric inconvenience, and felt well and strong.

The other patient was single and virginal. She was fairly regular from fifteen to sixteen, and after sixteen up till twenty-eight years of age was "poorly" about every five to six weeks. The periods became scanty and irregular when she was twenty-eight, and definitely ceased when she was twenty-nine. The uterus and ovaries were ascertained to be normal. She had no appearance of goitre, but was subject to palpitation and occasional syncope attacks. Otherwise she seemed quite healthy. There was no cardiac bruit, no pulmonary affection, and no symptoms of chlorosis. The first of the two patients had not altered in figure ; the other had become much stouter, and the abdominal walls especially had become obese. I had both patients under observation for over two years and neither had ever any menstrual show.

Referring to cases furnished by former writers on the subject, Courty and Brierre de Boismont record one case each at twenty-one ; Mayer found two cases at twenty-two ; Krieger, one case at twenty-three ; Brierre de Boismont, one case at twenty-six and another at

twenty-seven; Guy and Tilt, each had cases at twenty-seven; Boismont, Guy and Courty, each cases at twenty-eight; Mayer, Courty and Boismont, each cases at twenty-nine; Mayer five cases and Guy and Tilt each one case at thirty. Assuming that in all of these cases there was no special cause discovered, we have, therefore, twenty-two examples of **Premature Menopause**, and adding my own two cases, only twenty-four, out of a very large number of cases under the care of competent observers. A recital of the full histories of each of these cases would not aid us much in determining why the change occurred so soon. It is permissible to surmise that there was some physiological or pathological explanation, but if so it was not found.

The clinical considerations will depend on the existence of symptoms. If, as in the first of the two cases I have recorded, there has been evidence of sexual potentiality, as shown by previous regular menstruation and gestation, and the arrest of the periods causes no inconvenience, and the general health is well maintained, treatment of any sort beyond common-sense advice to the effect that the patient should not worry seems uncalled for. If the general constitution has been mal-influenced from any cause, this should of course be seen to. Tonics, especially arsenic, iron and strychnia, are indicated. If there should be any symptoms of a sub-acute or chronic endometritis, even of trivial nature, mercury should be added.

Scanty Menstruation in young girls may generally be attributed to errors in hygienic surroundings or in dietary. Girls at school, or shop girls, often afford examples of this sort. Attention to dietetic matters, restraining the school girls from sweets, pickles, pastry, etc., taken between meals, and correcting the too often insufficient nourishment of the shop girl, and insisting on judicious exercise, will generally ameliorate the condition.

Scanty menstruation is very frequently painful; if not, it is often to be referred to such causes as I have mentioned, or to imperfect congenital development of the generative organs. Change of residence and of general conditions of life often proves beneficial in restoring the appearance and regularity of the menses. The cure of constipation is very essential in treating all cases of deficient menstruation. Saline purgatives, combined with the less astringent preparations of iron or the extract of cascara sagrada with nux vomica, will be found useful.

Should there be scanty menstruation or premature menopause in a young married woman, accompanied by any psychical or physical symptoms which do not yield to medicinal treatment, it

may be worth while to employ **electricity** as a means of inducing a greater potentiality of the internal genitals.

The faradic current applied with the intra-uterine electrode has seemed serviceable in cases of sterile married women who have never conceived during three or more years of conjugal life, and have ceased to menstruate. After from five to twenty applications the periods often return, and the patients conceive. Dr. Lapthorn Smith (26), of Montreal, writes regarding the use of electricity during the menopause: "Bipolar intra-uterine faradisation with a medium wire causes a flow of nervous energy and sometimes of blood, which make a very fair substitute for the menstrual flow. Secondly, intra-uterine negative galvanisations cause a flow of blood towards the uterus. In women who reach the menopause without having been married intra-uterine or intra-vaginal applications are generally refused. In such cases, general faradisation or local galvanisation will be found beneficial. By applying the electrodes of the continuous current to each side of the thyroid gland, so as to stimulate the great sympathetic nerves, the calibre of the cerebral blood-vessels can be very much diminished, and very much less blood will flow to the head. In some cases of premature menopause the menses can undoubtedly be made to return by the same treatment, using negative intra-uterine galvanism as in treating dysmenorrhœa."

Writing with much moderation, he admits that fully 90 per cent. of cases of amenorrhœa may be best treated on general medical principles. "Of the remaining 10 per cent., more than half suffered excessive pain with the menses, or in some cases with a very scanty flow, and were therefore classed as dysmenorrhœa." "Electrical treatment used solely with a view to bringing on the flow is employed by means of the faradic tension current—that is, from a long, fine, secondary wire. Sometimes two or three applications are sufficient, in other cases two or three applications a week, for three months, were necessary; an infantile condition of the genital organs requires still longer treatment." "I am fully satisfied," says this author, "that the most pronounced case can have her uterus so powerfully stimulated by means of the intra-uterine bipolar faradisation that eventually it will attain a depth of two and a half inches, and, other conditions being favourable, she will conceive and bear children." Beard and Rockwell have published a number of cases of suppressed menstruation cured by electricity. Dr. Paul F. Mundé has reported most favourably regarding the beneficial effect of electricity in amenorrhœa and suppression. He used faradism either externally to the

utero-ovarian region or to the neck of the womb; in some obstinate cases he employed one pole in the uterus, the other alternately over the uterus and ovaries (27).

The main objection to this method of treatment is the length of time over which the applications may have to be used, three to six months or longer being often required. And in my opinion local treatment in young unmarried girls should be restricted as much as possible.

Tardy or Late Menopause.—Nearly every author who has given attention to menstruation has stated, either from his own experience, but in many cases from impressions derived from others, that the menopause is sometimes delayed by many years beyond the average. Recent knowledge has enabled us to refer the great majority, if not all, of these phenomenal cases to pathological conditions. This view was, however, foreshadowed by Tilt and other authors of the last twenty-five years. "Protracted menstruation is, however, more frequently caused by affections of the womb than of any other organ, and fibrous tumours of the womb often retard the date of cessation" (28). Still, following the example of writers who had preceded him, Tilt clung to the belief that there were phenomenal exceptions to the general mean age of the menopause. "Twice have I known the menstrual flow to continue its regular appearance up to the sixty-first year, in ladies of remarkably strong constitution; which was the case with a lady who regularly menstruated up to the time of her death in her eighty-fourth year" (29). Mr. Robertson cites a case in which menstruation ceased for twelve months about the fiftieth year, when it again became regular and continued so till the seventieth year. He also refers to Mayer's cases (30), 6000 in number, in twenty-eight of which menstruation was still progressing at the age of fifty; in eighteen at fifty-one; eighteen at fifty-two; eleven at fifty-three; thirteen at fifty-four; five at fifty-five; four at fifty-six; three at fifty-seven; three at fifty-eight; one at fifty-nine; four at sixty; four at sixty-two; and in three at sixty-four. From the final comment, "the seven last cases occurring in the upper classes," it is fair to infer that Tilt esteemed all these to be physiological, not pathological, hæmorrhages.

Again, "Auber attended two women, one sixty-eight and the other eighty, who for the last few years had again menstruated".

"Saxonia states that a nun, in whom the menstrual flow ceased at the usual time, experienced its return when her hundredth year was attained, and it continued regular until her death three years later!" Rush (31) mentions the case of a woman confined for the

last time in her sixtieth year, she menstruated until her eightieth, and died in her hundredth year. Meissner states that a woman who first menstruated at twenty bore her first child at forty-seven, and the last of seven other children at sixty. Menstruation ceased and re-appeared at seventy-five, continuing until ninety-eight, then stopped for five years again to return at the advanced age of one hundred and four. In 1812 she was still alive! (32).

Despite the most significant interpretation of these cases Tilt writes: "I might increase the number of such cases which are *not instances of irregular flooding but of the menstrual flow occurring regularly with its attendant symptoms or followed by pregnancy* (33). These facts contradict the opinion of those who assert that when the menstrual flow has once ceased definitely between forty and fifty, any blood that may afterwards flow from the womb must depend upon some undetected ulceration, but in most of the cases of late menstruation that have come under my notice I have not found ulceration." These were days when Henry Bennett's former idea of "cervical ulceration" being the great dominating uterine lesion was being vigorously doubted, if not quite disproved. Fleetwood Churchill (34), writing six years before this edition of Tilt's work, says of menopastic uterine conditions: "I have carefully examined the uterus in many cases whenever there was local complaint. In the majority I have found no organic change, in some depression, and in others hypertrophy with excoriation. I have seen the irregular red discharge kept up by granular excoriation."

Beigel mentions one instance of menopause at sixty-five and another at seventy-two. Raciborski (35) cites cases, one from Fabricius Hildanus, of a woman named Dorothy, who ceased menstruating at fifty, again had a return of the periods at seventy for three months, or, as it is expressed, "*une hémorrhagie venant périodiquement comme la menstruation pendant trois mois consécutifs*". This old lady lived till she was about a hundred years old. Another case, taken from Courty, relates regular menstruation in a woman at sixty-five, etc. Mauriceau (36) quotes Schenkus to the effect that one woman menstruated to the age of 103!

Much has been made by Kisch and other writers regarding Semple's (37) cases. To show how valuable they are, I quote his exact words:—

"MENSTRUATION AT ADVANCED PERIODS OF LIFE.

"Sarah Johnson, aged eighty-seven, was attended by me, in the year 1830, in the workhouse of the Liberty of St. Andrews, and

menstruated freely, but she in a few days after died. She complained of considerable pain. The fluid did not coagulate.

"1830.—Ann Lovell, aged seventy-five, a patient of mine, in the Liberty of the Rolls workhouse, was attacked, the early part of this year, with violent menorrhagia. The common remedies, *inf. rosæ acid.* etc., removed the complaint. The fluid did not coagulate. This woman has continued at irregular intervals to menstruate till the date of this communication; she menstruated last week.

"Mary Waller, aged sixty-seven, placed herself under my care, in the infirmary for the parish of Islington, also in the year 1830. She was then labouring under a violent attack of menorrhagia. The fluid did not coagulate. She continued two or three years on my list, and died from exhaustion. The usual remedies relieved this woman. It struck me as curious, that in three public establishments, distant from each other, three similar cases should have occurred in my practice.

"Mary Dick, aged eighty, was attacked, at her own residence, with an abundant flow of the menstrual discharge. When I saw her she was in great pain. She said she had not been unwell for thirty years before. Opiates relieved her, and she finally got well. This case occurred in the year 1829.

"Mary Brown, a nurse in Islington Infirmary, is at present menstruating; she is nearly eighty. She says her menses ceased when she was forty years of age. She has had the discharge now regularly for two or three years and at monthly periods. Dover's powder relieves her.

"Ann Lovett, about eighty years of age, a bed-ridden patient, now under my care in the infirmary at Islington, bleeds one month at the nose and the other month menstruates regularly; the menstrual fluid does not coagulate. When the menses cease leucorrhœa appears. She requires aperient medicines and occasionally zinc lotions. This patient's case is similar to Lovell's mentioned already in this paper.

"A female consulted me about two years ago for an attack of erysipelas on the face and arms. She stated that she menstruated at seventeen, and continued to be regular till thirty years of age, when the catamenia finally disappeared. She was, at the time when under my care, forty-four.

"In the year 1833, Mary Owen, aged seventy-seven, a pauper patient in the workhouse of the Liberty of the Rolls, was placed under my care with an abundant menorrhagic discharge. She was in great pain. She had not been in such a state, she said, for these last thirty years. In a few days, however, she died.

"1833, Aug. 31st.—Charlotte Kiernan, aged seventy-one, a pauper patient in the last-named institution, applied to me with abundant coloured discharge from the uterus. She was in much pain. Purgatives and opiates relieved this female. She told me that she 'was in the same state that she was when at the age of twenty'. This woman is now quite well.

"Mrs. Gray, a nurse at one of the public institutions under my charge, aged fifty-five years, told me that seven years ago her menses ceased, but for five years she had a monthly discharge of blood from the nipples. Her health was unimpaired.

"It is the general opinion that when aged females are attacked with this peculiar discharge they are sure speedily to die.

"My experience does not warrant me in forming this conclusion for several of my aged patients subjected to this infirmity are now as well as ever they were, and very likely to continue so; nor do I think they will die, except from extreme age.

"I am, sir,

"Your obedient servant,

"ROBERT SEMPLE.

"2 Rufford's Row, Islington,

"Dec. 23rd, 1834."

It is remarkable, when one reads a number of authors on this subject, to find how the same "big gooseberry" cases are brought forward from time to time, and how literally these authors all borrow from each other, often without a word of acknowledgment.

All, or nearly all, of the foregoing cases fall under one category—undiscovered uterine disease: Uterine endometritis, corporeal uterine sarcoma or carcinoma, fibroid or polypoid uterine tumours, malignant or semi-malignant (?) adenomata of the cervix, urethral caruncles, senile vaginitis, etc. Possibly not a few of these cases may be referred to the inventive powers of the patients. Those that *are* accurate would now be divided into (a) retarded menopause from disease and (b) post-climacteric bleeding from disease.

Before mentioning my own experience on this point, I would refer to another method of supporting these phenomenal cases of late menstruation, namely, **alleged fecundity** and **child-birth** at **advanced ages**.

Perhaps one of the most often quoted instances is the birth of Valerius Saturninus when "his mother Cornelia had reached seventy years of age".

Let us see how historical (?) facts are recorded. Raciborski (38) in 1868 writes: "Au rapport de Pline Cornélie aurait mis au monde

Valerius Saturninus à l'âge de soixante-dix ans". Kisch in 1874 writes: "So soll ja Cornelia in ihrem 62 Jahre von Valerius Saturninus entbunden worden sein" (39). In 1894 Auvard (40) states: "Cornelie mère des Gracques accoucha à l'âge de soixante-dix ans," but prudently adds, "mais il n'est pas dit que la menstruation continua jusqu'à cet âge, car quelques femmes peuvent concevoir après la cessation des règles; l'ovulation se faisant un certain temps après que l'écoulement sanguin a disparu". Well, let us admit that menstruation did cease, say at fifty or fifty-five years, my friend Auvard still seems to accept the story. What are the facts?

As to the lady,—Cornelia, the younger daughter of P. Scipio Africanus, was married to T. Sempronius Gracchus, censor, 169 B.C.: was by him the mother of two tribunes, Tiberius and Caius. She was virtuous and accomplished, etc. She superintended with the greatest care the education of her sons, whom she survived. She was almost "idolised" by the people, who erected a statue to her memory with the inscription: "Cornelia, mother of the Gracchi".

As to the alleged son,—who Valerius Saturninus was history says not. We see that Tiberius, who lost his father at an early age, and predeceased his mother, was born about 168 B.C., and died when aged about thirty-five, 133 to 134 B.C. Caius, the second and only other son of whom we have any record, was born about 159 B.C., or nine years after his brother.

Now Pliny published his *Historia Naturalis* in or about 77 B.C. (41). Every student of history knows how thoroughly unreliable Pliny is as an observer or analyser of facts; as a recorder of things he had heard and read he stands *facile princeps* as the great prototype of the modern evening newspaper reporter; and his facts are often little more reliable than those bawled in the streets to induce curious persons to buy the halfpenny papers.

How did Pliny start the idea, and where did he get it? Saturnus was a mythical god-king of Italy to whom was ascribed the introduction of agriculture, and from whom we derive the word "Saturnalian" (signifying loose, free, dissolute), suggesting the free pleasure of the Roman festivals solemnised in honour of the deified king. Pliny the younger, born in 61 B.C., and nephew to the historian, had an intimate friend named Pompeius Saturninus. Valerius was the family name of one of the great patrician families of Rome; whereas the Gracchi were notable as sympathising with the people, and hence styled plebeians. There is little doubt that "Valerius Saturninus" was the *nickname* of Pompeius Saturninus, one of young Pliny's acquaintances, and that P. Saturninus had no

more right to claim Cornelia as his mother than M. Raciborski had.

Assuming Cornelia's age to have been eighteen at marriage, *i.e.*, born about 187 B.C., and assuming young Pliny's friend to be about the same age as himself, say born in 60 B.C., the age of Cornelia would then have been one hundred and twenty-seven, not sixty-two or seventy.

I have gone into this one case at some length so as to show how ridiculous and unreliable this "classical instance" is. If an edition of Pliny's *Historia* had been edited by a Jewish gentleman named *Ananias* (*circa* 33 A.D.), one could well understand the interpolation of such narratives. But if it is still claimed that Pliny actually recorded the fact, I further observe that his great work was brought out ninety-two years after Cornelia's marriage, ninety-one years after the birth of her first son, and eighty-two years after the birth of her second and only other son known to history; that her husband, Titus Sempromius Gracchus, died shortly after the death of his second son, Caius—consequently neither the recorded facts of the lady's good character nor the physiological probabilities warrant our attaching the slightest credence to the story.

If it is possible to seriously consider some of these alleged births at advanced ages, we must regard most of them as either fabulous or miraculous! Kisch states: "Haller erzählt zwei fälle in denen Frauen die eine im 63 die andere in 70 Jahre Kinder geboren haben (42). Meissner hat eine Frau in ihrem 60 Jahre von ihrem siebenten Kinde entbunden. Thibaut de Chauvalon erzählt in seine Reisebesschreiben dass Weiber von Martinique und Guadeloupe (obgleich sie früh menstruiert seien) manchmal noch sehr spät concepiren; so berichtet er von einer 95 jährigen Frau deren 5 jährige Tochter er selbst gesehen hatte." "Haller records two cases of women who gave birth to children when aged sixty-three and seventy years respectively. Meissner delivered a woman aged sixty of her seventh child. Thibaut mentions in his book of travels that the women of Martinique and Guadaloup (who begin to menstruate at an early age) not infrequently conceive late in life; he reports that he personally saw one woman aged *ninety-five* with her daughter aged five years." This is a fairly good traveller's tale! The explanation probably is that the old lady said the girl was her grand-daughter, and that Thibaut misunderstood the precise relationship. It may be noticed *en passant* that Kisch passes by in silence the latter part of the history of Meissner's patient recorded at length by Tilt.

The report of the Registrar General for Scotland (February,

1862) relates that a woman in Glasgow was delivered at fifty-seven years of age. *Schmidt's Jahrbuch*, No. 65, 1838, records the history of a well-formed woman aged fifty years, married nineteen years, who two years after the cessation of the periods gave birth to her first child.

Works on Medical Jurisprudence contain several examples of late pregnancy. Nevermann's cases, quoted by Dr. Alfred Taylor (43), give out of 1000 cases in 10,000 births 436 children born from mothers aged above forty; of these mothers, nine were fifty, one each fifty-two, fifty-three and fifty-four years of age. Capuron, in his *Médecine Légale des Accouchements*, gives some very doubtful examples; one case in which a woman bore a child when she was sixty years of age (p. 98). Orfila (44), quoting from Bernstein, caps this by relating a case of menstruation continuing to the ninety-ninth year, the first child born at forty-seven and the last at sixty. Casper (45) placed the extreme procreative age of cessation from the fiftieth to the fifty-second year. This is in accordance with our own opinion.

I have myself attended two women, both primiparæ, at advanced ages. One, a Mrs. Ritchie, was married at about twenty-nine, and lived with her husband for over twenty years without conceiving; in her fiftieth year she became pregnant, and I delivered her in 1877 of a strong, healthy male child. Prior to conception she had been irregular for about a year, and had no period for several months before conception. The other woman was a widow who had never been pregnant during her first marriage, and had reached the menopause. At fifty years of age she married again, and within ten months gave birth to a child; the menses did not re-appear.

None of these cases of late birth, which can be accepted, necessarily prove a correspondingly late menopause. Numerous examples might be quoted, but as many of them are, if not as ancient as that of Sarah (46) (1898 B.C.), quite as difficult of physiological explanation applicable to 1896 A.D., they need not now concern us. Besides, it is clear that Sarah's was a post-climacteric case, illustrating the first clinical observation that ovulation and menstruation were independent processes: "It ceased to be with Sarah after the manner of women" (47).

As to my own experience, I know that a considerable proportion of healthy women in all ranks of life do not reach the menopause till after their fiftieth year. From fifty to fifty-four the number gradually decreases, and at fifty-five very few absolutely healthy women will be found menstruating. I have had one example of

a still later alleged regular menstruation. This was in a lady of sixty, who had had a large family (eleven children), the last when she was over fifty years of age. She consulted me only incidentally, and during our conversation she stated that she was still regular in her monthly periods. She declined an examination, as she said she was perfectly well internally; and therefore I am unable to say whether any uterine condition explaining the persistence existed.

The following case seems to be typical of what is usually regarded as "very late menstruation". Mrs. Ann S., of Tooting, aged sixty-five; married forty years; two children; four miscarriages; last pregnancy, thirty-six years ago; no "periods" for about twenty-five years, until three years ago. In 1891 she noticed a slight blood-stained discharge, and from time to time, until the middle of 1893, a watery, somewhat offensive discharge alternated with the blood discharge. When she came under my treatment on 6th June, 1894, this discharge was present. On examination, the endometrium bled pretty freely. The uterus was three and a quarter inches in depth; roughened patches could be felt with the sound.

On 21st June, after thorough vaginal disinfection, the cervix was dilated up to No. 18 Hegar. There was free bleeding, and pieces of organised tissue began to issue from the interior of the uterus even before the finger was introduced. A soft fungoid mass was felt on the posterior wall of the *fundus uteri*. The sharp curette was used freely, and, after uterine irrigation, pure nitric acid was applied to the endometrium. The uterus was packed and drained with iodoform gauze. Examination of the material removed was made, and the pathological report is as follows: "The material consists of whitish rounded lumps of firm tissue of various sizes, the largest being as big as a bean. Microscopically, the tissue consists of dilated glandular spaces lined with columnar epithelium, and surrounded by a densely cellular matrix. There is nothing to suggest malignancy, the appearances being such as are met with in polypoid endometritis."

Now, one class of former observers would have regarded this case as a return of menstruation; another would have considered the symptoms indicative of malignancy. The patient went home well on 2nd July, and has remained healthy, with no return of the hæmorrhagic or mucoid discharge.

These post-climacteric cases should not be classed as menopausal.

Of 500 post-climacteric cases, 36.5 per cent. had a return of hæmorrhage after the menopause had been established a year or

more. Of these, cancer of the cervix caused the bleeding in 54 per cent. of the cases (48).

Clinical Course of the Normal Menopause.—I have already remarked on the different significance attached to the word menopause. It is convenient to regard the term as embracing the whole period during which the change, from regularity of menstruation until actual cessation, occurs. Strictly, the term should either be applied to this time or to the time of the climacteric, which is again often confounded clinically with the post-climacteric or senile period. So indefinite are the views expressed by some writers that Gardanne (49) and Menville (50) classify practically all diseases which may affect woman after her forty-sixth year as "diseases of the critical age," or climacteric; Tilt (51) more cautiously, but still with much elasticity of pathology, classifies as "diseases of the change of life" all morbid affections which occur for the first time, or recur with great aggravation during that period, "variable as it is in each individual, but generally comprising the three years previous to, and the five years subsequent to, cessation".

I am not prepared to accept so inclusive a classification. I would prefer to class some functional irregularities as pre-menopastic and others as post-menopastic. Organic conditions at the menopause may be referred to the change of life if arising within two or three years before the definite cessation, but unless there have been symptoms present showing that disease has affected the woman during these years, we ought to refer them to post-climacteric changes. At the same time, we must admit that vaso-motor disturbances may occur both before irregularity of menstruation, and persist for two or three years after cessation. And, further, that certain constitutional diseases, *e.g.*, rheumatic arthritis, gout or rheumatism, may be first manifested shortly before cessation, and persist more or less during the rest of the patient's life.

The Average Duration of the Menopause or Existence of Pre-Menopastic symptoms is 2.5 years. It is extremely rare for the cessation to occur without some physical discomfort or some disturbance of the nervous system. Some women, however, cease menstruating with very slight inconvenience. After being regular every month for over five and thirty years, they miss the usual "period," which may never return. Some slight diarrhoea or inappreciable discomfort is all that is noticed; then health and well-being are unaffected. Such experiences are unfortunately rare.

Others suffer irregularities for a few months, after which the menses wholly disappear.

It is more usual for a woman to miss one, two, or more periods, then to have a menstrual return of almost normal quantity and duration, and again to repeat this at gradually longer intervals and with a diminished flow over a period of two years or more, until cessation is reached. As a rule, the intervals between "the periods" during the irregular or "dodging" time are longer than formerly, say from six to eight weeks. We sometimes find a more frequent recurrence; instead of a return every twenty-eight days, menstruation may recur every twenty-one, or even every fourteen days.

The quantity of hæmorrhage is usually gradually diminished, and the flow becomes less blood-like; alternatively there may be occasional appearances of brighter blood than is common during menstruation. In some women menorrhagia signals the beginning of irregularity.

The blood losses at "the periods" may be markedly increased without any discoverable cause, and apparently are due only to some temporary functional derangement.

Irregularity of the menses may be protracted over four or five years; but generally some uterine or other pelvic affection will be found in these cases.

Chemical changes in the blood and tissues are constant vital phenomena. The "menstrual wave," or "wave of vital energy," described by Stephenson, recurs rhythmically; increased oxidation causes activity of the circulation, increase of the temperature, increase of the urea and carbonic acid in the economy from the retrograde tissue changes; and, finally, during menstrual life the flow of blood from the uterus carries off the effete materials from the highly charged system. The elimination of albuminoids, as shown by the altered condition of the blood after menstruation, is greater than can be accounted for by the blood discharged.

When the menopause is attained suddenly the retention of such albuminoid substances must act toxically. Hence the resulting clinical fact that sudden cessation of the menses is, in the majority of cases, attended with pronounced symptoms of discomfort; and that it is in such that untoward results are most likely.

In the more common menopastic disorders, one great distinguishing feature is the extreme uncertainty of their duration; another is their lack of clearly typical characteristics.

Allusion has already been made to the atrophic changes characteristic of the menopause. The first structures affected by approaching senility are those which can be best spared without serious damage to the vitality. Thus it is that the spare blood pigment which colours the hair, the subcutaneous tissue which makes the

face smooth and without a wrinkle, are first withdrawn. Nature feels that her income is less than formerly, and retrenchment of expenditure becomes a necessity. Next follows the curtailing in energy of those busy metabolisers, the blood glands; the liver and the spleen are more important and therefore more difficult to control, so the utricular glands, the ovaries, the intestinal and abdominal glands are next subjected to the needs of economy; then the spleen, the liver, the bones, and, finally, higher centres and brain succumb, and then the play is finished, and the curtain falls (52).

The cessation in nearly every case is accompanied by some perversion of the nervous system. It may be said that a "normal" menopause is accompanied by less marked, but essentially the same, symptoms as an abnormal or exaggerated or diseased set of menopastic changes.

It is very difficult to estimate what should be classed as normal. We must be guided largely by what is most usual, and mainly of functional nature.

Sudden sensations of heat, accompanied by flushings; frequent cold clammy perspirations; shooting neuralgia-like pains, often of indefinite nature and variable situation; headaches; fulness of the vessels of the head and neck, palpitations, sciatica, coccygodynia, and other neuralgias; gastric irritation, diarrhoea, inertia, lassitude, uncertainty or irritability of temper, temporary or mental depression, sometimes varying with hysterical excitement, etc., etc.; have all been so often classified as pertaining to the normal change that one cannot now venture to deny that all these functional disturbances may be regarded as normal to the pre-menopastic and the early menopastic periods.

We may, therefore, refer to some of these vaso-motor, and also to some metabolic disturbances in fuller detail.

In at least half of the cases in which no other inconvenience is experienced (especially in individuals who have ceased to menstruate suddenly) there is some leucorrhœal discharge. From 10 to 15 per cent. have a periodical profuse leucorrhœa which takes the place of the former blood discharge. These periodical mucous discharges often continue for two or three years, sometimes longer. Not infrequently they cause, or are accompanied by, vaginal itching and pruritus vulvæ. In senile women, especially those who have been unmarried, one often finds a senile vaginitis which seems partly due to the persistent leucorrhœa, and is often accompanied by severe burning and itching sensations.

Diarrhoea occurs in 20 per cent. or more of those who have

suddenly and permanently reached cessation. Some women have monthly attacks, which, reasonably, may be attributed to cyclical irritation of pelvic nerve centres. Gastric disturbance and intestinal flatulence are very common. One should not attribute too great importance to these unless the symptoms are markedly exaggerated from the usual condition prior to irregularity.

Vomiting of mucoid matters has been stated by some writers to be common experience; 6 per cent. of Tilt's cases are said to have found relief in this manner. My observation is not in accord with this. On the other hand, I find a small proportion of cases suffer from gastric ulceration as a consequent or concomitant condition of cessation; in these vomiting of small quantities of blood, at times mixed with mucus, is not uncommon. Vomiting of small quantities of blood at this period of life is not always symptomatic of gastric ulceration. Congestion of the gastric mucous membrane (often accompanied by hepatic stasis) with temporarily increased glandular activity may cause rupture of capillaries, and hæmatemesis mixed with mucus results. Former writers have regarded these hemorrhages as "vicarious menstruation," but I am quite satisfied that this is erroneous. I have frequently seen hæmatemesis without other signs of gastric ulceration in chlorotic girls, in some of whom there was no arrest of, but increased, menstruation. At the menopause the cause may be referred properly to sympathetic nerve irritations acting on the gastric capillaries and venous radicles, and probably originated, primarily, by atrophic or degenerative changes in the gastric glands, which give rise to slight and superficial ulcerations.

I have frequently remarked on this condition to my friends and clinical assistants, and am glad to find my opinion corroborated in a recent interesting paper by Kuttner (53).

Hepatic symptoms (passive congestion) are common; sometimes we have hæmatemesis, sometimes bilious vomiting, as a consequence.

Congestion of the vessels of the head, causing redness of the face, headaches, indistinct vision, buzzing sounds in the ears, deafness, giddiness, epistaxis, disturbed and irregular sleep, may all be purely functional.

Congestion of the intestinal tract, shown by gastric catarrh, intestinal irritation, imperfect biliary action, the development of hæmorrhoids, and many other less easily classified conditions, such as bronchial catarrh, shortness of breath, numbness of the limbs, anuria or polyuria, skin affections, *e.g.*, pruritus or kraurosis, neuralgias, palpitations, etc., etc., may all be referred to irregular vaso-motor action. The common characteristic is that the symp-

toms do not remain constant, and cannot be attributed to definite structural changes.

Some patients become thin very rapidly, the mammary glands and the superficial fats shrivel up; others, the majority, during the early menopausal period become fatter, the mammae growing soft and flabby, and the abdomen thickly covered with adipose deposit.

When any one set of symptoms persists, either singly, or in combination with others, then we pass from "normal" change of life to the exaggerated or "abnormal" changes, which, as I have said, differ only in degree and persistency of condition from the more usual affections we must accept as normal.

(1) "Etude clinique sur les maladies des Vieillards," *Journal de Méd. de Beau.*, 1843.

(2) *Dict. des Dictionnaires de Méd.*, article "Vieillesse," 1851.

(3) *Klinik der Greisenkrankheiten*, Erlangen, 1860.

(4) *Beiträge zur Lehre von den Greisenkrankheiten*, Leipsig, 1863.

(5) *A Practical Treatise on the . . . Diseases of Advanced Life*, London, 1849.

(6) *Clin. Lect. on Senile and Chronic Diseases*. Transl. New Syd. Soc., 1881.

(7) *Handbuch der Spec. Patholog.*, vol. i., p. 316.

(8) Geist, quoted by Charcot, *loc. cit.* (6), p. 29.

(9) "On Fatty Degeneration," *Medical Gazette*, London, 1850, p. 229.

(10) *Mém. de la Soc. de Biologie*, t. i., p. 33, 1850.

(11) *Vide* Charcot, *loc. cit.* (6).

(12) *Brit. Gynecol. Journ.*, vol. ii., p. 295.

(13) *Vide* chap. on Fibroids, *infra*.

(14) Mangiagalli, *Annali di Ostet. e Gin.*, p. 45, 1895.

(15) *Die Menstruation eine Gynäkologische Studie*, 8vo, Berlin, 1869.

(16) *Vide* Mangiagalli, *loc. cit.*

(17) *Physiol. and Diseases of Women*, p. 185.

(18) *Universal Medical Magazine*, vol. viii., No. 5, p. 346, February, 1896.

(19) *Das Klimakterische Alter der Frauen*, Erlangen, 1874.

(20) *Dictionaire Ency. des Sci. Medical*, article "Menstruation," Depaul et Guéniot, p. 711.

(21) *Annal. de Gynécol.*, etc., t. xlii., p. 412.

(22) Quoted by Kisch, *loc. cit.* (19), S. 35.

(23) Scanzoni, *Beiträge z. Geburt. und Gynäk.*, Wurtzburg, 1858, etc.

(24) Bevan Lewis, *Text-book of Mental Disease*, p. 397, London, 1889.

(25) *Medical News*, Phila., lvi., p. 461.

(26) *International System of Electro-Therapeutics*. Ed. by Bigelow. Phila., 1894.

(27) Article in *American Journal of Obstetrics*, June, 1890, vol. xxi., and *Electricity as a Therapeutic Agent in Gynecology*; also *vide* other articles in vol. xxi., *American Journal of Obstetrics*, New York.

(28), (29), (30) Tilt, pp. 31, 24, and 25, 26.

(31) Burdach's *Physiologie*, Bd. iii., S. 395.

(32) *Krankhafte Zustände der Menstruation in den klimakterischen Jahren und Wiedererscheinen derselben in späten Alter. Die Frauenzimmerkrankheiten*, vol. ii., p. 905, Leipsig, 1842, 3 v., 8vo.

(33) The italics are mine.

(34) *Diseases of Women*, 3rd edition, p. 235, Dublin, 1864.

(35) *Lib. cit.*, p. 254, chap. i.

- (36) *Traité d'Accouchement*, t. i., p. 49, 6me. ed., Paris, 1721-8.
- (37) Extract from *Medical Gazette*, vol. xv., 1835, pp. 467-468.
- (38) *Lib. cit.*, p. 254.
- (39) *Monograph cit.*, chap. ii., p. 44.
- (40) *Traité de Gynécologie*, 2me. ed.
- (41) It is presumably from Hardouin's translation (Paris, 1685, 5 vols., 4to, or 2nd edition, 1723, 3 vols., fol.), or from Panckoucke, Paris, 1829-33, 20 vols., with French translation and notes by Cuvier and other eminent French naturalists and literary men, that the notion has been derived. Another valuable critical edition of Pliny's text is by Sillig, Leipsig, 1831-36, 5 vols., 12mo.
- (42) And *vide* Briand's *Man. Complet de Médecine Légale*, p. 137.
- (43) *Medical Jurisprudence*, vol. ii., p. 309, 4to ed., 1894.
- (44) *Méd. Légale*, 4to ed., v. i., p. 257, 1848.
- (45) *Handbook of Forensic Medicine*, vol. iii., p. 259. New Syd. Soc., 1864.
- (46) Genesis, xvii. and xxi.
- (47) Genesis, xviii., 11.
- (48) *Vide* Neumann, "Uber Postklimakterische Genitalblutungen," *Monatssch. f. Geb. u. Gynak.*, B. i., H. 3. and abstr., *Brit. Gynæcol. Journal* (by Webster), vol. xi., p. 265.
- (49) *Avis aux femmes entrant dans l'age critique*, 1816.
- (50) *De l'age critique chez les Femmes*, 1840.
- (51) *Lib. cit.*, p. 75.
- (52) Refer to Johnstone's "Menopause, Natural and Artificial," *N.Y. Journ. of Gynecol. and Obstetrics*, Ap., 1894.
- (53) *Berlin. klinish. Wochensch.*, Nos. 7-9, 1895.

CHAPTER V.

DISORDERS ATTENDING THE CHANGE OF LIFE.

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(For other references see end of chapter.)

WE must not attribute all coincidental illness observed at or about the time of the menopause to the change of life. It seems to me that too much has been made by former writers, such as Gardanne, Menville, Tilt, and Kisch, in their works of these, so to speak, concomitant, and yet by no means pathognomonic illnesses. Still, if the effect of the change of life is such that antecedent conditions are made worse by it; or conversely, if these existing conditions cause the menopause to be more harmful to the individual, it is practically necessary to recognise the relationship.

The disorders of the change of life are conveniently divided into, 1, those affecting the system generally and the viscera, other than the genitalia or pelvic organs; 2, those affecting the uterus, the uterine appendages, and the other pelvic organs.

1. **Climacteric disorders** of the first class (*i.e.*, general systemic disorders) are referred to five sub-classes, *viz.* :—

- (a) Affections of the **nervous** system.
- (b) Affections of the **circulatory** system.
- (c) Affections of the **digestive** system.
- (d) Constitutional or **diathetic** conditions, arising from heredity or acquired proclivity to certain diseases.
- (e) **Minor affections**, *e.g.*, **skin eruptions**, etc., which depend on complex causes.

It should, however, be recognised that while I have thus separated these individual classes of disorder, it is most frequently found in practice that two or more of them co-exist, so that in great measure they must be discussed not as separate but as conjoint conditions.

If the theory which I maintain is correct, the atrophy of glandular structures throughout the body is the originating cause of the cessation of menstruation, which atrophy is brought about by physiological decay, or it may be in certain instances by morbid conditions.

Then follows the loss of nerve influences (derived from centres and ganglia), which affect the vaso-motor and sympathetic nerves generally and determine alterations in the blood currents, and thereby great and persistent structural changes are effected throughout the whole organism.

The slighter manifestations of pre-menopastic and menopastic phenomena may properly be referred to vaso-motor disturbances and to the resulting vascular congestions or stases (active or passive hyperæmias).

The slighter *nervous* affections may be regarded as the most common and withal not the least distressing train of symptoms.

It is a well-credited clinical fact that excessive mental emotion will at times bring about premature permanent cessation of menstruation. It may be that in these cases there is a direct shock to the nerve centre which dominates the function. And, as in such circumstances the peripheral irritation from glandular growth will persist for at any rate some time, although the central factor is destroyed, we have usually considerable manifestation of irregular nerve discharges.

The heats and flushes, the indefinite rigors, the clammy perspirations, the dimness of sight and deafness, the extreme irritability or nervous depression are all specially liable to be present.

Neuralgia of the nerves of the head and neck, backache, which may be either sacralgia or coccygodynia, tremors of the

limbs, "a giving way at the knees," or partial, in some total but temporary, powerlessness of the arms or legs are frequently met with.

I have elsewhere (1) shown the association of certain neuralgias with uterine actions. These neuralgias may be general or systemic in origin, or may be attributed to reflex causes originating in uterine conditions.

Some patients suffer from erotism; in others the sexual act is regarded with distaste, even with abhorrence.

Many of these conditions are so well recognised that they have only to be referred to.

One curious affection, sudden and complete temporary blindness, deserves mention. This is known as hysterical copiopia, and has been fully described by Foerster. The patient suffers pain in the region of the conjunctival folds, in, and especially behind, the eye, and in the forehead; less frequently along the malar or superior maxillary branches of the fifth pair of nerves. In addition, there is great dislike to bright light (photophobia) and several other evidences of increased hyperæsthesia. It attacks both eyes. Treatment is of little use. Usually the condition disappears spontaneously, but "it may continue many years. It is frequent in the higher classes, may be met with in both sexes, but is far more common in women than in men." It has been regarded in the former as a reflex neurosis due to chronic pelvic inflammation. Valerian, castoreum, and such like remedies have been prescribed (2).

I cannot recall any case exactly resembling the above description, certainly not enduring "for many years," without distinct structural damage of the eyes occurring.

I met with one case of catamenial amaurosis in a young girl of twenty, who suffered moderate pain at each period but was fairly regular. Sudden and complete blindness came on, accompanied by intense neuralgia in both temples. Her period supervened, and after about a week her sight returned. I had the advantage of an excellent opinion given by a well-known ophthalmic surgeon, now deceased, who agreed with me that there was no discoverable lesion in either of the eyes.

"Choked disc" explains some cases of unilateral amblyopia. Thrombosis of retinal vessels in the region of one or both of the maculæ may cause either single or double loss of vision. But simple anæmia, or the form of pernicious anæmia, which occurs at the menopause and has an accompanying retinitis; or complex causes such as the retinitis of Bright's disease or of syphilis; or all

or any of these complicated by cardiac disease ; or such a condition as diabetes must not be overlooked.

Optic neuritis, neuro-retinitis, and complete amaurosis have been met with.

In all cases of decided impairment of sight an ophthalmoscopic examination should be made.

Deafness or impaired hearing may cause considerable inconvenience. Otologists recognise the difference between hysterical and neurasthenic deafness. M'Bride, of Edinburgh, writes :—

“There seems to be at present very great confusion as to the meaning of the term hysteria. Some authorities seem inclined to place every symptom, from malingerer—provided always it occurs in the female—up to marked neurasthenia, in the same category. I cannot but think that we should recognise the possibility of a neurasthenia as distinct from hysteria altogether. In the case described, for instance, the patient was a sensible and intelligent woman, showing no inclination to crave sympathy. Moreover, she at once stated that she heard the tuning-fork through the skull-test in the worst ear,—a fact which, from the point of view of most aurists, would at once exclude the idea of hysterical deafness.

“Most persons are at times, even when apparently quite healthy, subject to a feeling of languor and lassitude. This condition is due, I take it, to deficient activity of the nervous system, and when it is continuous, may be described as neurasthenia. Now, if the normal channel through which impressions are conducted to a nerve of special sense be already imperfect, the corresponding sense will naturally suffer most.

“This neurasthenic element should be looked for in patients already deaf from organic disease, but in whom increased deafness occurs under circumstances which can have no influence in changing the pathological condition already existing in the ear, *e.g.*, emotion, fatigue, dyspepsia” (3).

The various other phenomena, both nervous and mental, differ widely in degree in different cases. Women who lead well-regulated lives, and have been healthy and free from worries of mind and strain of body before the change, may escape from many of the minor ailments which are so very usual.

Irritability or depression of spirits is one of the most commonly experienced changes. Certain differences may be distinguished between women in different grades of life, even between different types of women in the same grade of life. It is mostly a matter of nervous organisation, and the power of resistance against, or the proneness to succumb to, any perturbing influence cannot be fore-

seen or calculated. No scientific generalisation can be obtained by accepting the often loosely made statements of the average patient as to what effect this or that condition has brought about.

Speculation has had more to do with former records than observation. For example, Tilt records that of 500 women 459 had "nervous irritability," 277 had "pseudo-narcotism," 220 "gangliopathy and faintness," 4 "laughing and crying fits," and so on. It is a curious fact in this table (xix.), which ought to be reliable as it forms the basis of his book, how frequently the number 4 occurs. Fourteen "morbid liabilities," ranging from cancer of the womb to sciatica, had each only 4 victims. And again, "gangliopathy and faintness" had, as we have seen, 220, while "gangliopathy or strange epigastric sensations" claimed 49. And whatever may be thought of the table otherwise, its value may be estimated by the record that of all the 500 women only one suffered from toothache! It was hard on the dental profession four and twenty years ago, but happy days for "the socially higher classes" of England, when the percentage of those who, despite many curious and presumably irrelevant complaints, suffered from toothache was only 0.5! I venture to state that in my opinion these statistical tables of Tilt's, like many which preceded and succeeded his, are scientifically valueless.

Headache is a very usual symptom at change of life. In women, who have previously been subject to headaches, especially in those who have been accustomed to have severe headaches, of one or other form, most commonly neuralgic, before the establishment of the period, the explanation is not difficult to seek. It is a congestive headache, which the flow relieved, and which was caused by the generally increased vascular tension we have referred to in a previous chapter. But in some other cases (although it must indeed be regarded as exceptional never to have suffered from headaches at any time), we are told by patients that, since the periods became irregular or ceased, they suffer from violent headaches, either in the temples, the top of the head, across the forehead, or less frequently in the back of the head. These headaches are periodic in a considerable proportion of cases, and may be relieved either by drugs or by a natural diarrhoea. Migraine, or sick headache, is by no means unusual during the continuance of menstrual activity, and in these cases may be markedly increased at change of life.

Drowsiness, or a tendency to frequent and prolonged sleep, is a well-known symptom, due to cerebral anæmia. This condition is found in women who have nursed their children too long, in those

who have suffered from profuse blood losses, and also as one of the many phenomena of hysteria. It is, so far as my experience goes, not uncommon during the change of life, especially in patients who suffer from increased uterine discharges. Many of the vaso-motor disturbances incident to the menopause are unfeelingly and unthinkingly named hysterical. Naming a train of symptoms hysterical does not help the patient much, or elucidate the condition. But for want of a better term we must still retain it. The typical symptoms met with in younger women, such as the browache (the clavus), and the lump in the throat (the globus), the violent laughing and crying, or the still more marked convulsive seizures, are by no means common during the change of life, still rarer after total cessation of the periods.

The nervous symptoms one meets with most frequently are those of seemingly imaginary sensations of pain and discomfort, or exaggerated sufferings, which may have some objective cause. What I personally always inquire, at any rate of strangers, is, What do you eat and drink? It is needless to add that the latter is the more important. There is an undoubted tendency to over-stimulation, or, as one should more correctly regard it, to over-indulgence in alcohol for its excellent sedative effects. It is a delicate matter to touch on, but I cannot help stating that many of the "nervous" symptoms of the menopause are greatly intensified, if not caused, by alcoholism. Used in proper quantity and at suitable times, alcohol, in one or other form, is of great value in such cases, but there is a terrible risk of its being abused.

The fact of neuralgias being commonly present has been mentioned; ere we leave the subject of the minor nervous complications, we must glance very briefly at what is known as ovarian neuralgia and its allies. Ovarian neuralgia is not necessarily associated with inflammation of the ovary or Fallopian tubes. The relation of the cerebro-spinal system to the sympathetic is such that it cannot be over-rated. What constitutes pain? If an individual, who is not wilfully deceiving herself and others, thinks that she has pain, how can one disprove it? Ovarian and uterine neuralgia, with coccygodynia, with some forms of sciatica and spinal irritation, are clinical entities which may depend on peripheral or on central irritations. We know that ovarian neuralgia has symptoms much resembling those of actual inflammations of the appendages, but it is unaccompanied by fever, and the pain is apt to alternate with neuralgia in other situations. Above all, if an examination is made, no objective sign of disease will be discovered. The dorsal and lumbar nerves may suffer from paroxysmal pains which, in some

patients, start from the region of the ovaries, in others from the neck of the uterus.

The whole question of sympathetic affections, despite many learned and thoughtful studies dating back nearly fifty years (4), (5), (6), remains greatly speculative. Cohen (7) thinks that there is an immediate connection between the neuralgia and other functional disorders of the female genital organs considered by him to be vaso-motor phenomena. According to his views, we have a primary ilio-lumbar neuralgia, and a secondary vaso-motor neurosis of the uterus which may show itself as congestion, hæmorrhage, and pain, or instead of hæmorrhage, abnormal secretions. For the last thirty odd years we have not been able to go much further, although the now admitted probability of a special nerve centre for menstruation, and the possibility of an ovarian nerve (Johnstone) which is always existent, bring modern research to the support of Cohen's view. One of the most interesting contributions on the connection between the cerebro-spinal system and the sympathetic which is at once, as all will admit, attractive and philosophical, is contained in Dr. Wilks' (8) *Diseases of the Nervous System*. This is too precious to be quoted briefly, it must be read in its entirety.

The Minor Circulatory Disturbances have much in common with those we have just considered. The flushes and heats, the localised congestions, etc., are due to vaso-motor disturbances originating in the sympathetic or possibly in special nerve centres.

One of the most usual complaints is irregularity of the heart, which commonly is described as fluttering or palpitation. Throbbing of the vessels of the head and neck, pricking sensations in the limbs, coldness of the extremities, etc., are very frequently experienced.

The functional heart affections of the menopause have not hitherto been much studied. We find both tachycardia (or greatly accelerated action of the heart for variable periods) and extreme arrhythmic irregularity, as Dr. Sansom described the condition, "a veritable *folie du cœur*".

Tachycardia is now fairly well understood to depend on a combination of causes. For healthy action the heart muscle, the cardiac ganglia, the vagus nerves, the sympathetic nerves and ganglia, and the cardiac centre in the medulla must be healthy and normal. Abnormal heart-rate will result from disease or abnormality in any of these structures. Arrhythmic action arises from the condition of the blood; and, secondarily, from reflex irritation of the pneumogastric and sympathetic nerves. Anæmia causes cardiac irregularity; blood too rich in red globules or fibrin also causes impaired rhythm.

Extreme irregularity may continue without symptoms, and it would seem, without danger. "It would seem probable," writes Sansom, "that the vaso-motor conditions as well as the heart-regulating mechanism are much disturbed, and it is difficult to realise that patients, presenting these extraordinary perturbations, may nevertheless complain of little or no distress, and may be pursuing their ordinary avocations" (9).

Neither tachycardia nor the extreme cardiac irregularity belongs exclusively or even specially to the period of change of life. Both may be met with in men, and in young women who are menstruating regularly. Although many explanations have been offered, such as gastric and intestinal irritations; constitutional diseases (such as syphilis, rheumatism, gout); influenza, Graves disease, etc.; and not a few cases have been ascribed solely to mental disturbances and the effects of severe nervous shock, there is no room to doubt that the combined influence of faulty conditions of the cerebro-spinal centres and the sympathetic are the immediate determinant causes. These are so common at the menopause that it would be strange if such cardiac conditions were not frequently met with.

Among predisposing causes, Dr. Shafter (10) regards general exhaustion of the nervous system, all forms of reflex irritation, venereal excesses, purposeless occupations and amusements, protracted mental exertion, abstinence from adequate repose, as most important. Special temperaments, personal peculiarities, congenital or superimposed want of vigour, general debility, deformities of the ribs and spinal column, small, weak heart, uterine irritation, hysterical etc., are also of great importance. Then conditions acting on the general blood supply of the body affect the blood supply of the heart; the turgid and plethoric state of gross feeders, depraved states caused by bad and insufficient diet, and all forms of blood disease—*e.g.*, anæmia, gout, scurvy. "The immediate exciting causes of functional cardiac affections," writes Shafter, "are mental shock and distress, protracted and unusual exertion, errors in diet, excess in tea, coffee, or tobacco, overdoses of medicines such as aconite or digitalis, prolonged abstinence and exposure to cold."

But there is one functional heart affection that may be regarded as almost peculiar to the change of life. The patient suffers from severe palpitations, from dyspnoea on exertion, from cardiac distress, faintness or syncope attacks, rapid pulse (tachycardia), but has no increase of temperature, very little or no œdema of the ankles, no swelling of the hypogastric or epigastric regions, and only slight pallor of the face. These symptoms may constitute definitely recurring attacks, lasting over three or four days or a

week, each attack continuing from a few minutes to two or three hours at a time. One lady whom I have had under observation for several years has had frequent attacks; during more than one of her illnesses the symptoms pointed strongly to angina pectoris. She had been subject to various neuralgias; more than ten years ago she had very severe intercostal neuralgia with palpitation, but during the last few years, although she has had occasional attacks of hemicrania, she has had no intercostal neuralgia. I, as the result of experience of like cases, have on several occasions assured her that a few days' rest in bed and suitable treatment would relieve the alarming symptoms. This patient has only had these attacks since the change of life began, and since its definite termination they have become much less frequent and less severe. Usually her heart beat was slow and regular, but during the attacks the rhythm is very irregular and the rate approximately 150 or more. The duration of the painful fits is longer than that of angina, lasting sometimes two or three hours; the recurrent false angina persists longer, over some days; in some of the attacks of rapid heart action and faintness pain may be wholly absent.

Anæmia and the gouty diathesis, rheumatism and indigestion (especially atonic indigestion associated with alcoholism), are predisposing causes of this functional heart affection. It appears to me to be, in some instances, a false angina with great acceleration and irregularity of the heart's beat; in others there is very slight indication of the precordial pains. In all cases it seems to be a neurosis—the result of deranged innervation. Whether structural changes may sometimes finally occur or not, I do not know. I feel satisfied that in the cases I have met with neither discoverable valvular disease, nor cardiac dilatation, nor softening, nor ossification of the coronary arteries, nor apical growths, nor any of the other structural affections associated with fatty degeneration with which angina is most frequently conjoined could be demonstrated.

The attacks are provoked by the same causes which induce angina—mental irritation, over-exertion, exposure to chills, fatigue or bodily illness. The symptoms are much the same as those found in paroxysmal tachycardia. It may be difficult or impossible to count the radial pulse. The stethoscope affords little satisfaction; one may not be able to differentiate the first from the second sound; the ventricles contract irregularly, and the first sound may thus be divided. When we palpate, the cardiac impulse is lacking and its place is filled by a series of diffused irregular vibrations. Percussion shows little if any alteration; the area of dulness may be increased downwards, on the right side especially,

but this is far from a common or satisfactory datum, as the area will be found to vary from time to time. The face is usually pale, the expression anxious, and the patient is apprehensive of impending death; the lips may be pale or bluish in colour. The urine passed during an attack is often increased in quantity, the urates and phosphates are in excess. After an attack urates predominate, transient albuminuria is not uncommon. I have seen a few cases in consultation in which influenza occurring during the climacteric seemed to be the originating cause. In some instances no reason could be assigned. After the periods have wholly ceased these attacks may suddenly or gradually disappear.

It may be considered that I have erred in classing this as one of the slighter disorders. If so, my justification is that up to the present I have met with no case, and I have seen a good many, which was attended with any grave results so far as this particular affection could be esteemed as due to the menopause.

Hæmoptysis may occur at the climacteric quite independently of heart disease, aneurism, malignant growth or tubercle of the lung. It is sometimes associated with bronchial catarrh or structural vascular changes or rheumatism. It may have no discoverable explanation. It usually subsides without the supervision of any coarse lesion of the heart or lungs.

Epistaxis is much less usual at the end than at the beginning of menstrual life. I have only seen one case of bleeding from the nose during the climacteric, which required plugging the posterior nares to restrain the flow.

Women who have been subject to varicose veins frequently suffer further distension of the veins during the change. Patients with hæmorrhoids not infrequently have tolerably free loss of blood when at stool, but their piles also, undoubtedly, become more active from the allied congestive conditions of the liver and intestinal tract.

Cases of so-called "vicarious menstruation" from the bowels are erroneously attributed to the suppression of the menses.

It is quite true that there may be periodic congestions and blood escapes, but the blood is in no sense menstrual. Pathological conditions of the liver or spleen, or heart, or gastro-intestinal ulcerations, or special blood conditions, *e.g.*, scurvy, purpura, etc., etc., must not be overlooked. In certain cases the blood comes from the stomach and is evacuated by the bowels. Further, one must definitely ascertain that the blood-like discharge is really blood. Stools mixed with dark bile or blackened by iron or bismuth may easily mislead the inexperienced. The most important affection

of the climacteric, next to hæmorrhoids, which is apt to cause blood discharges from the bowels, is congestion of the liver.

Digestive Affections.—It has been usually agreed that dyspepsia is very common at this time. Now, premising that dyspepsia or indigestion is clearly a symptom or set of symptoms indicating morbidity of the digestive organs, and not of itself a disease, we find that this condition is very usual ; but it is not special to the menopause.

The forms of dyspepsia we are then accustomed to recognise most commonly may be referred to functional disorders of the stomach ; or it may be that there is some structural alteration of the gastric glands or of the blood supply. It is always difficult to decide where such functional affections cease and anatomical changes begin. It is unnecessary to occupy space in discussing the phenomena of indigestion with its infinitely varied combination of symptoms, which are so well known to every one.

Next to functional dyspepsia we have a mild form of gastritis usually called a "bilious attack" ; chronic gastritis may result ; its progress will depend greatly on how far the inflammation has affected the glands of the stomach.

Gastric ulcerations of advanced life, which are vastly unlike the smaller but deeper ulcers occurring in young women, are not necessarily attended with any severer symptoms than might be presented by a purely nervous gastralgia.

Anæmia and disordered menstruation are associated with nervous gastralgia and both forms of gastric ulceration. The tenderness over the epigastrium, persistent indigestion, increased pain after eating, eructations of flatulence, or bringing up of watery or mucous discharges, are met with in all three conditions.

Hæmatemesis may occur. It may be due to ulceration or malignant disease of the stomach, or to some obstruction in the portal circulation, or possibly to an altered state of the blood.

I cannot accept the statement made in many books that "vicarious" hæmorrhage from the stomach not infrequently takes the place of the menstrual flow. It is said that the blood escapes more or less exactly at the time of the normal discharge ; and while the bleeding lasts the stomach is slightly tender and the digestion impaired ; that during the intervals there are no symptoms of indigestion and no pain ; these points are believed to distinguish between loss of blood caused by suppressed menstruation and blood vomiting due to disease of the stomach. But while I have certainly noted at least twenty cases in which vomiting of blood has happened during the suppression of menstruation, I have

never been satisfied that this vomiting was so timed and so free from other symptoms that it could be regarded as "vicarious". Besides, unless a large vessel is laid open by an ulceration, all hæmorrhage from the stomach is capillary hæmorrhage brought about directly by strain on the minute vessels, and possibly due to such localised causes as we have already referred to. After the cessation of menstruation the hyperæmia of the liver alone would be sufficient to account for many cases of hæmatemesis (11). Garrigues (12) defines "vicarious menstruation" as "the occurrence at the time of menstruation of bleeding from another part of the body than the uterus, or of *another secretion*" (13). He says it "is a rather rare condition mostly found in weak nervous hysterical women. Wounds, ulcers, and varicose veins predispose to it."

The important discussion on vicarious menstruation at the British Gynæcological Society (14), in 1886, introduced by Dr. Robert Barnes, was an able paper, but the discussion was chiefly notable for the admirable reply of Dr. Samuel Wilks. Dr. Barnes contended that the doctrine was "established not only by physiological deduction but also by cases". Dr. Wilks, whose opinions I fully share, held that "Dr. Barnes's paper contained nothing to convince him of the reality of vicarious menstruation". I have carefully re-read the whole discussion, with the illustrative cases given, and feel sure that these cases, if carefully investigated, would admit of Dr. Wilks's interpretation that the verdict "not proven" must be given.

In February, 1895, I was summoned to Hounslow to see an old lady who had been vomiting blood and had a large abdominal swelling. She was sixty-five years of age, and told me that she had been "regular up to the last few months"; since the end of October, 1894, she had been in bed. She stated that she had great bearing-down and other symptoms of internal trouble, as well as periodic vomitings. On cross-examination, it was clear that her statements were wholly untrustworthy. She was a chronic alcoholic, had chronic gastritis, an enlarged liver, a dilated fatty heart, and an enormous deposit of fat on the abdominal walls, with a small ventral hernia. The hæmatemesis, which enthusiasts in the doctrines of "vicarious menstruation" might have regarded as important, was undoubtedly due to alcoholic conditions of the stomach and liver.

I agree with Dr. Wilks that during suppression of menstruation there may be vascular disturbances, and this every one has seen in many instances; and that under certain circumstances which may be in nearly every case accounted for, these women may have

coincidental hæmorrhages. I am also wholly at one with him in discrediting the existence of true "vicarious menstruation" either during or after menstrual life.

Abdominal distension, or, as it has been named, "abdominal hysteria," is a reflex condition due to the abdominal sympathetic. It closely simulates peritonitis; the abdomen is found greatly, it may be uniformly, swollen, tender on palpation, and tympanitic; the bowels are constipated; the skin warm and dry; the tongue slightly coated, the pulse frequent, and the expression anxious. Some cases present these symptoms for only a few hours; others persist for some days. In the latter there are generally one or more circumscribed spots of tenderness which help to distinguish the condition from a general acute peritonitis. The pulse is frequent but full, not small and wiry; the temperature may be 102° or 103° at first, but does not persist; occasionally there is no fever, even during the onset of the acute pain. The attacks are recurrent; they may happen every six weeks, or at longer or shorter intervals. The pain is seldom increased by inspiration, or by coughing, or stretching out the legs. One lady I attended had many such attacks, affecting the region of the ileocæcum; there was always acute pain, fever, and great anxiety. A hard lump, fully the size of a man's doubled fist, could be felt; the swelling was exquisitely tender, and there was at times great sickness and vomiting. These attacks continued at intervals over nearly three years during the climacteric; but since the menopause has been definitely passed have not recurred. I had also experience of similar illness in a male patient several years ago; he was a very nervous and "bilious" man, who, after exposure to cold and wet, and over-fatigue, had frequent attacks of bowel spasm, attended with symptoms resembling peritonitis. I believe there is irritation of Meissner's plexus, and a spasmodic contraction of the muscular fibres of the intestine, causing an actual but temporary obstruction of the bowel, in those cases in which we can distinguish a distinct "lump" occupying the situation of the colon, or in its neighbourhood.

I need not occupy space in seeking to determine the distinctions which exist clinically between these special spasmodic bowel affections and ordinary colic, inflammation of the cæcum and appendicitis, perityphlitic abscess, tumours of the ovary, or kidney, etc., as these are described in all text-books; but I wish to emphasise the fact that there is a special distension, so far as I know generally, but not invariably, in the region of the cæcum, which is due to spasm of the bowel; it is accompanied by the formation of a very hard tender swelling, which is not caused by

faecal accumulation; and the distension originates from reflex disturbances of the abdominal sympathetic. It is most frequently met with in nervous women during the change of life.

Abdominal distension, partly due to flatulence, partly to obesity of the abdominal walls, with sympathetic irritation or enlargement of the breasts, sometimes accompanied by lacteal secretion, sickness, irritability of temper, bladder irritation, etc., may simulate pregnancy; or in other cases suggest an ovarian tumour. Most phantom tumours are immediately dispelled by putting the patient under the influence of an anæsthetic. The most puzzling symptoms may combine to favour the idea that utero-gestation is present.

In a paper read in the section of Obstetric Medicine and Gynæcology at the annual meeting of the British Medical Association in 1891, I wrote as follows: "There is a condition of abnormal enlargement, with allied sympathetic symptoms, but with no discoverable definite uterine or ovarian tumour, after the patient has been deeply anæsthetised. These are the cases of so-called nervous or flatulent and adipose pregnancy, usually named 'Pseudocyesis,' or 'spurious pregnancy'. In such cases the diaphragm seems depressed, the intestines are projected forward and greatly distended with flatus, the recti feel rigid; there may be an undue deposit of fat in the abdominal walls and omentum. Contractions of the abdominal muscles occur, and these, with the tensely enlarged flatulent colon and distended intestines, resemble not only the enlarged uterine body, but mimic the uterine contractions. Palpation and percussion may both prove misleading, the former on account of the displaced intestine and unyielding abdominal walls seeming to suggest uterine enlargement, the latter on account of the fatty omentum yielding dulness instead of resonance. Case I. (in abstract)—*Spurious Pregnancy, Mimic Labour*. Mrs. B., an intelligent, sensible woman, aged forty-two; one child twenty-two years of age. Two miscarriages eighteen and sixteen years ago. Menstruation regular since patient was aged fourteen, except during pregnancies. No history of uterine disease. In May, 1889, suffered from morning sickness; swelling of the feet and ankles; had enlargement of the breasts and secretion of milk. About this time had slight appearance of her period. She arranged with her doctor to attend her in her expected confinement. She increased in size, and felt what she regarded as foetal movements. In January, 1890, she had rhythmical pains, and believing herself to be in labour, sent for her medical attendant. After lasting several hours the pains passed off. Mr. Parker examined her at this time, and also subsequently in consultation with a medical friend, but could not

satisfy himself that she was normally pregnant. He sent his patient to me on 17th March. Since February Mrs. B. thought the abdomen had become smaller.

"I examined her under chloroform. On bimanual examination the uterus was found normal. The cæcum was markedly distended; the size of the abdomen lessened, but the enlargement did not wholly disappear under full anæsthetisation. The abdominal walls were very fat, and the intestines bulged prominently. The breasts were full and there was a full secretion of milk. On regaining consciousness, the patient was emphatically assured that she was not pregnant. She was ordered camphor, assafœtida and nuxvomica, and aperients. On 24th March, she felt much easier, had still shortness of breath, but was able to walk better. On 24th April, considerably improved. She had had a period lasting two days on 12th April. On being again questioned about the mammary secretion, she said that about a year ago or more she experienced considerable itching of the nipples; she rubbed them to relieve this, and then noticed milk flowing; it had continued in varying quantity ever since. She now complained of right-sided neuralgic pain, which seemed to start from about the rectum. In April, 1891, Mr. Parker kindly informed me that the general health of his patient was good. The milk ceased to flow about six weeks before his report; menstruation, which prior to consulting me had been 'hardly seen for a year,' had since been regular and in fair quantity. This case presents most of the features found in pseudocyesis (false pregnancy); while false pregnancy is by no means very rare, mimic labour, as in this case, is very uncommon. The late Dr. Matthews Duncan only knew of one example. Cases of flatulent distension which resemble pregnancy, usually occur about the climacteric, or in sterile women who suffer from irregular menstruation. Yet this is not invariably the case. I have seen such conditions in fecund married women, and in these errors are naturally more probable" (15).

Constipation is so usual a condition with women, as compared with men, that we should anticipate that during the change of life when the other pelvic organs become less active, the lower bowel also would become torpid. "Sometimes," writes Kisch, "constipation is the primary and diarrhœa the secondary manifestation" (16). In other words, the habitual constipation during menstrual activity may at first become still more obstinate, and when the periods have become very irregular the constipation gives place to diarrhœa, due to reflex bowel irritation. The explanation of this diarrhœa was very clearly apprehended by

Walther (17) more than seventy years ago; who, on the one hand, mentioned the desirability of not allowing women to take too strong purgatives at the climacteric, and, on the other, showed that diarrhœa in moderation acted as a substitute for the blood-loss which the woman was formerly accustomed to have.

Jaundice is also referred to by some writers as a comparatively common affection. Actual jaundice is, in my experience, unusual, but slight indefinite jaundice-like symptoms, *e.g.*, muddiness and staining of the conjunctiva, etc., and bilious stools, are by no means rare. Congestion of the liver shown by actual increase of hepatic dulness and by tenderness over the right hypochondrium and epigastrium, and also by frequent bilious stools, may be regarded as a common climacteric condition.

Rectal irritation, in a few instances going on to, or arising from, proctitis or periproctitis, is sometimes present. There is burning heat, tenesmus and feelings of downward pressure; and occasionally dysenteric, *i.e.*, membranous mucoid diarrhœa. The sphincters may be in a state of spasm, and any attempt at digital examination causes great pain.

Pruritus ani is more common than actual rectal inflammation; and procidentia of the rectum, either from straining or associated with polypoidal growths, is occasionally met with. Varicocele of the recto-vaginal septum, which presents a longitudinal swelling, thick, hard and tender, may complicate hæmorrhoids or occur independently of piles. Sedatives are demanded (18).

The urine corresponds in many cases with that found in dyspepsia; we note deposits of urates, increased elimination of urea, and of phosphates; and sometimes transient albuminuria. At times the secretion is very watery, "nervous urine"; at others it is concentrated. Lithic acid in excess in the system gives rise to lithæmia, and probably originates not a few neuralgic and mucous-membrane disorders. In some cases there is an increased watery secretion and a transient glycosuria, but the possibility of mistaking creatin for sugar must be borne in mind. Diabetes mellitus may of course occur at this period, but diabetes insipidus is vastly commoner.

The **Constitutional and Diathetic Affections** are anæmia, chloro-anæmia, rheumatism, gout, tuberculosis, etc. When these conditions are slight, they may complicate other manifestations, or, in certain instances, originate them; for example, anæmia explains many of the gastric and cardiac symptoms already referred to; rheumatism and gout are accountable for not a few of the neuralgias and skin affections, and so on. But, as this phase of the subject requires

some special consideration, we shall consider it more fully afterwards.

The skin affections occurring at the menopause are fairly definite. The flushes of heat and perspirations have already been mentioned. Some patients have offensive-smelling perspiration. The more ordinary cutaneous diseases found are pruritus (the itching may be specially of the vulva or of the rectum or elsewhere), acne rosacea or acne cachecticorum, prurigo, eczema, erythemas, herpes, urticaria; less commonly, erysipelas and esthiomene or lupoid disease are observed. Dermatologists have differed widely in their opinions as to whether the change of life is specially liable to any of the more definite skin eruptions. I have personally remarked that prurigo, eczema, acne, and pruritus are very common.

Uterine disturbance is generally recognised as a factor in the production of skin diseases. Martineau points out that *chloasma*, a well-established condition in pregnancy, may arise from uterine affections in the non-pregnant; the face, the mammary glands, the genitals, the anterior surface of the trunk being the sites of election. Rayet, Grisalle, and Baire have observed dark pigmentations appearing after sudden cessation of the menses. In one woman, aged fifty-seven, in whom the cessation had occurred two years before, the whole skin was pigmented, the discoloration was most noticeable on the hands, the thighs, and toes. We are all familiar with the acne of adolescence, which is to be regarded as an indication of active physiological changes in the skin follicles. In later life one finds the same affection occurring in debilitated or gouty persons of both sexes. Atrophy of the tissues thus shows itself, the mouths of the cutaneous follicles remain open, and acne and comedones develop; one also finds in such patients localised thickening of the epidermis. Acne cachecticorum depends on changes in the sweat glands, and is associated at times with the clammy perspirations of the menopause.

Pruritus senilis has been erroneously attributed to gastric disturbance. Kaposi points out that it is due to an atrophic process going on in the skin associated with irritation of nerves. In another form of pruritus, met with about middle life, albuminuria or glycosuria is often found. *Pruritus universalis* is a frequent symptom of pregnancy and affections of the generative organs, but it may also be referred (Kaposi) to psychical causes.

Eczema genitalium is almost peculiar to the menopause and the post-climacteric periods. It usually begins on the labia majora, from whence it spreads to other parts of the genitals, and to the thighs; it is accompanied by intense itching, the patient cannot

refrain from scratching herself, and the surface often becomes raised and exquisitely tender. Subsequent pigmentation of the parts affected is not uncommon.

Scanzoni remarks that anæmic women who are subjects of some genital affection often present various skin eruptions, especially when they have an intercurrent exacerbation of the uterine affection. He regards *acne*, *eczema*, *erythema*, *urticaria*, and "the furuncular diathesis" as most common. Kaposi agrees; he states that *furunculosis* is seen in all people who suffer from *eczema*. *Acne rosacea* he holds to be due to changes in the vessels, commonly due to depressed nutrition, sometimes to disorders of the stomach or uterus. The starting-point of erythema may be found in the uterus or ovaries.

In some cases of menopastic or post-climacteric lupus of the genitals the appearances are such that it is very difficult to establish an exact diagnosis between lupus and epithelioma.

Should any skin affection occur its cure will prove much more tedious during the irregular stage, *i.e.*, the premenopastic time, than during regular menstruation, or even after its definite cessation. In one case of eczema at the menopause which had resisted all other forms of treatment, Dr. Shaw Mackenzie tells me that he effected a speedy cure by local derivation of blood by leeching.

In addition to the foregoing there are other symptoms usually referred to, but which hardly require detailed enumeration or lengthy consideration.

For example, many perversions, such as an awakening of sexual desire, it may be for the first time, or a marked increase in desire is not uncommon; the opposite condition is not infrequently the case; loss of memory, great irritability of temper, etc., may be referred to the nervous system. Irritable bladder is very usual in antemenopastic as well as in menopastic states.

"Neurasthenic or hysterical patients not infrequently complain of symptoms referable to the bladder which are not always, as has been maintained, the result of the *nosophobia* from which they are suffering. On the contrary, in many of these cases, these patients are really suffering from actual (though *sine materia*) cystalgia.

"This condition can be distinguished from similar hypochondriacal manifestations by the fact that usually the vesical pain is not always present, but appears in the form of more or less frequent and prolonged attacks. Moreover, the patients do not exhibit the childish and anxious disposition characteristic of nosophobiacs.

"The pain sometimes comes on when the bladder is empty. In these cases the act of micturition is accompanied by such

distressing tenesmus as to cause syncope. These vesical crises are sometimes excited by coitus.

"In respect of the diagnosis, this affection must be distinguished from cystitis, vesical calculus, prostatitis and the pollakiuria of Bright's disease. When these have been eliminated, the diagnosis is usually easy from the presence of other signs and symptoms of hysteria or neurasthenia" (19).

Changes in physical appearance, growth of hairs on the face and chin, flaccidity of the breasts, etc., are due to trophic changes.

We must not expect to find all the enumerated symptoms present in any one individual. Some women suffer from many of them, others seem to escape nearly all. Those which are almost always experienced are the manifestations of nervous disturbance, especially the flushings, and closely following those in frequency are digestive affections.

I have not as yet referred to uterine bleedings, as I think it more profitable to consider these under a different chapter.

When the menopause is long delayed, or is accompanied by great irregularity or severity of symptoms, we ought to suspect some pathological condition, and not attribute all complaints and seeming ills to the hysterical imaginings of a patient at the change of life.

(1) *Transact. Edin. Obstet. Soc.*, vol. xiv., pp. 37, 88, 89.

(2) W. A. Freund, *Gynäkologische Klinik.*, vol. i., pp. 265-272, Strasburg, 1885.

(3) Reprint from *Archiv. of Otology*, vol. xii., Nos. 3 and 4, 1883.

(4) Romberg, *Lehrbuch der Nerven Krankheiten*, 2te, Bd. ii., Aufl., 1851, pp. 142 et seq., Berlin, 1854.

(5) Henoch, *Klinik der Unterleibs Krankheiten*.

(6) Gooch, *Some of the most Important Diseases Peculiar to Women*, p. 299, London, 1831.

(7) Cohen, "Des Névroses Vasomotrices," *Arch. Gen.*, t. ii., 1863.

(8) Pp. 491 et seq., London, 1883.

(9) *Transact. Medical Society of London*, vol. xvi., p. 103, 1893.

(10) *Quain's Dictionary of Medicine*, vol. i., p. 810, 1894.

(11) *Vide* chap. iv., p. 102.

(12) *Text-book of Diseases of Women*, p. 232, 1894.

(13) The italics are mine.

(14) *Brit. Gynecol. Journ.*, vol. ii., p. 151, 1887.

(15) "The Diagnosis of Spurious and Doubtful Pregnancy," *British Medical Journal*, 7th November, 1891.

(16) *Das Klimakterisches Alter d. Frauen. in phys. u. pathol. Beziehung*, p. 159.

(17) *Hufelands J. d. prak. Arzneykunde*, lix. f. 3, 1824 (Regulat. f. d. Praxis f. d. Krank. des Weibes nach d. aufhören d. menstr. überhaupt).

(18) Jules Chéron, *Rev. Méd. Chir. des Malad. des Femmes*, January, 1894.

(19) *Medical Week*, 25th August, 1893.

CHAPTER VI.

TREATMENT OF THE Milder Disorders of the Menopause.

THE principal basis of treatment must be founded on a clear apprehension of hygienic principles.

Due attention must be paid to diet, physical exercise, and clothing. "Drs. Diet, Quiet, and Merryman" will be found most successful practitioners to follow. But above all, the Pauline doctrine of "sobriety in all things" is essential.

As to diet, we must discriminate between the proper nourishment for patients who are anæmic and those who are plethoric. In women who have a tendency to become stout the food should be restricted in quantity, and carbohydrates, such as sugar, starches, *e.g.*, rice, sago, tapioca, etc., taken very sparingly. White flesh is preferable to dark, chicken and game better than butcher meat, and veal and pork less digestible than underdone roast meat or well-stewed beef or lamb. White fish ought to constitute an important part of the dietary. Potatoes, turnips, carrots, vegetable marrow, and such-like, should be avoided. Well-cooked green vegetables, such as spinach, celery, and Scotch kale, are permissible. Ripe fruit and well-cooked fruits, such as apples, pears, etc., may be taken with discretion.

If there is no tendency to skin eruptions, oatmeal, in the form of well-boiled oatmeal porridge, is a useful change from other breakfast dishes. If the digestion is tolerably good, peas, beans, and lentils may be taken. These contain much nourishment, a large proportion of which is nitrogenous or flesh-forming, not fat-forming.

Pastry, preserved meats, and "made dishes," are not advisable. The simpler and plainer the food the better.

The time of eating is of some importance. As a rule four hours should intervene between each meal; about three meals a day are sufficient for people in tolerably good health. If afternoon tea is taken it should *not* be regarded as an opportunity for making a meal; sweet cakes, muffins, and such-like, should be avoided.

The proper quantity of food must be partly a question of individual necessity. The appetite is often capricious; if the dish

is a favoured one more may be eaten than is strictly wise. Dr. Pavy has estimated the total quantity for an ordinary person at 23 oz. of dry food, or (if the quantity of water contained in all food is estimated) at about 40 oz. in all. For people who are not actively employed a good deal less will suffice. About 2 lbs. of bread and $\frac{3}{4}$ lb. of meat, or their equivalents, will form a sufficiently accurate quantity for most.

The food ought to be chewed slowly and carefully.

Liquids should be taken very sparingly at meals. All liquids, even water, taken freely increase the tendency to obesity. Skimmed milk in moderate quantity is allowable. All malt liquors, *e.g.*, beer, ale, stout, should be avoided. Tea and coffee must be weak and should be freshly prepared, and taken, especially by nervous women, with discretion.

If alcohol is customary or necessary (and that it is very rarely actually necessary we ought all to realise) light wine diluted with plain water, or some good table water, is the best form.

But it is utopian to expect that women at the menopause will always follow their doctors' advice in avoiding alcohol. Nor is this invariably to be advised. Many derive much benefit from a judicious use of stimulants. If we are to sanction this we must lay down clear and definite rules regarding the quantity to be taken. The late Dr. Parkes found that *for a healthy man* about $1\frac{1}{2}$ oz. of absolute alcohol daily was the maximum amount which should be taken. This means roughly, one and a half wine glasses of brandy or whisky, or three to four glasses of port, sherry, or Madeira, or five to six glasses of light hock or claret, or sauterne, or, of champagne glasses, about three glasses of average strength champagne. Now, this must not be taken as permissible for a woman who is not in good health, or who is not having the same amount of physical exercise as a healthy man. We must consider that the relatively greater quantity of non-alcoholic stimulant sedatives, *e.g.*, tea and coffee, consumed by women should partly be taken into account. And two-thirds of the above quantities will form a liberal allowance of the *actual physiological quantity* for a woman at the menopause. Of course custom goes for a good deal, and most people will at times take more, but it is our duty as physicians to instruct our clients very clearly as to how much alcohol is to be permitted as a maximum.

Should stoutness become very pronounced a still stricter dietary is required; there are various special methods of dieting in obesity, and one or other of these should be followed. Thyroid extract combined with restricted diet and occasional Turkish baths and

massage, is at present the most recent anti-fat cure. Other special treatment by baths and drinking mineral waters at Woodhall Spa, Kreuznach, Marienbad, Carlsbad, or some other mineral spa may be advised.

Women who become thin and anæmic, and those who revert to chloro-anæmia, must be dieted differently. Their indigestion must be rectified. Give milk, cream diluted with hot water, chocolate, eggs, milk foods, as sago, rice, tapioca, Iceland moss, arrowroot (carbohydrates), and also dark or light flesh, whichever agrees best with the patient. In these cases red wines, such as port, Burgundy, and good claret, are indicated. For people who cannot drink wine, ale or stout or maltine may be given with meals. Royat, Chateau-le-neuf, Plombieres, Schwalbach, Tunbridge Wells, Felixstowe, or Bath may be more properly chosen as health resorts than those recommended above for the obese.

If, on the other hand, there is a rheumatic or gouty manifestation, such places as Aix-la-Chapelle, Aix-les-Bains, Droitwich, Tarasp (in the Engadine), Wiesbaden, or Buxton may prove more suitable.

Proper Sleep is absolutely essential for such cases. If a patient sleeps naturally, eight or nine hours in bed is sufficient. Sleeplessness may be overcome by giving some easily digested food, such as bread and milk, or some clear meat soup, or, exceptionally, alcohol just before retiring to bed. This is much better than artificial sleep induced by drugs. When patients cannot sleep at night, and yet must go on with the ceaseless and monotonous range of daily household cares, the physician must recognise the danger of a grave nervous breakdown. If health and youth are essential for calm, uninterrupted, and prolonged refreshing sleep, advancing age, relative or actual, and pathological changes in the vascular system, due either to inherent changes in the vessels or to imperfect action of the controlling vaso-motor nerves, are shown by the opposite conditions; sleeplessness on retiring to rest, disturbing dreams, and a tired inertness on awaking in the morning.

For those who require drugs we should prefer paraldehyde, or sulphonal, or lactophenin, or chloralamid, or bromidia, or the bromides of sodium and ammonium, to dosing with chloral or any preparation of opium.

Hypodermic injections of morphia should be strongly discountenanced for simple sleeplessness.

It is a great and growing evil, hardly sufficiently recognised, but it is unquestionably true, that many women are so fascinated by the effects of the hypodermic injections of morphia that they become acutal morphiomaniacs.

Sumbul (musk root) has been recently reported on most favourably in the treatment of neurotic women. Its action resembles that of musk and valerian as an anti-spasmodic and nerve tonic. In small doses (m. v.-x.) of the fluid extract it stimulates appetite, helps digestion, and improves irregular nerve action. In larger doses (m. xxx.-xl.) it is of considerable service in correcting functional irregularity of the heart, and in soothing the nervous system by its hypnotic action. It may, therefore, be prescribed in a full dose to be taken half an hour before the patient retires to rest.

Lactophenin (which has been employed in the delirium of typhoid with marvellous effect by von Jaksch (*r*); and also is of use as a pleasant and reliable antipyretic, to be preferred to anti-febrin or phenacetin) will be found serviceable in cases of sleeplessness complicated by cerebral neuralgia. The dose is from seven to fifteen grains, and the drug may be best given in starch capsules.

Bathing.—Hot foot baths at night, with or without mustard in the water; a *hot* body bath before going to bed twice or thrice a week; cold sponge baths in the morning, and in married women frequent vaginal douching will be advisable.

Some conditions of leucorrhœa and uterine atonicity are better treated with tepid water; absolutely cold water, especially in winter, should not be used. Very hot water (110°-115°) used in the douche generally affords more relief in genital irritation and pruritus than water at a lower temperature.

Opening the eyes in cold water in the morning, or bathing the conjunctivæ with a cold douche, relieves the hot, smarting feeling in the eyes.

A moderate amount of exercise should be taken. Patients should be encouraged to walk rather than drive, and drive rather than take horseback exercise.

Chills and cold must be avoided. Exposure to cold is very apt to produce local congestions.

Sexual excess should be prohibited. Abstention from sexual intercourse altogether is advisable. Coition is not infrequently responsible for local genital troubles, such as menorrhagia. Marital relations may be more freely permitted, without such risks, after the climacteric.

Vaginal irritations may be relieved by bathing with alkaline waters; a teaspoonful or two of carbonate of soda in a pint of equal parts of milk and hot water often proves very soothing. Vaginal tampons of cotton wool soaked in pure glycerine are

beneficial in ameliorating pelvic congestions. They produce a free watery discharge from the vagina and cervix. Unless there is real reason for their use, however, it is well to abstain from using any local applications.

It may be considered unwise to attempt to discuss the question of clothing. The dictates of a Worth will be more esteemed by most women than those of a Sydenham, an Abernethy, or a Gull in all that regulates the fashion and cut of clothes. Rational dress societies and the growing taste for indulgence in athletic sports among young women will in time aid the hygienist in his crusade against various feminine fashions and habits. Meantime we may be allowed to respectfully invoke the assistance of our professional sisters in speaking plainly on the evils of tight-lacing, "full dress" in cold weather, light or wet boots, and thin underclothing.

During the menopause, underclothing should be warm; flannel is the best material, then silk, then merino, then linen, cotton worst. "Jaegers" material, which is now well known, forms a valuable texture for underclothing of all sorts. Cotton-wool underclothing, as suggested by Dr. Lahmann, has none of the objectionable qualities of the ordinary cotton underwear, and is less expensive and more durable than that made of sheep's wool. This clothing, which can now be procured in London, is highly spoken of by those who have worn it.

The chest, arms and legs should be well covered. The weight of petticoats should be supported by shoulder braces or attached to a bodice; tight strings or bands are not to be chosen.

Wet garments should be changed as soon as the individual returns home.

The change from summer to winter clothing should begin sooner in the year as life advances, and when lighter garments are worn in summer a change of the upper clothes, not of those worn next the skin, should be first made.

Clothing should be changed frequently; especially is this necessary when the patient is subject to perspirations.

Cold feet may be remedied by wearing woollen stockings and stout roomy boots or shoes. Cork or tinfoil soles between the stocking and the boot maintain the heat.

While we attend to the bodily health the mental conditions must not be neglected. The depressing sensations and increased nervousness exert a harmful influence which should be averted. All avoidable cares, worries and responsibilities must be set aside as far as possible. Social amusements, congenial occupations and healthy intellectual exercise should be indulged in. The eternal

stitch of the fancy work for a bazaar is hardly less hurtful than the undue physical exertion involved in working a treadle sewing-machine. Self-control must be practised as much as possible; self-introspection avoided. Too much sympathy may do the climacteric woman no good, but harm; too little may render her desperate.

The foregoing may be lightly regarded as "what everybody knows," and as unimportant. A due attention to the maintenance of health by common-sense management is of the greatest and ever-constant importance, for it must be recognised as a primary axiom that there is no specific treatment for the slighter ailments of the change of life. All that can be done is to interpret such symptoms as occur intelligently and treat the patient for their relief.

Chloro-anæmia we will refer to later, but meanwhile we may say that, recognising its slighter forms as due in part to vaso-motor disturbances of the circulatory system, partly to malassimilation of food from dyspepsia, and possibly partly to hydræmia from increased uterine blood losses, we must not overlook its significance as a symptom. Some patients who have been formerly chlorotic or chloro-anæmic at puberty, or in early menstrual life, revert to these conditions at the menopause. In such individuals we must regard the prominent symptoms, whether nervous, dyspeptic, cardiac or anæmic, as those requiring our first attention.

Drug Treatment of the Minor Ailments of the Menopause.—

It is a common idea that as neurosis plays so prominent a part in producing many of the symptoms complained of, therefore bromide of potassium, with the possible addition of valerian, sumbul, assa-fœtida or musk, must be regarded as the sheet anchor of treatment. This is surely wrong. Undoubtedly the bromide salts are valuable, but only when given at the proper time. Before we give sedatives, to mask symptoms it may be, and to gain but temporary comfort to our patients, we must when needful restore the impaired functions which have in great measure either increased or brought about the nervous derangement. Attention to the various hygienic considerations mentioned above will probably aid us in determining the indications for treatment by drugs.

Anorexia, or loss of appetite, may be suitably treated with tincture of *nux vomica* and compound tincture of gentian, or fresh infusion of gentian, or tincture of *nux vomica*, *sal volatile*, and infusion of *calumba*, *cinchona* or *quassia*. These vegetable drugs should be given for such condition before food. The addition of tincture of cardamoms, or compound tincture of lavender, may be useful. If there is much flatulence and distension of the stomach, powders of *nux vomica*, *pulv. rhei*, *bismuth carb.*, with compound

cinnamon powder, or powdered ginger, may be found more suitable. For fastidious patients, the powder may be concealed in a caché. In conditions of atonic dyspepsia, a mixture of dilute nitrohydrochloric acid 15 minims, syrup of bitter orange peel $\frac{1}{2}$ fluid drachm, with laurel water to 1 ounce, taken thrice daily before meals, may be still better.

Constipation must be attended to; there should be an action of the bowels daily. The risk of producing troublesome diarrhœa by over-strong purges must not be forgotten. Aloes, unless there are hæmorrhoids, is one of the most popular drugs, and may be said to form the basis of most "female" pills. I think aloin, with eunonymin, extract of belladonna, and extract of nux vomica, is generally very efficacious, and causes no griping. Capsules of cascara sagrada, m. xxv. to xxx., cascarrine (Leprince) in doses of grs. ii. to xv., or compound liquorice powder a small teaspoonful, taken nightly, or every second night, will be found more suitable for some patients.

If diarrhœa comes on it must not be checked too brusquely. Milk diet, bismuth, limewater, pills of lead and opium, powders such as pulv. kino co., or pulv. catechu co., may be required. Some cases yield better to pil. cupri sulph. with ipecacuanha and opium. But we should recollect that in a large proportion of cases the diarrhœa is nature's method of adjusting the balance of metabolism; and if we interfere medicinally too soon, we may only transfer the tension to some less easily controlled organ than the intestines.

For many cases of dyspepsia and occasional diarrhœa at the menopause, I have found Richardson's lactopeptine an excellent remedy. Papain in gr. iss. to iii., thrice daily after meals, is a good general solvent and digestant, affecting both proteid and starchy foods. Subgallate of bismuth, gr. x. to xx., after food is serviceable in fermentative dyspepsia. Djambæ, a mild astringent stomachic, is useful where diarrhœa is a prominent symptom of the dyspepsia.

The whole question of treatment is one of general therapeutics; we treat the symptoms present, and keep the patient as nearly well as circumstances and conditions will allow.

One cannot here illustrate every possible necessary method of treatment; general principles only must be briefly mentioned. Dr. Saundby's *Ingleby Lectures on Dyspepsia in Women*, 1894, may be profitably referred to.

It is apparent that sudden cessation of the periods must be more trying to the individual than a more gradual termination. One ought therefore to treat such cases of sudden arrest with a view

to determining a re-appearance of menstruation, if there are symptoms of general systemic distress.

Should suppression of the menses seem to require attention, we may resort to the remedies applicable to arrested menstruation in earlier life. Iron, aloes, saline purges, permanganate of potassium, made up in pill with kaolin, or in capsules, aletris cordial in drachm doses thrice daily. Extract of viburnum prunifolium and other familiar drugs may be cited. I have, however, found that apioline (not apiol), as manufactured by Chapoteau of Paris, has given better results than any of these. One *perle* is given thrice daily about the usual expected time of menstruation. The drug need not be taken for more than three or four days at a time. In the interval, sulphates of iron and magnesium, with arseniate of sodium and nux vomica, should be prescribed. If there should be dysmenorrhœal pain, the liquid extract of salix nigra, or the fluid extract of viburnum prunifolium, both in 1 drachm doses every four hours, with the possible addition of bromides or extract of Indian hemp, will prove very beneficial. The tincture of senecio jacobæa has yielded good results. Dr. William Murrell has administered this, and also senecin, the active principle, to women suffering from irregularity of the menses. A liquid extract is also prepared. The dose of the tincture is from 1 to 2 drachms thrice daily, of senecin 2 grains, or of the liquid extract 25 to 35 minims thrice daily. Murrell writes: "I find senecio useful in those cases in which the menstrual function, having been performed regularly for some years, has been suddenly suspended as the result of cold. In the majority of cases the period is not re-established until the drug has been taken ten days or a fortnight; but in one case, the patient having missed two months, came on unwell after six 2 drachm doses." From personal experience I can confirm Murrell's views.

Santonin is preferred by Bergey (2) to all other drugs as an emmenagogue, and for the relief of dysmenorrhœa; he gives it in 10 grain doses at night. I have no experience of the drug in this way.

Lappa officinalis, which has only lately come within the pale of allopathic remedies, deserves further attention. It is held to be a valuable regulator of all menstrual irregularities, and markedly helpful in the treatment of amenorrhœa due to chlorosis. I hardly think it can be looked on as equal to apioline or *pure* apiol as a direct uterine stimulant; but it is certainly well spoken of by those who have fairly tried it (3). It is a general tonic, and may be combined with other alterative compounds, such as salix nigra aletris cordial, or celerina.

"Morse's Glycerole of Celery Compound," which contains celery seeds, catsup herb, and chamomile, is a really useful and quite harmless sedative, and provides an excellent vehicle for many of the disagreeable tasting drugs, such as viburnum, salix nigra, etc.

Oxalic acid has been highly spoken of as an emmenagogue. It is probably an efficient agent, and a capable abortifacient, but cannot be regarded as a safe drug. Bloom (4) orders: Oxalic acid, 8 grains; syrup of lemons and water, of each 2 ounces. A teaspoonful of the mixture four times a day. Talley (5) met with a case in which poisonous symptoms followed three doses of half a grain each, repeated at intervals of about four hours. It should therefore be given cautiously. Both anæmic and plethoric patients may take it. If there are no marked symptoms evidently due to suppression, we should not attempt to re-establish the flow.

When a woman tells her medical man that she is experiencing heats and flushes, rigors, perspirations, dimness of sight, great depression of spirits, etc., and that these symptoms have all come on since the irregularity or arrest of the periods, he should satisfy himself that there is no special gastric or general cause, such as anæmia, albuminuria, or glycosuria. It should be borne in mind that glycosuria may be due to intestinal poisons.

If none of these call for attention, he may benefit his patient greatly by prescribing a general tonic, such as nux vomica, gentian, calumba, or sal volatile, with bromide of sodium. From time to time the changes may have to be rung, but the suitable remedies will remain essentially much the same. For neuralgias of the head, neck, back, or limbs, salts of quinine, such as tannate or sulphate, with small doses of opium, or antipyrine and bromide of sodium, or chloralamid or bromidia may be prescribed. The citrate of iron, or ammoniated citrate, with quinine, should be given as inter-attack treatment. Local applications, such as chloroform or belladonna liniment, equal parts of chloral hydrate and camphor; or a mixture of butyl chloral hyd. ʒvi. , and menthol ʒiss. , or Ferris's "Anodyne Amyl Colloid" applied on hot flannel may prove very helpful. The ovarian and obstinate spinal neuralgias are suitably treated by applications of equal parts of belladonna and iodine liniments over the sites of pain.

For the sudden blindness of reflex origin we cannot expect much benefit from drug treatment. As I have mentioned, valerian, castoreum, musk, etc., have been prescribed. I think application of small blisters behind the ears, or over the temples, or should there be any concomitant ovarian irritation over both iliac regions, has

seemed to hasten recovery in the few cases I have seen. If the amaurosis can be attributed to anæmia, iron and arsenic should be exhibited. If, on the other hand, Bright's disease, or syphilis, or diabetes, is present, we must treat these general conditions.

Deafness, if hysterical, will yield most readily to local treatment by electricity; and internally the administration of phosphorus or phosphide of zinc should be employed.

The relief of irritability or depression of spirits is not wholly a question of drug treatment. Tonics, with bromides of sodium and ammonium, and, if there is much vascular congestion, bromide of potassium, should be given. It is in these cases that the properly regulated administration of alcohol will prove most beneficial; but it is likewise in these cases that there is most risk in prescribing alcohol without specifying definite doses.

The headaches which are neuralgic may be treated, as has been said, by bromides and quinine, or bromides and antipyrine, or guarana, or gelsemium, or phenacetin, or croton chloral, or nepenthe, or in very severe cases by hypodermic injections of morphia and atropine. Regularly recurring periodic headaches are best treated by quinine, antipyrine, salicin, or phenacetin.

Local applications, such as sedative liniments on hot cloths, or menthol crystal, may be markedly beneficial.

For women who suffer severely from headaches at the climacteric try bromide of iron, arseniate of iron, or, alternately, bromide of quinine or quinine and arsenic, as a continued treatment between the attacks of pain. Iodides of sodium or of potassium with alkalies and vegetable tonic infusions are found useful in many cases. Sumbul (m. xx. of the fluid extract thrice daily) has proved useful. Mild applications of the continuous current (30 to 40 ampères) over the nape of the neck and scalp may afford relief to some patients.

The Cardiopathy of the Menopause is essentially, if not altogether, functional. But the remedies employed are those found serviceable in conditions of actual organic disease. Digitalis, the most powerful cardiac drug we possess, sparteine, strophanthus, convallaria and belladonna may be prescribed as general principles of therapeutics suggest. For the alarming syncopic attacks sometimes present inhalation of nitrite of amyl affords the most speedy relief. At the same time diffusible stimulants, such as spirits of aromatic ammonia or alcohol, should be given when indicated. Nitro-glycerine in 1/100 gr. doses, or sodium nitrite gr. 2 to 4 in solution, taken thrice daily, is of distinct value in such cases. Hypodermic injections of hydrochlorate of cocaine or of

atropine or of morphia and atropine may be required in some very acutely painful cases. A large enema containing from ℥ii. to ℥i. of hydrate of chloral has seemed to do very well on the few occasions I have tried it.

The whole question of cardiac therapeutics is somewhat unsettled, and the varying opinions of many recent observers who have paid special attention to the subject show that there is considerable divergence of views. All seem agreed that digitalis still holds the first place as a heart regulator in valvular disease. But for the regulation of functional affections and for allied affections of the myocardium, different physicians adopt different remedies. It would be obviously out of place to follow these discussions here, but it may be advantageous to refer briefly to the drugs which have been found most serviceable. On the whole we must first place digitalis. Strophanthus is less popular than at one time it promised to become; it slows the heart beat, but seems to influence the small vessels less powerfully than digitalis; its advantages are that it has a more directly stimulating effect on the heart and is not a cumulative drug. Convallaria, first introduced in 1882 by Sée as an adjuvant to digitalis, has not maintained its early popularity. Some regard it as even a specific in fatty degeneration, but the majority of therapists doubt its constant beneficial action. Da Costa has given up using it. Citrate of caffeine is similar in action to strophanthus; its diuretic action renders it of special service. Cocaine is also valuable, but there is the risk of forming "the cocaine habit". Both are of benefit during urgent symptoms of weak cardiac action. Sparteine is still indefinitely placed. Some regard it as only second to digitalis, others think it of comparatively little use. The sulphate salt is the most convenient form. Chloride of barium and adonidin have been of service. Tincture of cactus has been highly spoken of by Campbell Pope (6), but Da Costa (7) classes it with convallaria as disappointing.

Seymour Taylor (8) regards belladonna as serviceable when digitalis disagrees, and this we can confirm. He also strongly supports the administration of *prunus virginiana* or American wild cherry as being of special value as a heart tonic. *Apocynum cannabinum* is used by Glinski (9) as an alternative to digitalis; it is non-cumulative, diuretic, sedative, and has no bad secondary effects. The tincture (1 in 10) in doses of 7 to 10 minims, or the decoction (1 drachm in 8 ounces) in doses of $1\frac{1}{2}$ to 2 ounces, is given two or three times a day.

Nitro-glycerine is of great service in the relief of climacteric cardiac irregularity, but it must not be continued indefinitely. I

have recently ordered sodium nitrite with sumbul as a change drug from nitro-glycerine with good effect. Iron and quinine are useful, but strychnia is the most valuable tonic in cardiac asthenia; it may be given with digitalis by the mouth, either the liquor strychniæ, or tinct. of nux vomica, or the former hypodermically. Arsenic is also very useful as a heart tonic. *Piscidia erythrina* in 20 drop doses of the tincture is sometimes of use. It should be given morning and evening in a wineglassful of water.

In more chronic conditions of asthenic nervous heart, rest in bed, careful shower baths, massage, and, later, Swedish movements, as practised by Schott at Nauheim (10), and recommended by Drs. Bezly Thorne and Wethered, may prove beneficial.

Hæmorrhages, other than genito-urinary, must be treated in accordance with one's general knowledge of medicine.

Epistaxis, if slight, needs little attention; the feet may be put in very hot and the hands in very cold water, or held up above the head. Snuffing up powdered alum or tannin often acts quickly. In very bad cases one may require to plug both the posterior and anterior nares with iodoform gauze dipped in glycerine of tannin or in solution of perchloride of iron.

Hæmoptysis, if not referable to any cardiac or pulmonary condition, must be treated by absolute rest and quiet. Turpentine, ergot, hydrastin, hamamelis, etc., may be prescribed. Hæmatemesis may be due to capillary congestions or to other causes which we have mentioned. Ice swallowed in small lumps (unless there should be symptoms of subacute gastritis, when this is contra-indicated), turpentine in milk, ergot administered by the mouth or hypodermically, dilute sulphuric acid, gallic acid, etc., may be employed. Personally, I have found more satisfaction from turpentine internally and ergot hypodermically, in both hæmoptysis and hæmatemesis, than from any other single or combined remedy.

If there is liver congestion or cardiac embarrassment, we must treat these originating causes of the hæmorrhages. Judicious purging with salines will be indicated. Whatever are the scientific facts as to the cholagogue action of calomel, one knows from wide experience that a dose of calomel, either by itself or combined with jalap and scammony, and followed by a saline purge, clears up and cures many obscure "bilious" conditions. In rheumatic bilious subjects we may give a preliminary dose of magnesium sulphate, and then a mixture of salicylate of sodium thrice daily.

Functional Dyspepsia.—I have already mentioned the necessity of endeavouring to cure the dyspeptic symptoms so very usual at this time. A full discussion of the methods of treating dyspepsia,

and an account of the attached reasons, sound and fallacious, would require a larger volume than I, meantime, aspire to write. In atonic dyspepsia with flatulence, I have stated my preference, as a rule, for dilute mineral acids. In irritative dyspepsia, bismuth, alkaline earths (potassii carbon., lithiæ carbon., sodii carbon.), with liquid preparations of opium and dilute hydrocyanic acid, will be more efficacious. Recently, aseptic and anti-fermentation remedies have been coming into vogue; of these salol for intestinal dyspepsia and salicin for purely gastric indigestion are most esteemed. Ox bile tabloids, gr. iv., three daily, are often valuable as additional treatment. But attention to diet, and drinking a pint of hot water twice or thrice daily, either plain hot water, or water with gr. v.-x. of sodium carbonate, or lithia citrate added, will often be found curative of very obstinate dyspepsia. The many medicinal waters such as Apenta, Friedrichshall, Rubinat, Hunyadi Janos, Pullna Cœsculap or Victoria, and Carlsbad salts, are all suitable and appropriate in certain hepatic and gastric conditions, but I cannot now analyse the various merits of these saline aperients.

For the conditions of painful abdominal distension I have referred to, I find that gentle efforts at purgation, followed by sedative treatment, especially the less astringent preparations of morphia, such as the bimeconate solution or nepenthe, with external soothing applications, *e.g.*, strips of flannel soaked in very hot water, and smeared with equal parts of belladonna extract and glycerine, have given me the best results. Some cases require solid opium; if we have to give this to relieve peristalsis, I advise the addition of extract of belladonna or atropine.

For the non-painful distensions, due to general flatulence and sympathetic irritations, assafœtida, camphor, valerian, or aromatic spirits of ammonia may be ordered. Nux vomica or strychnia, and compound tincture of lavender or of cardamoms, are very valuable additions. If constipation should be habitual, one may do much by enforcing regular periodic daily attempts at defecation. If the action does not occur, the injection of half an ounce of glycerine, or a pint of cold water, or, in very obstinate cases, a pint or more of hot soapy water, containing an ounce of castor or olive oil, and a teaspoonful of turpentine, will prove effectual. A convenient form of administering glycerine as an enema is by means of solidified glycerine suppositories.

Rectal irritation may be treated by various remedies. I have found both this and vaginal irritations greatly relieved by suppositories of cocaine, morphia, belladonna, with the addition of bismuth, cacao butter being used as the vehicle. Ichthyol and glycerine

(10 to 20 per cent.) is often most useful in rectal, vaginal and pelvic irritations.

Liq. calcis chlorinat. applied on a pledget of cotton until smarting occurs, and then bathing with the solution, has been successfully used in obstinate pruritus ani.

If the urine is deficient, citrate of lithia and acetate of potassium in solution, with free flushing of the kidneys by large draughts of hot water, and diluents, such as barley water, etc., must be given.

Among the cutaneous affections acne rosacea is so common that a few words may be advantageously said regarding its treatment. Ergot has been advised on the ground of its causing contraction of the skin capillaries. When the hyperæmia is active, ointments or lotions of boric or tannic acid, calamine, or any of these, with the addition of sulphate of zinc, may be used. For marked hyperæmia ichthyol is useful. Precipitated sulphur in solution or ointment may be used. Incising the pustules and painting with resorcin gr. 7, ichthyol gr. 15, collodion 1½ oz. mixed has been recommended by Galatas.

The "abortive" treatment of acne may be tried. Two plans have been adopted; either to paint each spot with a mixture of ichthyol (1 part to 3 of water), which is to be allowed to dry on the skin, or paint with liquid pure carbolic acid and cover with flexible collodion. The first may be tried when the eruption is papular; the second when it is pustular.

Prurigo has been treated recently by massage, vaseline being used as a lubricant; the itching was relieved, but the condition was not cured. Sulpho-carbolate of sodium, with equal parts of vaseline and lanoline, has also been employed. Weak solutions of carbolic acid, of tar, of resorcin, or applications of pure glycerine may be efficacious.

For the obstinate eczemas of the climacteric there are few remedies better than ordinary black wash (lot. nigra of the B.P.) to which a small quantity of glycerine has been added. The lotion should be applied on strips of linen rag, and changed twice daily. Chrysarobin has been highly recommended by some dermatologists. Ichthyol (1 or 2 to 1000), resorcin, thymol, salicylic acid, carbolic acid, tannin, and acetate of alumina have each their advocates.

In neurotic reflex eczema Holstein (11) gives ergotin internally and applies liquid extract of ergot externally (2 to 12 to 30 per cent.) in the form of an ointment.

The constitutional treatment of the patient will, however,

always need consideration, and the complicating conditions must receive appropriate attention.

Herpes of the genitals may be either dry or moist. If dry, frictions are made with an ointment containing equal parts of lead plaster and lanoline, with a small addition of lard or equal parts of grey ointment, lanoline, and half as much olive oil. If moist, the parts should be bathed with boric acid solution or a weak solution of carbolic acid, and then dusted with a powder of starch, bismuth subnitrate, and tannic acid (12). I think the addition of powdered opium or morphia has, in my experience, been a great improvement.

In treating urticaria, Dr. Stephen Mackenzie (13) recommends a nightly warm bath, with some sulphurated potash or starch added—say, 2 ounces to 30 gallons of water; and then smearing the affected part with a lotion of carbolic acid and glycerine or salicylic acid vaseline.

Phosphorus given internally has seemed to do good in lupus erythematosus. Ashburton Thompson's solution, gtt. xv. in water, thrice daily after meals, is the appropriate form and dose. If there is constipation or liver disturbance, blue pill and colocynth may be given. Nitric acid after meals is good. In hyperæmic cases acetate of potash should be prescribed. In most chronic skin affections of the menopause arsenic or arseniate of iron may be tried when other remedies fail. Thyroid extract in doses of gr. v., thrice daily, is sometimes very useful.

For *erotism* full doses of bromide of potassium at night, with cold general sponging of the body morning and evening, and due avoidance of all inciting causes, either from psychical or other excitants, should be recommended.

In cystalgia, one of the most recent writers on the subject, Dr. Mesnard of Bordeaux, prefers constitutional measures, especially hydrotheraphy, Weir Mitchell's treatment in a mild form, and plenty of fresh air. In cases in which the application of cold water is not well borne, benefit may be derived from prolonged warm sitz baths with warm fomentations and poultices on the hypogastrium. If milk can be digested a milk diet should be enjoined.

Arsenic, nux vomica, salts of zinc, *e.g.*, phosphide and oxide, phenacetin, and antipyrine are useful internal remedies; opium and belladonna suppositories are often indicated. In event of very severe pain the hypodermic injection of morphia may be used with discretion.

There are many conditions which may be looked on as merely incidental to the menopause for which our general experience of

drugs will suggest suitable remedies. In the glycosuria often found both in thin and in post-climacteric women it is probable that changes in the pancreas account for the condition. The well-known observations of Rokitansky, Frerichs, Claude Bernard, and von Mering, had shown this long ago. Modern therapeutics suggests to us the employment of pancreas substance in the form of tabloids. Those prepared by Burroughs and Wellcome contain five grains each, and being coated with keratin pass through the stomach and reach the intestine supplying the needed principle.

I have in chapter iii. referred incidentally to the relation of gland secretions to the economy and to the employment of different gland extracts medicinally. My personal experience has been confined to the use of thyroid extract, and, in a few cases, ovarine in tabloid forms. I find the administration of thyroid extract distinctly serviceable in some menopastic cases. In obesity, in chronic or subacute skin affections, and also in some instances of general malaise with depression of spirits at the climacteric, my patients have unquestionably derived benefit. I order tabloids of fresh thyroid extract in doses of five to ten grains thrice daily. I find the general health and strength has improved, the nervous symptoms, especially irritability, have become less, and in one or two instances there has been marked amelioration in existing dyspeptic condition. I do not recommend the thyroid extract as a panacea, and have never ordered it except as additional to other general tonic and sedative treatment.

As corroborative of my opinions I may refer to the experience of Dr. Bruce (14), who found that patients suffering from mental depression and deterioration derived marked benefit from a course of thyroid extract. The pulse changes were shown by increased rate and volume and lessened tension. No sensory disturbances were observed in the cases. All the patients slept well. Among the patients treated were cases of mania, melancholia, puerperal insanity, lactational insanity, climacteric insanity, etc. He argues that in carefully regulated doses the drug can do no harm, and will probably prove beneficial in neurasthenic women.

(1) *Centralblatt f. Innere Medicin*, 17th March, 1894.

(2) *Therapeutisch. Monatsch.*, Ht. 5, S. 191, 1894.

(3) *Medical Age*, 10th March, 1894.

(4) *Medical News*, 14th October, 1893.

(5) *Therap. Gazette*, 15th March, 1894.

(6) *Med. Press and Circular*, p. 63, 16th Jan., 1895.

(7) *American Journal Med. Sci.*, p. 362, April, 1894.

(8) *Medical Record*, 7th July, 1894.

(9) *Vratch*, Nos. 6 and 7, 1894. Also for general recent cardiac therapeutics *vide* Braithwaite's *Retrospect*, vol. cx., p. 199; *Year Book of Treatment*, article by Sidney Coupland, p. 1, 1895-96; "The Gouty Heart," by Mitchell Bruce, *Practitioner*, Jan., 1895; and "Heart Disease," *Med. Ann.*, p. 305, 1895.

(10) *Vide Lancet*, 5th May, 1894; and *British Medical Journal*, 10th Nov., 1894.

(11) *Monatsch. f. Prakt. Derm.*, i., 1894.

(12) Besnier, *Presse Médicale*, 22nd Sept., 1894.

(13) *Practitioner*, October, 1894.

(14) *Journal of Mental Science*, February, 1895; and *Lancet*, 9th March, 1895.

CHAPTER VII.

BLOOD DYSCRASIAS, DIATHETIC AND CONSTITUTIONAL AFFECTIONS
IN THEIR RELATION TO THE MENOPAUSE.

I DO not now propose to consider the many interesting pathological factors involved in the thorough study of these subjects, yet some brief reference must be made to certain points bearing on the clinical appreciation of these conditions.

It may be asserted broadly that all these blood dyscrasias and special diathetic manifestations depend on imperfect or perverted metabolism. The blood, or the nerve regulation, is primarily at fault, and if the imperfectly understood influence of heredity is also taken into account, it is, at least theoretically, easy to comprehend many somewhat obscure problems.

Among the conditions we shall consider, we must rank the anæmias—simple anæmia, or chloranæmia, and pernicious anæmia—as most important.

Anæmia consists of a deficiency in the quantity or quality of the blood. Blood losses may account for the want of blood in the system, or there may be other discharges, such as leucorrhœa, diarrhœa, etc., or impairment of the nutritive functions, due to irregular metabolism from reflex or central nervous disturbances, may affect the quality of the blood. The liver is the seat of two distinct processes, one resulting in the depositing of irregular coarse granules in the leucocytes and endothelial cells of the hepatic capillaries, the other causing a finer granulation of the hepatic cells themselves. The first process principally affects the red globules and is of a chronic and passive nature; the second is active, and may be regarded as a true hæmolysis. Hæmolysis may and does indeed constantly occur without pigmentation during the process of bile formation. The spleen is much more active than the liver as a blood destroyer. Next in power is the gastro-intestinal mucous membrane; this action is manifest during digestion, as shown by the increased size of the spleen, by the increase of bile, by the augmented number of leucocytes in the blood, and of uric acid in the urine. The liver also acts as a blood destroyer, but is

specially employed in removing the hæmoglobin after it has been separated by the spleen and gastro-intestinal glands. Bone marrow acts slightly as a blood destroyer (1).

Applying these observations to a climacteric woman, we find special reasons why anæmia is likely to be present. The blood glands, especially the spleen and lymphatic glands of the stomach and intestines, are subject to senile changes; the liver also, but in less degree, undergoes structural alteration. The combination of these actual structural defects with the superadded disturbance of the sympathetic nervous system, a disturbance partly due to the blood condition, partly special to the individual, unites to form a vicious chain productive of many untoward symptoms.

A certain degree of anæmia is usually found during the change of life. Even women who appear plethoric and full-blooded are often relatively anæmic. But as a rule simple anæmia is much less prominent than chloranæmia. When anæmia is a marked symptom one may in most cases find it associated with menorrhagia or metrorrhagia or profuse leucorrhœa.

"Mrs. H., *ætat.* forty-two, mother of six children, the youngest born nine years before, was sent to me by Dr. Samuel Wilks in March, 1893. She had been subject to profuse losses at the periods for six years; the losses had become distinctly greater for some months before she consulted me. The periods recurred every fourteen days, and the duration was from twelve to fourteen days; from sixty-five to seventy diapers were required on each occasion. Constipation alternated with diarrhœa. The patient was exceedingly anæmic and suffered from all the usual accompanying symptoms. On physical examination the uterus was found enlarged, retroflexed and somewhat prolapsed; there was also ovarian prolapse. The uterus could be easily replaced, but immediately fell back on withdrawing the sound. A pessary was introduced. Hydrastis canadensis, ergot and Indian hemp were prescribed, and she was advised to continue taking arsenic in small doses. With rest and various uterine astringent drugs the periods somewhat diminished, but the patient still continued to lose considerably more than she could afford. In July the uterus was explored and curetted. In September the blood loss was about half what it had been before, and the patient had gained much. Her face was now fuller and less waxy, her lips red and her general condition vastly better. In July, 1894, she reported herself. The flow at the period just passed had been somewhat profuse during the first four days; the duration was six to seven days; the interval was eighteen to twenty-one days; the number of diapers used on the last occasion forty. In

June the pessary had been removed, and although she had felt no inconvenience from its disuse the uterus had again become retro-displaced. Arsenic, nux vomica and tincture of cardamoms were ordered as a general tonic. In this case the hæmorrhage was undoubtedly the cause of the anæmia, and its partial arrest was followed by the speedy improvement of the patient. No drug treatment alone proved sufficient.

In another case with a very similar history the endometritis was not the only cause of menorrhagia, a small cervical fibroid also assisted to determine the hæmorrhage.

In a third case, occurring in the practice of a friend, a fibroid which had been diagnosed some time before was not interfered with as the usual age for the establishment of the menopause had been passed. The tumour however continued to grow rapidly, and severe recurrent hæmorrhage so drained the patient, and she became so markedly anæmic, that hysterectomy had to be performed. After recovery from the operation the patient did well.

Other cases depend on profuse leucorrhœa or diarrhœa, or dyspepsia and constipation, etc., and these must receive appropriate treatment.

The form of anæmia known as chloranæmia is the most usual one at the change of life. Every practitioner is familiar with the chlorosis of puberty or of young women, associated with suppressed or deficient, more rarely with increased, menstruation. Chlorosis has been regarded as an affection due to disorder of the sympathetic system, of the reproductive system, and of the digestive system. It is not now requisite that we should consider these theories, it is probable that all three are so far correct. The essential features accompanying the condition are pallor and greenish tinging of the complexion, palpitation, breathlessness on exertion, hæmic systolic murmurs over the base of the heart and along the great vessels, or *bruit de diable* in the jugular veins, especially on the right side; the digestion is imperfect, constipation is usual, the urine is generally plentiful and of low specific gravity. Neurotic symptoms are generally present.

Chlorosis at the menopause is frequently found in women who have formerly suffered from it at puberty or in early menstrual life. In most of the instances I have met with the patients have been able to recollect a previous state of "green sickness" when they were younger. Chloasma uterina may accompany menopastic chloranæmia. The symptoms of chlorosis are less marked than in younger women, with the exception of the nervous symptoms, yet these also differ in that hysteria is a more prominent feature in the

young. In the chlorosis of early life the cardiac and vascular phenomena are more pronounced, and ulcerations of the stomach and slight spinal curvatures (generally muscular) are not infrequently met with.

Chloranæmia of the menopause is accompanied with irritability of temper, depression of spirits, general debility, irregular and weakened cardiac action, dyspepsia, and constipation. The green tinge of the skin is present, but seldom so marked as in younger women. The backache differs. It is felt lower down and is mostly a sacralgia, or the pain may be partly in the lower lumbar region. The occurrence of coccygodynia is noted in both, but is more common in the older women. Not a few patients who suffer from climacteric chlorosis are haunted with the idea that the skin discoloration, the thinness, and the dyspeptic symptoms indicate the existence of cancer of the stomach. If the observation of Osswald (2) can be maintained, *viz.*, that free hydrochloric acid is always present in excess in the stomach of a patient suffering from chlorosis, and if the total absence of free HCl in the gastric juice is usually pathognomonic of cancer in the stomach, we would have a very reliable test to depend on. But there seem to be cases of chlorosis which derive marked benefit from administration of weak hydrochloric acid combined with salts of iron and arsenic; this experience indicates that all cases are not alike. Osswald suggests that when treatment by salts of iron has failed alkalies should be prescribed. My personal knowledge corroborates this recommendation. Nor can we invariably rely on the absence of HCl from the stomach as a proof of cancer. Wagner (3) examined 216 patients with a view to determining this, and concluded that it cannot be relied on as an absolute test; although the absence of the acid affords additional evidence of malignant disease which is suspected from other symptoms, and, further, if free HCl is not present in the stomach the tendency to cancer is favoured.

In treating chloranæmia, iron will be found the best remedy, unless the dyspeptic symptoms hinder its assimilation. The less astringent salts of iron are preferred by some; others combine the sulphate with some vegetable purgative, such as aloes, and a tonic, as nux vomica. The hypodermic injection of 5 centigrammes of the ammonio-citrate of iron in 1 gramme of water has yielded (Dori (4)) excellent results after an extended trial. Ergot, combined with perchloride of iron and strychnia or nux vomica, is found suitable in anæmic cases. Arsenic, unless prohibited by troublesome diarrhoea, when arsenite of copper may be substituted, is a valuable addition to all the iron salts.

Hæmogall derived from hæmoglobin is being given with good effect ; the dose is 5 grains after meals. Sometimes salol or hydro-naphthol given before meals (of either gr. v.) is found to succeed when iron fails.

With all the newer methods of treatment, one should not forget that carbonate of iron is generally of use. "Blaud's pills," especially if combined with nux vomica and arsenic, have cured many thousands of patients, and on the whole are perhaps the best everyday remedy. Different preparations of ox blood, or of marrow mixed with extract of malt, are procurable, and may be tried. Meat juices are of value.

Meat peptones (of which the so-called Kemmerich's meat peptone may be cited as an example) contain from 55 to 60 per cent. of proteids, of which 30 per cent. is albumen, 18 per cent. peptones, and 10 to 12 per cent. composed of other soluble albumens. Added to these are the contained phosphates and chlorides, so that we have a nourishing and easily assimilable food.

Hæmalbumin has been recommended highly by Dahmen. One grain of it is said to be equal to 6 of butcher meat. It is administered in water, wine, or beer.

In chloranæmia, especially for cases with cardiac weakness, these peptones are indicated.

Orexin has been recommended by Penzoldt as of much value in the treatment of chloranæmia in functional neurosis, such as neurasthenia, hysteria, etc. In advanced pulmonary tuberculosis and in gastric ulceration it is contraindicated. The practical objections to the hydrochlorate salt, that it causes burning sensation in the œsophagus and burning heat in the stomach, may be overcome by using basic orexin in fine powder placed inside a gelatine capsule or wafer, and immediately after swallowing the drug, drinking a pint of warm milk or clear soup. Penzoldt (5) treated 273 cases, and has probably more experience of the drug than most other writers, so that we must accept his statements with respect. Dr. John Gordon (6) considered the drug to be a useful stomachic tonic and stimulant in early tubercular disease, in which loss of appetite and constipation were the chief symptoms. The anæmia improved in consequence of the improved appetite and digestion. Other observers speak less favourably of orexin. I have no personal experience to record regarding it, and have merely mentioned the remedy as one which may in certain cases prove serviceable.

Tincture of piscidia erythrina, the dose of which is from 20 m. to 1½ drachms daily, has been found of advantage for the præcordial

pain and other neuroses of chlorosis. The drug must be continued daily for a month or six weeks.

A very annoying symptom of chlorosis is falling out of the hair. I have found a hair wash, consisting of tincture of cantharides, alcohol, and weak hydrochloric acid, to have good effect.

Constipation is an almost invariable accompaniment. The late Sir Andrew Clark (7), Duclos of Tours (8), and v. Hosslin (9), have directed special attention to the influence of constipation as a cause of chlorosis. The greenish-yellow hue of the skin is attributed, by v. Hosslin, to the absorption of hæmoglobin and hæmatin from the intestinal canal. Clark and Duclos believed that fæcal intoxication and absorption of ptomaines had a direct causative action, and advised purgatives and intestinal antiseptics. Practical experience has long ago shown that the regulation of the bowels is of the first importance in chlorosis; and whether we accept Clark's views on etiology or not, there is no question that purgation is a necessary part in the therapeutics of anæmias and chlorosis. I have generally ordered aloin, nux vomica, myrrh, sulphate of iron with ipecac.; and belladonna as a nightly pill, to be followed, if need be, by a saline aperient in the morning.

A powder of equal parts of milk of sulphur, iron filings and cream of tartar, of which a teaspoonful or more should be taken every night, is of very great efficacy, both in restoring deficient secretions, and as a general tonic and alterative.

Pernicious Anæmia.—Pernicious anæmia may be met with in women at the menopause. It is not infrequently confused with Addison's disease without the pigmentary stains, or with leucocythæmia. There is a distinct relationship between this form of anæmia and these affections. Patients subject to purpura also present many similar conditions. The symptoms are at first the same as those of chloranæmia; and indeed it is only because chloranæmia is a curable, and pernicious anæmia, for the most part, an incurable affection, that clear distinctions are possible. As pernicious anæmia progresses, we find great emaciation, localised dropsies and small patchy blood extravasations. The neurotic symptoms are often marked; there is amblyopia or amaurosis, vertigo, deafness, numbness or tingling and at times loss of power in the limbs, great depression, loss of memory and hebetude. Some cases have gastric crises or syncopic attacks; in others the appetite is fairly good, and the pulse rather quickened and irritable. A slight jaundiced staining is sometimes noticed; weakness increases, with deepening yellowness of the skin; drowsiness and slight rises of temperature occur; dark-coloured stools,

high-coloured urine of low specific gravity, and containing urobilin, are voided.

Both Hunter and F. W. Mott incline to the opinion that pernicious anæmia should be referred to the agency of micro-organisms. Mott (10) reported a fatal case in a woman aged forty-nine. A chemical examination of the liver, spleen and kidney was made; the liver contained a large proportion of iron in the ferric state; the spleen was free from iron in appreciable amount.

Chlorosis may, under the influence of debilitating causes, pass into pernicious anæmia (11).

Some cases of pernicious anæmia have symptoms of tenderness in the course of the bones; the bone marrow is the seat of pathological action, and a condition much resembling leucocythæmia is present. Swelling of the spleen, a marked increase of the leucocytes, and in some cases enlargement of the surface glands are manifest. According to Rindfleisch (12), the changes in the bone marrow in pernicious anæmia should be attributed to defective hæmogenesis.

Perhaps the most important of all recent observations made as regards prognosis is that "the characteristic syndromata of this affection may be due to removable causes". Kauffmann (13) treated two women, one aged twenty-seven, the other thirty-five. The marked symptoms in both were gastric. The second case had more pronounced symptoms, with retinal hæmorrhages, etc. The diagnosis was strengthened by the examination of the blood. In the slighter case an enumeration of the red globules gave 2,000,000 to the cubic millimetre; five months later they increased to 5,500,000, and the patient went home well.

In neither of the cases was anæmia very marked; but there is no reason why one should, except in very advanced conditions, anticipate an invariably fatal termination in from six to twenty-four months, as is gloomily prognosticated in most of the text-books.

Leucocytosis and **leucocythæmia** may be found in connection with, or taking the place of, the more usually received symptoms of pernicious anæmia. By leucocytosis we understand a temporary increase of the white corpuscles from 1 in 500 to 1000, to 1 in 50, or even 1 in 20, of the red corpuscles of the blood; in leucocythæmia we have a permanent increase of the white and decrease of the red globules, until they may even become equal in number.

Recent investigation of the pathology of leucocythæmia points to the splenic enlargement as rather an effect than a cause of the disease.

Dr. Douglas Stanley states (14) that the mere enumeration of the red discs conveys little real information; their shape, size and

character are of equal if not greater importance. He says that in counting the white corpuscles the relative numbers of the various forms should be given. Stanley notices that there are white corpuscles found "quite distinct from those seen in healthy blood". He accepts the view that the red corpuscles originate from the "erythroblast cells in the marrow of certain bones". In some conditions of anæmia nucleated red corpuscles may appear in the blood before properly maturing; in leucocythæmia they have been noticed when the actual reduction in number of the red corpuscles was not great, which points rather to increased production on the part of the red marrow, independently of any rise in the demand for red globules as is met with in anæmias. In concluding his valuable contribution, Stanley emphasises the fact that leucocytosis is quite a different condition from leucocythæmia; "for, as Müller and Rieder (15) express it, in leucocytosis we find among the colourless cells only such as are found in normal blood; while in leucocythæmia we find elements which are never found under the same conditions". The increase of normally shaped white corpuscles, even in large numbers, is not unusual, and may be seen in suppurative conditions and diseases attended with high temperatures.

Treatment of Anæmias of the Menopause.—Attention has already been directed to the therapeutic importance of arsenic in anæmia. Arsenic, in the form of arsenite of sodium, or the arseniate of iron, given in full doses, is admittedly the best drug in treating these conditions. Arsenic alone is held to be of more value in pernicious anæmia than when combined with iron. The important thing to observe is that the drug should be pushed to the fullest dose short of producing gastro-intestinal irritation and diarrhœa. Generally a dose of fifteen drops of liquor arsenicalis, three or four times a day, may be eventually reached without any of these symptoms appearing. When there are obstinate dyspeptic symptoms with vomiting, washing out the stomach through a rubber tube with a warm alkaline solution (1 drachm of carbonate of sodium to 1 pint of water, an hour before meals) is of advantage.

In milder cases of vomiting, carbonate and subnitrate of bismuth in small doses, with cocaine $\frac{1}{2}$ to $\frac{1}{10}$ of a grain, half an hour before meals, is of signal service. When fulness of the stomach and fermentation are complained of, hydrochloric acid with nux vomica and compound tincture of lavender should be given after food. Intestinal antiseptics, such as beta-naphthol in 2 grain doses, or salol, have been tried by some with good effect.

Bone marrow has been prescribed by Dr. Dixon Mann of Manchester, Professor Fraser of Edinburgh, and others. Mann

gives a teaspoonful dose once or twice daily, either out of a spoon or spread between thin slices of bread.

The marrow is extracted from the head of the long bones obtained from recently killed animals with other portions of bone which contain red matter; the bones are broken into small pieces and digested in glycerine. After several days the extract is filtered off. Mann reports three cases of anæmia, in which this treatment was followed by very favourable results; and expresses his opinion, formed from these and "many other favourable results," that marrow extract is an agent capable of affording valuable aid in the treatment of anæmia (16).

Fraser has given an elaborate and instructive history of one case. He states that although his communication only deals with one case, the curative effect seemed sufficiently evident to justify its publication. In the first instance some of the remedies usually employed were prescribed; these included ferrous chloride, 6 to 12 grains daily; arsenic, 15 to 30 minims of liquor arsenicalis daily, in addition to the iron; then arsenic and iron with the addition of 3 ounces raw ox bone marrow daily; later, ox bone marrow, arsenic and salol; this was followed by ox and calf bone marrow and salol (the arsenic being discontinued). After these had been given for thirty-two days the patient was put on ox and calf bone marrow and ferrous chloride for a month; and, finally, ox bone marrow, iron and salol. The detailed history of this case leaves no room for doubt that the patient was in a most critical condition when admitted and practically well when he went home (17).

William Hunter was one of the first advocates of the anti-septic-intestinal treatment of the essential anæmias; he believes that beta-naphthol and salol are best. On the other hand, Henry (18), for chemical as well as therapeutic reasons, prefers thymol, which he regards as the best of intestinal antiseptics—"a fact more fully appreciated in Italy than elsewhere".

In every instance of severe anæmia, whether due to accidental causation, such as excessive blood losses, or to other causes already referred to, such as sympathetic nerve irritation and consequent altered function of the spleen, etc., the advantage of transfusion, as a means of tiding the patient over a crisis, must never be lost sight of. Blood transfusion has been favourably reported on by the late Dr. Brakinridge, of Edinburgh. It is however questionable if the dangers from clotting of fibrin or from fibrin-ferment intoxication warrant its common use. Saline infusions made from common purified salt, a teaspoonful to the pint, as practised by

Arbuthnot Lane and others, or of phosphate of sodium, as first used by John Duncan, of Edinburgh, are safer and seem equally efficacious. These fluids may be either transfused into an arm vein or injected hypodermically. For hypodermic injections large quantities (2 pints and 2 quarts) are advised.

The late Dr. Wooldridge, whose views have been adopted by Horrocks, considered that the intravenous injection of blood or of defibrinated blood was dangerous. Horrocks (19) considers that water, plain, or with common salt, is best for the immediate treatment of collapse due to hæmorrhages. His apparatus has the great advantage of simplicity; it consists of a cannula, a glass funnel and a piece of indiarubber tubing. For essential anæmias solution of phosphate of sodium (a teaspoonful to the pint) is in my opinion preferable. If objection is made to opening a vein, rectal injections or hypodermic injections of the fluid may be used. Injections of blood serum have been somewhat extensively practised. Transfusion of dog's blood or of the serum of dogs has been employed. De Dominicis (20) treated seven cases in this way; three were young girls suffering from severe chloranæmia which had resisted previous treatment; the other four were cases of pulmonary tuberculosis. In the chlorotic cases the results were excellent; two of the tubercular patients improved greatly, the other two were not benefited. Richet regarded these results as in accord with his own. Brown-Sequard, in the discussion on De Dominicis' paper, expressed the opinion that the serum of the dog had special recuperative power.

Formerly goat's milk was held to be specially valuable for certain systemic conditions. Now goat's serum or the serum of horses has been suggested for transfusion; it is more than doubtful if these have any special properties.

On the whole the injection of saline fluids will probably yield better clinical results; and undoubtedly the objection to the transfusion of the serum of dogs, goats, or horses is something more than a matter of sentiment on the part of the patient.

In cases of anæmia presenting the special features of leucocythæmia, excision of the spleen has been advised and practised. The results are such that one cannot regard splenectomy favourably. Warbasse (21) gives an analysis of twenty-eight cases treated by different surgeons. Of these twenty-five died as the immediate result of the operation, twenty from hæmorrhage during the first twelve hours following operation, two from septic peritonitis, and one from shock. Only three survived; one case was a mild leukæmia with moderately large spleen, and was permanently cured; the

second died from general prostration in thirteen days; the third died in eight months after operation from progress of the disease. It is, therefore, not improbable that the blood conditions pertinent to the *one cure*, of *twenty-eight* cases, were not the same as in the undoubted cases. The splenic enlargement does not constitute the disease which affects the whole system, and especially the blood and blood glands generally.

Gout.—It is usually assumed that gout, or the manifestation of the uric acid diathesis, is mainly a disease of middle life in males. Now, although there are good grounds for accepting this assumption as generally accurate, one cannot in face of clinical experience deny the fact that women, during or after the menopause, are not infrequently the subjects of gouty symptoms. I have personally treated a few cases of acute gout in women during menstrual life; but agree with common observation, which is so old that it has been attributed to Hippocrates, that women are not subject to gout until after the cessation of menstruation.

One may parenthetically remark that by gout Hippocrates, if he actually originated the idea, also meant to include rheumatism; for later authors, such as Celsus and Galen, had only dim ideas of distinction between gout and rheumatism. The first description of the classical symptoms of acute gout has been attributed to Aurelianus, who lived in the sixth century; while Ætius of Amida recognised the influence of heredity in predisposing to the disease, and Paulus of Ægineta devoted attention to the formation of gouty tophi. Baillon, in the end of the sixteenth century, again noted that gout and rheumatism were distinct diseases. But it is to Sydenham we owe the first intelligible explanation of the nature of gout. He apprehended that the disease arose from imperfect metabolism. I must leave the medical chemists and "gout specialists" to determine whether excess of uric acid in the system is the cause or the consequence.

Most authorities regard the decreased elimination of uric acid by the kidneys as the more correct solution; Garrod, Roberts, Pfeiffer and Levison have specially maintained this view. But it has been affirmed that uric acid is unfairly blamed for the actual gouty manifestations; Rademacher (22) states that he has separated a distinct acid (containing 28.28 per cent. of nitrogen and having the formula $C_6H_8O_4N_4$) from the urine of persons suffering from acute or chronic gout. "This acid is only found during an attack of gout, always in a free or uncombined state, while the uric acid remains in the urine as a urate and in solution." So far as I am aware this observation has not been generally accepted.

Levison, of Copenhagen, in his recent monograph on this subject, *Die Harnsäurediathese*, announces the following conclusions:—

1. Uric acid is formed by the decomposition of the albuminous substances of the tissues and especially of the nuclein or nucleins.

2. The excretion of uric acid is increased or diminished by all those factors (diseases, medicines, poisons, etc.) which produce a quicker or slower destruction of the cellular elements of the body, especially of the leucocytes.

3. Indigestion of food, especially of meat, brings about a transitory digestive leucocytosis which is evidently called forth by the nuclein introduced in the food.

4. The amount of uric acid eliminated in twenty-four hours is not affected to any great extent by the diet. There is only this difference, that the easily digestible animal albumens produce digestive leucocytosis as well as the formation of uric acid much more speedily than do the vegetable albumens, which are difficult of digestion.

A most interesting article on the relationship of nuclein to uric acid, by R. H. Chittenden, appeared in *The Dietetic and Hygienic Gazette*, and was reproduced in the *American Therapist* (23). It is impossible to do justice by a short abstract; a perusal of the original will show that abnormal quantities of uric acid in the system have far-reaching influences on many diverse conditions.

Acute gout, as evidenced by sudden pain in the metatarso-phalangeal joint of the great toe, usually occurring about three or four A.M. with the well-known febrile symptoms, does indeed affect women during the menopause and after the cessation of menstruation; but so far as my experience goes it is comparatively a rare affection.

The same cannot be said of asthenic or atonic or suppressed gout. In fact, one sees dyspeptic symptoms, such as epigastric discomfort, pain, flatulence, eructation, constipation, etc.; neurosal symptoms of restlessness, irritability of temper, depression of spirits, headaches, lumbago, sciatica, etc.; cardiac symptoms of irregularity of rhythm, palpitation, præcordial oppression, tachycardia, etc.; pulmonary symptoms of bronchitis, or asthma, or emphysema; gastro-intestinal symptoms of gastralgia, enteralgia, hæmorrhoids; renal, hepatic, or bladder affections; and markedly, skin affections, especially eczemas and psoriasis; none of these are actually peculiar to gout, but if they arise in a man of over forty they, in default of other evident cause, will probably be referred by his physician to "latent gout"; if in a woman who has consulted

a gynæcologist, to "functional disorders of the menopause". Now, I would not desire to suggest that "latent" gout and "functional" disorders of the menopause may be held to be convertible terms; but there is often a history of hereditary tendency to gout, or a special individual life-history which helps one in deciding how we are to regard gout as causative of some of the symptoms we have mentioned above. Repeated examination of the urine will probably afford the most reliable clinical distinctions, and blood analysis would possibly afford additional information. As in many other disorders, the therapeutic action of drugs may clear up the diagnosis. Lithia salts have been regarded as of the greatest service by Garrod in resolving the urates existing in the blood. Of these the bitartrate produced by neutralising potassium bitartrate with lithium carbonate is probably the best. It is diuretic and laxative, especially if taken on an empty stomach. I formerly used to prescribe citrate of lithium and carbonate of lithium; the citrate is less efficient than the carbonate, and the disagreeable, earthy, bone-like taste of the carbonate is objectionable. Further, the bitartrate of lithium is not only more agreeable than the carbonate, but unquestionably gives better therapeutic results. Tabloids of 5 grains each is an elegant form of exhibiting the drug.

Most important and interesting are the injurious influences of uric acid upon the nervous system. Charcot first pointed out the existing relationship. He said: "One may consider the uric acid diathesis as forming a tree, the principal branches of which are gout, articular rheumatism, some forms of migraine, and certain cutaneous affections. On the other hand there is a nervous tree, comprising neurasthenia, hysteria, epilepsy, hereditary forms of insanity, general paralysis, etc. These two trees spring in the same soil; they communicate by their roots; they are so intimately related that one is tempted at times to ask if they are not one tree."

"In gout," says M. Déjerine, "nervous disturbances of every sort are very common; they occupy a large place in the symptomatology of this affection, and may affect the intelligence, the motility, the general and special sensation. M. Charcot has remarked that in connection with gout one may encounter disturbances analogous to cerebral rheumatism, acute delirium, insanity and headache."

Dr. J. F. Barbour has contributed an article on "The Uric Acid Diathesis and its Treatment" to the *American Therapist* (24), in which special attention has been devoted to the "neuro-arthritic" conditions. He quotes from a paper by Dr. Ménélac Sakorrhaphos (25), of Athens, and from Vigouroux's monograph (26),

both of which strongly support the views above expressed by Charcot.

The treatment of acute attacks may be briefly dismissed. From a single, brief, personal experience I can testify that small doses of perchloride of mercury, calomel, arsenic, and strychnia, with rest in bed, and absolute restriction from all solid food for forty-eight hours, will abort an attack. Plenty of water or weak tea should be swallowed. Local application of equal parts of iodine and belladonna liniment over the joint affected and wrapping it in cotton wool gives speedy relief. Piperazine given in doses of 5 grains three or four times daily seems to afford speedy relief in some acute cases; it does not increase the elimination of either uric acid or urea, but renders the urates soluble, and facilitates normal metabolism. Recent observations appear to throw some doubt on the value of this remedy, but, so far, the weight of evidence has clinically been in its favour. For chronic or subacute gout, iodine and its salts, or iodine with caffeine or guaranine, may be found most serviceable. Colchicum or colchicine is still prescribed, and if given it should be combined with alkalies and strychnia.

In the *Lancet* for 5th January, 1895, a new remedy, *viz.*, uricedin, for the uric acid diathesis, is mentioned. "Dr. Hugo Langstein, of Teplitz-Schonau, strongly recommends a preparation named 'uricedin' in the uric acid diathesis. This substance consists of citrate of potash and sulphate of soda, together with chloride of sodium and citrate of lithium. It is white and granular, and it dissolves in water. It was brought under the notice of the Twelfth International Medical Congress by Dr. Mendelssohn, of Berlin, who stated that 300 grains might be taken daily without any ill effects, and with very marked benefit to patients with uric acid diathesis. Dr. Langstein now writes (27) that he has employed it in fifty cases of gout during the last bath season, with excellent results. He considers that it is much more certain in its effects than the alkaline mixtures that are commonly prescribed or than mineral waters. It may be used in conjunction with the ordinary *régime* of baths and water-drinking at a German *Bad* such as Teplitz, and it is very useful as an after-treatment for the patient who has been to the baths in the summer to take during the succeeding winter. He was first led to employ this preparation in the treatment of his patients on account of the excellent results he had obtained with it in his own case. He had been suffering from increased uric acid in the urine associated with very severe smarting urethral pain for a long time, and had only been able to obtain temporary improvement from ordinary alkaline treatment

and from a variety of mineral waters, and at last decided, with considerable misgiving, to make a trial of uricedin. At first he took 38 gr. per diem. The day after commencing this treatment he excreted more uric acid than usual, but on the third day the reaction was neutral, and no more uric acid was found for another week, after which a glass of beer brought it on. All this time the smarting pain in the urethra had continued, and then, as no calculus could be found to account for it, the daily dose was gradually increased until 150 gr. were taken. The pain then diminished in a very marked degree, and the uric acid secretion was only observed at times when the uricedin was discontinued."

For the suitable dietary of gouty patients, reference must be made to the many special treatises on the subject.

Rheumatism in the form of rheumatic arthritis is much more commonly seen about the climacteric than gout. Even to-day the pathology of rheumatic arthritis is not defined. It is generally regarded as a blending of gout and rheumatism, but probably a better understanding of medical chemistry may eventually prove it to be a distinct affection. It is generally a subacute or chronic disorder; even when acute there is less febrile disturbance and general systemic affection than in acute rheumatism, and although there is aching and pain in the joints, the degree of local disturbance is much less than in either rheumatism or gout. Unlike gout, it is apt to affect the carpal and metacarpal joints and the phalanges of the fingers without any previous invasion of the joints of the great toe; unlike subacute rheumatism, it does not invade the muscles.

Rheumatic arthritis is markedly a disease of females, and of females especially in the fourth and fifth decades. Sir Alfred Garrod (27) has recently summed up the result of his thirty years' study of articular affections and has given a table containing clear clinical distinctions between gout and rheumatic arthritis. Garrod holds that rheumatic arthritis, 1, "has no excess of uric acid in the blood or other specific morbid condition of that fluid". We can hardly accept the latter as meaning more than as yet there has been no specific condition discovered. 2. "None of the affected tissues show deposits of uric acid. 3. The inflammatory process affects the articular cartilages, producing ulceration from the very first and denudation of the bony surfaces. 4. Only the joints are affected. 5. In about two-thirds of the cases the articulations of the jaw and cervical vertebræ are affected. 6. Females are much more liable than males. 7. Hereditary tendency is very slight. 8. May occur at any age, usually between fifteen and thirty. 9.

Diet and beverages which improve the strength tend to lessen the affection. 10. The onset is insidious, and is characterised by gradually increasing weakness and languor." Garrod points out that true gout may affect the knee or other large joints in elderly women, and states that the diagnosis between gout and rheumatic arthritis is often difficult, and may indeed only be cleared up by treatment; if the latter is treated as gout, by low diet and antiphlogistics, the consequent injury may be great.

With regard to Garrod's conclusions as numerically classified my own experience of over twenty years affords me clinical reasons for doubting the exact accuracy of his seventh and eighth conclusions. I believe that a family history of paternal gout or maternal rheumatism, or a mixed history of these diatheses, is very important. In fact, many young girls are subject to slight rheumatic attacks which are not infrequently referred to "growing pains". These are succeeded by dysmenorrhœa of a rheumatic character, and in a small proportion of cases there may be more or less acute rheumatic affections. When such patients arrive at the menopause, symptoms of rheumatic arthritis appear. In other instances the first symptoms are noted when the change of life has occurred.

Mr. Armstrong, of Buxton, in a recent paper read before the British Gynæcological Society, recorded the following statistics:—

"An analysis of the last 180 cases of rheumatoid arthritis which I have seen gives the following results:—

"Males, thirty-four.

"Females, 146; and of these 146, 120 suffered from uterine or ovarian derangements or change of function, in nearly every case before the onset of the arthritis, and in the few instances where it was not so, the onset of the pelvic irritation was followed by marked increase of the arthritic troubles.

"In fifty-eight cases the symptoms came on at, or immediately after, the climacteric period, and in sixty-two there was distinct uterine or ovarian trouble.

"I have grouped the cases according to the most prominent symptom found, although in many cases more than one of the following troubles were present:—

"Dysmenorrhœa in twelve cases. Irregular menstruation in twelve cases. Menorrhagia in eleven cases. Ovarian congestion and irritation in ten cases. Metritis in eight cases. Puerperal trouble in nine cases.

"One feature about those cases placed under the heading of 'menopause' was that in ten of them the onset was both sudden

and premature, and in those cases it is remarkable with what rapidity and severity the changes in the joints appeared.

"The change of life did not come on in any of these cases from anæmia, or from any other deterioration either of the blood or general health. Two of the cases seemed to follow the taking of large doses of ergot, two the removal of both ovaries (in one case for fibroid and in the other for cystic disease), and three followed chill at the periods.

"In forty-one of the sixty-two cases the joint pain was said to be worse just before the period came on, and was often relieved by the flow; in eight cases the pain was worse midway between the periods, and in the other thirteen there was no variation noticed. The treatment of cases of rheumatoid arthritis of this class has been on the whole most unsatisfactory, for while many cases of gouty or rheumatic origin have been greatly improved by the use of various mineral baths and waters, those complicated by uterine trouble have often benefited only to a very slight degree and sometimes not at all."

All cases of rheumatic arthritis are best treated by tonic alteratives, such as iodide of iron, arseniate of sodium, sulphur, malt extracts and cod-liver oil. Free doses of iodides of potassium and sodium, often valuable in gout, are contraindicated; but Dujardin Beaumetz (28) holds that small quantities, *e.g.*, fifteen grains daily, with sodium bromide and chloride, or in alternation with gold and sodium chloride, do well. The essential treatment is massage, electricity and medicinal baths, such as Aix, Bourbonne, Plombières and Dax; the mud baths at the last named are highly thought of. The salt brine baths of Droitwich often yield equally favourable effects.

In the treatment of all cases of rheumatic arthritis we must bear in mind that it is by no means improbable that the malady is due to central causes which affect the muscular and articular nutrition. Alterations have been observed in the anterior cornua of the cord and in the peripheral nerves; such changes emphasise the importance of the malady in relation to the menopause.

Chronic rheumatism may become aggravated during the change of life. Neuralgias, dyspepsias, skin affections and other symptomatic conditions must be treated on general principles. The treatment by salicylic acid or some of its salts, *e.g.*, salicylate of sodium, is now generally adopted for all acute or troublesome subacute conditions. Antipyrine, phenacetine, or salacetol (which last contains 75 per cent. of salicylic acid and is specially useful in intestinal rheumatism) have each their special advocates in the treatment of rheumatic neuralgias.

Albuminuria may appear in persons of or about fifty without any discoverable organic kidney disease. The following table (29) shows the relative age proportions :—

Age.	No. of cases.	Albumen and casts. Per cent.	Albumen and no casts. Per cent.	No albumen or casts. Per cent.
20 to 30	25	8 or 32	3 or 12	14 or 56
30 to 40	39	9 or 23	4 or 10	26 or 66
40 to 50	47	26 or 55	3 or 6	18 or 38
50 to 60	99	64 or 65	11 or 11	20 or 24
60 to 70	57	42 or 74	5 or 9	10 or 17

All cases of undoubted Bright's disease or of other conditions recognised as likely to cause albuminuria directly have been excluded from the above observations. The percentage of urines containing albumen and casts rises markedly and steadily after forty years of age ; and the proportion of those showing albumen without casts remains almost the same throughout adult life. The casts shed are chiefly hyaline and finely granular, of small diameter ; and Shattuck's attention was attracted by the frequency with which these were found in the urine of persons about fifty years of age, or over this, who had no other evidence of renal disease.

Manifestly, these clinical observations can be best explained from the broad, general pathological fact, previously mentioned, that all glands decay at the change of life. The extra work thrown on the kidneys, as eliminative organs, may in part account for the superficial desquamations of their tubules, but the post-climacteric glandular involution, general to the whole system, is also of much importance.

Glycosuria is sufficiently common to deserve notice. The only distinctions we can draw clinically between the transient but often recurrent presence of sugar in glycosuria and diabetes mellitus may be in the fact that the progressive wasting, great thirst, and other well-recognised accompanying symptoms of the latter are not present in the former. The condition of instability of the blood glands at the menopause, the disturbances of the nerve centres, and the perverted metabolism all combine to render glycosuria a probable result. Recent experimental researches made abroad seem to throw additional light on what is unquestionably one of the many unsolved problems of pathology. A valuable summary is given in the *Medical Press and Circular* (30), from which the following is quoted :—

“INTESTINAL POISON A CAUSE OF GLYCOSURIA.

“The origin of glycosuria is still shrouded in much obscurity, one observer placing it to the credit of the liver, another to the nerve system, and more recently to the pancreas. Drugs, such as amyl-nitrite, chloral-hydrate, or phloridzin, will produce artificial glycosuria, but how it is produced in the complicated organism is not so easy of explanation. The same results were recently obtained by Mering and Minkowski working independently, after the removal of the pancreas, which have now directed attention to the abdominal cavity as a probable source of the diabetic condition. The sugar eliminated by the urine is so much carbo-hydral from the alimentary canal after passing unused through the blood, according to some ; others locate the sugar to the action of the muscles, which should be easily oxidised into carbonic acid in the veins, as albumen is converted into urea in the arteries.

“The prick in the mesial line of the fourth ventricle, injury to the upper ganglion, or the hepatic filaments, are oft-repeated causes of this disease, but post-mortem examinations of diabetic patients are unusually free from all such imputations.

“The vaso-motor centre may be inhibited by cerebral action, the walls of the blood-vessels relaxed, and a hyperæmia of the chylopoetic system produced, resulting in glycosuria, all due to cerebral irritation of the grey matter located somewhere in the encephalon. This comprehensive causation throws little light on the mysterious beginning of diabetes, nor does it locate with any accuracy the morbid centre. Töpfer and Freund, of Vienna, with the object of testing whether any ferment or poison existed in the blood or alimentary canal, have conducted a series of experiments on animals in the laboratory, the results of which were read before the Imperial Society of Surgeons.

“From these results we are led to infer that the poison is found at an early step of the assimilation. It has the appearance of a poison in its action. It may act on the cerebral area, on the vaso-motor of the liver or its circuit, on the pancreas, or on some other morbid tissue for its production, but the presumption of Töpfer and Freund is that the pancreas is to blame. It is assumed that the pancreas has an inherent power to neutralise a normal product of the canal. If the product be too great for the function of the pancreas it passes on and acts as amyl-nitrite, chloroform, etc., with glycosuria ; on the other hand, if the function of the pancreas be low the same result takes place.”

These observations appear so applicable that no apology need

be offered for having quoted them. An important contribution to the dietetic treatment of glycosuria, alike applicable to diabetes mellitus and the less grave glycosuria we meet with in women at the climacteric, was made by Dr. Pavy in the *Croonian Lectures for 1894* (31). He concludes that the rational procedure is to endeavour to keep the urine free from sugar, and at the same time not to carry food restriction further than is absolutely necessary.

Among other recommendations, two new breads have been introduced as substitutes for gluten or bran breads which patients soon weary of; these are aleurone bread, made from aleuronat, a variety of gluten flour, and soya bread. Ebstein advocates aleurone, and various writers think well of soya bread. Among useful drugs, phosphoric acid to allay thirst; opium, or some of its derivatives, such as morphia or codeine; hyoscyamus, cocaine, or ammonium bromide, are prescribed with the idea of acting on the central nervous system. Nux vomica with croton chloral is advisable, if the pancreatic theory of causation is held, and tonics such as quinine, strychnia, mineral acids, especially phosphoric and nitro-muriatic, have long enjoyed a foremost place as useful remedies. I have alluded to the use of pancreas substance in a former chapter. Benzosal or benzoyl-guaicol, salol, thymol, and other intestinal antiseptics, find favour with some. Vichy water with salts of lithium is advised by Dujardin Beaumetz (32).

In estimating the importance of saccharine urine, many side-lights must be brought to play on a case. An important head-light is to be quite certain that the presence of creatin is not mistaken for that of sugar. I have known more than one instance of such an error being made by men in high position.

Pulmonary Tuberculosis can hardly be classed as one of the diseases incidental to the menopause. Yet every medical man who has enjoyed a wide experience will admit that cases of this nature are by no means so rare after the age of forty-five as at thirty-five. Lung affections may have existed in earlier life, and become ameliorated, and remain quiescent for five and twenty years or more; then the anæmia of the change of life so weakens the system generally, that an exposure to cold is at times sufficient to re-awaken mischief which has long lain dormant, and progressive disease results. For several years I have had no opportunity of watching the development of such cases, but my past experience as a family physician affords me sufficient clinical material for the belief that the decade between forty-five and fifty-five is one which is not infrequently subject to pulmonary tuberculosis. I have, I think, seen more cases in men than in women at this age, but can

recall several instances in the latter which seemed to be due to causes apart from any personal history of lung affections in early life.

The assumed relationship existing between malignant disease and the menopause is so important that its discussion is reserved for another chapter.

(1) Wm. Hunter, *Brit. Med. Journ.*, 26th Nov., p. 1159, and 3rd Dec., p. 1223, 1892.

(2) *Münchener Med. Woch.*, 3rd and 10th July, 1894.

(3) *Vratch*, 1st November, 1894.

(4) *British Medical Journal Supplement*, vol. ii., p. 72, 1893.

(5) *Therapeutisch. Monats.*, Berlin, May, 1891.

(6) *Lancet*, 11th July, 1891.

(7) *Transact. Clinical Society*.

(8) *L'Union Médicale*, 30th October, 1890.

(9) *Münchener Med. Woch.*, 8th April, 1890.

(10) *Lancet*, 6th February, 1890.

(11) Luzet in *La France Médicale*, 18th July, 1890.

(12) *Münchener Med. Woch.*, 3rd June, 1890.

(13) *Berliner Klinisch. Woch.*, 10th and 17th May, 1890.

(14) *Birmingham Med. Rev.*, January, 1894.

(15) *Deutsch Archiv f. klin. Med.*, Bd. xlviii., p. 118.

(16) *British Gynæcol. Journal*, part xxxviii., p. 247. Abstract from *Lancet*.

(17) *Brit. Med. Journal*, p. 1172, 2nd June, 1894.

(18) *Annual of Univ. Med. Sci.*, vol. i., K. 14, 1894.

(19) *Trans. Lond. Obstet. Soc.*, p. 430, 1894.

(20) *Comptes-rendus des séances de la Soc. de Biologie*, Paris, 1893, 9 s., p. 543.

(21) *Annals of Surgery*, p. 207, August, 1894.

(22) *American Practitioner and News*, Louisville, 21st June, 1890.

(23) *American Therapist*, vol. ii., No. 8, p. 241, February, 1894.

(24) *Ibid.*, No. 12, p. 337, 15th June, 1894.

(25) *Le Progrès Médical*, 21st Oct., 1893. Vigouroux, *Neurasthénie et Arthritism*, Paris, 1893.

(26) *Prager Medicinische Wochenschrift*, No. 45, 1894. Quoted, *Allgemeine Medicinische Central-Zeitung*, No. 95, 1894.

(27) *Med. Annual*, p. 501, 1894.

(28) *Bulletin général de Thérapeut*, 1894, t. 6, p. 97.

(29) Shattuck, *Boston Medical and Surgical Journal*, p. 613, 21st June, 1894.

(30) P. 171, 13th Feb., 1895.

(31) *Lancet*, vol. ii., 1894.

(32) *Journal de Médecine de Paris*, 6th November, 1892.

CHAPTER VIII.

HÆMORRHAGES OF THE MENOPAUSE.

THE hæmorrhagic and leucorrhœal discharges of the climacteric, for to some degree leucorrhœa at this epoch must be estimated as a substituted hæmorrhage, deserve careful consideration. Popularly there are many existing erroneous impressions regarding both varieties of uterine discharge at this time. It has been held that catarrhal affections, accompanied by blood and mucous discharges, were likely to be cured spontaneously by the structural changes which then occur. And, as with almost every other pre-existing pelvic affection, the unwarranted assurance is not infrequently formed that "everything will be all right after the change of life". How far this is incorrect we shall now discuss.

During the gradual establishment of the menopause there is frequently an excessive loss of blood. It may be that the quantity lost at each period is increased; or the duration of the periods may be lengthened by three to eight days, or more, in addition to the former usual duration; or the periods may recur too frequently, every ten or fourteen days; or, finally, from a combination of these circumstances we may have, relatively, a largely increased periodic blood loss. Furthermore, many women who have never previously suffered from leucorrhœa have almost constant interperiodic mucous discharges.

Such hæmorrhages are considered by some as natural to the climacteric age; this is undoubtedly a mistake; not infrequently it has proved a dangerous and fatal error.

Endometritis of the menopause has been recognised as a separate variety of uterine inflammation. We shall have occasion to revert to this. In the meantime it is sufficient to point out that a neglected endometritis at this time may cause grave local symptoms and seriously affect the general health. Among the common results are emaciation, obstinate constipation, intractable dyspepsia, chloranæmia, neuralgia (especially of the pelvic viscera and head and spine), mental depression, and general debility.

The uterine conditions favour the occurrence of further patho-

logical developments. As the result of atrophic and inflammatory changes during the menopause one sometimes finds, especially in the post-climacterium, partial or total stenosis of the cervical canal. If both the internal and external os become closed, and a catarrhal secretion takes place both in the body and cervix, the condition described as *uterus bicameratus* results; this is recognised from the biglobular swelling separated by a distinct transverse furrow, the upper globe being the distended uterus, the lower the distended cervix. When there is not a separation between the os internum and os externum, but the uterine secretions are shut off from escape by closure of one or other os, and there is uterine catarrh, the mucus accumulates, and the condition known as *hydro-metra*, which signifies a thin serous watery collection within the uterus, exists; should there be an admixture of air from gases of decomposition developed in the fluid, we have *physometra*; a mixture in which blood predominates is a *hæmatometra*; if, on the other hand, a purulent or muco-purulent fluid is the result, we have *pyometra*. Certain cases of menopastic and post-climacteric uterine inflammation, accompanied by watery or thin purulent discharges, are to be explained thus: The stenosis in these cases is not complete, or, if so, the weight of the accumulated fluid, or this, with some degenerative change in the thinnest part of the cervix, permits intermittent discharges. Such cases are possibly frequently confused with malignant disease of the corpus uteri, and indeed the symptoms are by no means dissimilar; reference will be directed to their differential diagnosis, when malignant disease is discussed.

Hæmorrhage is not a disease; it is a leading and significant symptom characteristic of many important conditions affecting the uterus and pelvic organs. It is sometimes difficult to decide what should be regarded as a usual quantity. What would be a normal loss in one woman would constitute hæmorrhage in another; so that we must determine the normal amount of the individual woman by ascertaining the amount she has generally lost during the earlier years of her full maturity when in a condition of perfect health; and from a comparison with her past experience, endeavour to decide the symptomatic value of her existing condition.

Generally, we should regard any periodic hæmorrhage as excessive which continues longer than six or seven days, unless the total quantity lost can be shown to be trifling; which recurs more frequently than every twenty-one days, and which clearly constitutes a larger quantity of blood than six to eight ounces. Ancient writers, such as Hippocrates and Galen, estimated the menstrual

loss in health at eighteen to twenty ounces. Meigs, writing of American women fifty years ago, regarded twenty-one ounces as the average. Modern observation has shown these estimates to be mistaken. Four to eight ounces is probably approximately correct. Yet the possible variation is such that undue loss can only be determined when the quantity suddenly becomes much more profuse than formerly, and the woman's general health is affected.

Only exceptionally does free uterine hæmorrhage occur without some manifest anatomical cause. We should, therefore, regard every unusual loss of blood from the uterus as the result of some pathological condition which may generally be discovered, and successfully treated.

Causes of hæmorrhage are to be referred both to general and local conditions. In chapter iv. allusion has been made to certain states which favour congestions and blood stasis, so that we need not again refer to these. If in addition to the common, and therefore presumably "normal," congestion of the liver and gastro-intestinal tract, we should have any pathological condition of these organs, it is easy to realise that, just as in women who are in their full maturity, almost invariably in menopausal women also, the uterus proves one of the most facile places for the egress of blood. So that subacute liver and gastro-intestinal congestions are frequently relieved by increased blood flow, or increased frequency of recurrence and protracted duration of the periods.

Congestion of the liver (nutmeg liver) is the most common hepatic affection of the menopause. We find uniform enlargement of the organ with pain and fulness in the right hypochondrium, tenderness on pressure or percussion over this region; difficulty in lying on the right side, on drawing a deep breath, or on coughing. Some patients cannot lie comfortably on the left side from dragging of the liver, possibly from left-sided enlargement of the organ.

Cardiac, pulmonary, splenic, or renal affections may precede or accompany the hepatic congestion. In such conditions, uterine hæmorrhage is an ordinary method of physiological relief.

It is important to distinguish between bleeding which may be due to such conditions, and that which is more particularly and essentially local in origin.

Hepatic cirrhosis may be met with either in the hypertrophic or atrophic form. The latter is frequently accompanied by gastro-intestinal hæmorrhages, but in women at the menopause, uterine hæmorrhage may happen instead. Jaundice at the menopause is probably due to hypertrophic cirrhosis in a large proportion of

instances. Enlargement of the spleen is often associated with liver enlargements.

Cardiac disease may favour climacteric hæmorrhage. Mitral valvular disease, with tricuspid incompetence, causing congestion in the pulmonary circulation and of the systemic veins, may be regarded as a typical cardiac affection specially liable to give rise to uterine hæmorrhage. Marked dilatation with hypertrophy, with the resulting debility in action and vascular stagnation, originating venous congestions, dropsies and deficient elimination, is especially the heart affection which proves most harmful at the climacteric.

An able paper by Dr. Wm. J. Gow, on "The Relation of Heart Disease to Menstruation" (1), giving an account of fifty carefully recorded cases, seems to indicate that heart affections do not cause increased menstruation. Dr. Gow found in the majority either amenorrhœa or scanty menses. As many of his patients were markedly anæmic, and the majority had been sufferers from rheumatic fever, these conclusions may be readily accepted. It must, however, be observed that only a small proportion of the cases were over forty years of age. Case 12 was forty-two; she had had rheumatic fever fourteen years before, and resulting with mitral stenosis; the menses were regular, lasting four days, "loss not excessive". Case 39, aged forty-two, had rheumatic fever four years previously; suffered from mitral stenosis and incompetence; had amenorrhœa for ten months; but "says she has suffered from heart trouble since birth of her last child, six years ago". Case 42, aged forty-four, single, had had three attacks of rheumatic fever; mitral stenosis and incompetence, dropsy, ascites, jaundice; had not menstruated for two years; confined to bed since the last rheumatic attack two years ago. Case 50 was aged forty-two, had had two attacks of rheumatic fever; aortic incompetence and obstruction, and mitral incompetence; menses regular, duration four days, but scanty. All the other patients were younger women. It is well known that scanty menstruation, or amenorrhœa, may result from severe constitutional illness, such as rheumatic fever. The cases above quoted are therefore no proof that the belief I have expressed is generally incorrect. Reference to his table will prove that in several of Dr. Gow's cases the scanty menstruation might have been shown to depend on complex causes. If the inquiry had embraced women of a menopastic age, it would probably have afforded different conclusions. If uterine hæmorrhage occurs, while it may increase the general weakness, it frequently affords the patient much temporary relief.

Renal disease is also associated with, or provocative of, increased

climacteric hæmorrhages. Chronic interstitial nephritis, especially those cases which may reasonably be regarded as "chronic alcoholic nephritis," is specially apt to determine these uterine blood losses. And, in a less degree, other varieties of chronic Bright's disease may also, as part of a general degenerative glandular condition, be influential in causing uterine hæmorrhage before anæmia becomes established.

Some chronic constitutional diseases, such as hæmophilia, malaria, syphilis, tuberculosis, and chloranæmia, may be manifested in this way. But with the exception of the last named, I am inclined to refer these, when causative of profuse menstruation, to an earlier period of life than the climacteric.

Chloranæmias, and certain rheumatic conditions affecting the quality of the blood, may favour hæmorrhage in certain cases. In other instances chloranæmia is more probably, in part at least, the result rather than the cause of menorrhagia.

Many other influences might be cited which are apt to occasion temporary increases of blood loss, *e.g.*, acute infectious diseases, such as typhoid, small-pox, cholera, etc., but these are, so to speak, accidental, and, unless followed by a localised uterine affection, temporary in the influence they exercise.

Occasionally no cause can be determined.

The detailed consideration of the management of hæmorrhage due to, or associated with, any of the above-mentioned conditions, must be sought for in works treating on general medicine. But a few leading principles of treatment may be here justifiably indicated. In treating climacteric patients who are the subjects of liver congestions, experience has proved the advisability of exhibiting vegetable stomachic bitters with chloride of ammonium, or iodide of sodium. In other cases of deficient gastric secretions, nitro-hydrochloric acid should be combined with the bitter infusion. Judicious dieting, and general rules of hygiene, must be observed; violent purging is harmful; but free and regular action of the bowels must be obtained.

For cardiac complications, attended with hæmorrhages from the uterus, the keynote of treatment is mild purgation and symptomatic treatment of the heart symptoms. Usually one finds digitalis of the greatest use.

For renal complications the generally accepted methods of treatment should be followed. Tincture of perchloride of iron and some alkaline, such as bicarbonate of potassium, judicious purgation, diaphoretics, of which the Turkish bath when practicable is the most efficient, and other suitable measures should be employed.

In any of these general affections an occasional dose of the fluid extract of hydrastine, of cotton-root bark or of ergot, especially if given in combination with liquor strychniæ, or tincture of nuxvomica, may suffice to restrain too profuse hæmorrhage. If these fail the patient must rest absolutely in bed, and hot vaginal douches, 115° and upwards, should be ordered. In some cases the fluid extract of cotton-root bark (m. xxx. to 3i every third hour) or turpentine (m. xv. every third hour) will arrest uterine hæmorrhage when ergot fails. In very severe bleedings we may have to plug both the cervix and vagina with iodoform, or some other antiseptic gauze. The same lines of treatment must be followed should the bleeding seem to depend on any of the other causes we have mentioned, or when there is no ascertainable cause.

Local Causes.—It must be evident that while the special changes to which the genitalia are subject in the earlier part of the climacteric render these parts very liable to hyperæmia and vascular congestions, the passive congestions due to the inactivity of the thoracic and abdominal viscera, which are then almost invariably present, may in great measure determine absolute hæmorrhage. So that one cannot always affirm that uterine hæmorrhage is the actual effect of some morbid state, yet one should practically consider every hæmorrhage as the expression of some discoverable and removable condition.

Ere we consider the local conditions predisposing to hæmorrhage, we may profitably discuss the matter somewhat generally.

Menorrhagia is frequently met with; alternating with this we have periods of suppression, or of scanty flow, or of profuse and unusual leucorrhœa. Such cases may very generally be regarded as solely due to the commencement of the menopause. If, on the other hand, the periods are more frequent, or even greatly protracted without being specially profuse, we have reason to suspect some inflammatory condition of the endometrium, or the possibility of the formation of some new growth. Metrorrhagia is more significant than menorrhagia. Irregular, profuse hæmorrhages at the menopause should always be regarded as requiring an explanation.

If doctors and patients would recognise the imperative necessity of seeking to determine the cause of every case of unusual blood loss at the climacteric by a careful local examination, it is quite certain that many women who suffer from the effects of a masterly inactivity, or, to put it more plainly, from neglect in treating morbid conditions, would be saved from ruined after-health, and not a few, who are now left until too late, successfully treated for malignant disease. One cannot state too strongly how perniciously

wrong it is to esteem the "change of life" as an adequate explanation for all hæmorrhages which occur at this period.

The local conditions to which we must direct our attention are essentially due to vascular congestions or to structural changes in the genitalia. In order of frequency we may place them thus: Endometritis, cervical erosions and polypi, urethral polypi and carunculæ, fibro-myomata, glandular adenomata, carcinomata, and sarcomata. The special importance of recognising malignant from non-malignant changes has determined me to consider the former separately, so that we will now only treat of the non-malignant local affections.

Endometritis of the Menopause differs so far from endometritis of the fruitful period of life in that it is not only a hæmorrhagic or hyperplastic condition, it is not simply an inflammation of the uterine tissues of subacute or chronic nature, but it is essentially an inflammatory condition which is mainly characterised by atrophic changes.

Pathology recognises three great types of endometritis, these being determined by the tissue chiefly affected. One is glandular, another vascular, and the third interstitial. In the first, the glands are greatly hypertrophied; in the second, the vessels are dilated and enlarged; in the third, an ill-defined embryonic tissue is produced.

Glandular endometritis (2), which has been so well described by Carl Ruge (3), Wyder (4), and De Sinety (5), is principally characterised by marked hypertrophy of the glandular structures, which is so great in some sections that the granulations appear as masses of adenoid tissue.

In the vascular type there is great thickening of the mucous membrane, it is raised and swollen; there is marked engorgement of the blood-vessels, and cellular infiltration of the connective tissue; there is only moderate dilatation of the lumen of the glands.

The third type is in the fertile period, a result of the others—"the vegetations," says De Sinety, "are specially made up of embryonic tissue. There are only traces of the glands and some remains of more or less degenerated epithelium. We have a truly inflammatory tissue, like that which forms upon an exposed wound. At certain points there are islands of degenerated tissue which do not stain and are analogous to those observed in pus-producing foci" (6). The first type or stage is characterised by mucoid discharge; the second, by profuse hæmorrhage; the third, by mucopurulent discharge.

The tendency of modern writers is to regard these types as merely different phases of the same pathological condition ; and, therefore, the varieties of catarrhal, decidual, exfoliating, fungous, hæmorrhagic, hyperplastic, etc., are now regarded as unnecessary refinements of classification, and the causation of the affection preferably held to determine the nomenclature ; thus we have simple, septic, or specific endometritis.

The important observations of Mörcke on the uterine epithelium, which we have previously referred to, have considerable bearing on menopastic endometritis. He observes (7) that in old age the epithelium loses its cilia, the epithelial and interglandular cells decrease in size. The connective tissue is greatly increased. The cervical glands perish, those of the corpus are converted into small cysts.

We must not confuse post-climacteric or "atrophying endometritis" with menopastic endometritis. In the post-climacteric variety the normal columnar epithelium becomes changed into an irregular thin horny tissue, more like the flat epithelium found in the vagina. There is profuse purulent discharge. The opposite walls may become adherent, and, as we have mentioned above, closure of the internal os gives rise to senile hydro- or pyo-metra.

Menopastic endometritis is intermediate between endometritis of the fertile period and that of senility. In the majority of cases what we have described as the vascular type or stage is the predominant condition, so that one finds what has been described by Olshausen as *endometritis fungosa*. It must, however, be remarked that owing to the already existing atrophic changes in the uterus, characterised by decreased epithelium, and interglandular cells, by withering (or it may be in some cases by hyperplasia) of some of the glands, and by marked increase of connective tissue, there is a special tendency for hæmorrhagic discharge without great hypertrophy or sponginess of the mucous membrane (8).

All gradations of conditions may be found ; we cannot, therefore, expect every inflamed endometrium to exhibit the same appearances on examination.

The symptoms complained of by the patient are feelings of weight and pelvic discomfort, of "pressing down," of inability to undergo fatigue, of constipation, more rarely of occasional diarrhœa, and of varying degrees of irritation of the bladder. Above all, there is greatly increased hæmorrhage at the periods ; interperiodic leucorrhœa is not unusual.

Many patients who formerly had menstrual recurrence every twenty-eight days, have now twenty-one days' interval ; others

who formerly had their periods lasting four to five days, are "ill" over a week. I have had several cases in which the periods recurred every fourteen days, and continued over a week. In some others the hæmorrhage had never wholly ceased for two or three months.

Bimanual examination discovers the uterus to be enlarged in the great majority of cases; there is often some downward and backward displacement; and prolapse of one or both ovaries is common. If the sound is introduced, it will usually enter at least three inches, it may be considerably more. The endometrium may be felt roughened and raised in patches. Unless great gentleness is observed, there is a probability of causing hæmorrhage.

Cervical erosion may not be present, but if the condition has existed for some time, it is by no means unusual.

The general health is frequently affected; the patient may be very weak, and anæmic from the blood losses; dyspeptic and neurotic symptoms are common.

Treatment of Menopastic Endometritis.—Two plans are available—palliative and operative. I mention the former, as not only do we find some patients so averse to anything having the name of "an operation," that they would rather suffer the inconveniences and dangers they have than submit themselves to such an ordeal, but there are also certain menopastic women who from their neurotic condition are likely to be much disturbed by the anxiety attendant on operative interference; and thirdly, a number of cases may be cured without operative treatment. Rest in bed, hot douching, vaginal tampons of ichthyol and glycerine, saline purges, various drugs, such as the bromides of sodium and potassium, hamamelis, ergot, hydrastis, cotton-root bark, turpentine, salipyrin, viburnum prunifolium, etc., etc., are often found useful in restraining these hæmorrhages.

In many cases of uterine hæmorrhage it is not easy for the practitioner to decide which drug should be preferred. I need not enter upon an analysis of the various remedies I have mentioned. Ergot is so commonly employed that its limitations are presumably well understood. Hydrastis canadensis or golden seal is a most valuable uterine styptic, and in many menopastic hæmorrhages is distinctly superior to ergot.

Salipyrin is less widely known, but is a valuable addition to our anti-hæmorrhagic uterine remedies. Zurhelle, Kayser and Bigelow have recommended it as useful in both menorrhagia and metrorrhagia. Dr. Orthmann (*q*), assistant in Professor A. Martin's Polyclinic, Berlin, has recorded its therapeutic effects on thirty-two

patients. Fourteen suffered from purely functional menorrhagia ; three had salpingitis and oöphoritis ; fifteen had hæmorrhagic endometritis, four of these had uterine or appendix inflammations ; four were associated with parturition or abortion ; seven were subsequent to operations on the tubes or ovaries. In the severe menstrual hæmorrhages, marked improvement occurred in seven cases ; a complete cure was effected in two. Dysmenorrhœal pain was greatly relieved. Of the four cases complicated by inflammation, two were improved, and so also were all the four subinvolution cases. The post-operation cases were less favourably influenced. Of the whole thirty-two cases, twenty were more or less beneficially influenced by the drug. The best results were obtained in the subinvolution cases. We may therefore conclude that salipyrin is to be placed as a uterine styptic in the same class as ergot. The dose is fifteen grains thrice daily, increased if need be. It is made up as lozenges. No unpleasant effects followed its prolonged use.

The following information regarding stypticin, a new uterine hæmostatic, has been submitted by a correspondent :—

“Stypticin is a coined name for hydrochloride of cotarnin, the latter being one of the oxidation products of the opium alkaloid, narcotin. In chemical structure and therapeutical effects it is closely allied to hydrastinin. It seems to have been first applied in the treatment of uterine hæmorrhage by Gottschalk, who records the results of forty-seven trials (10). This investigator found that small doses had little or no effect, and that 0.5 grm. can be taken five or six times a day without bad effects. As might be expected from a consideration of its origin, it possesses a well-marked sedative action which is both local and general. On this secondary action is based its claim to superiority over hydrastin derivatives and other uterine hæmostatics, and its use is therefore specially indicated in dysmenorrhœic affections.

“Stypticin promptly checks hæmorrhage resulting from pure uterine subinvolution due to muscular atony and not to retention of membranes, etc. In cases arising from the latter cause, ergot and hot douches together act better. In fungous endometritis, stypticin is a valuable adjuvant to the curette ; it is very useful when the patient objects to curetting, and particularly in those cases in which this treatment does not stop the hæmorrhage. It is also useful in bleeding caused by fibroids or the climacteric ; in hæmorrhage secondary to parametritis or disease of the appendages, it is less effectual than hydrastis. In such cases, however, idiosyncrasy is usually marked, and a cure is often not effected till the changes have been rung on all the various hæmostatics. In purely conges-

tive menorrhagia it acts best when combined with hydrastis. Stypticin is powerless to control the bleeding of uterine polypi, and is contraindicated in threatened abortion, or, indeed, in any of the hæmorrhages of pregnancy, as it has a marked power of stimulating uterine contraction. This may be induced by it directly or result indirectly from the anæmia produced by its vaso-constrictor action. In menorrhagia, the drug is best given four or five days before the period and continued till bleeding ceases; this not only diminishes the hæmorrhage, but also necessitates the use of much smaller doses. In all Gottschalk's experiments no other treatment than that of stypticin was adopted. The effect in subinvolution was lasting, but further research is required to establish the permanence of cure in other affections. Enough, however, has been observed to indicate the great value of the new remedy."

It can be administered very readily, either subcutaneously or by the mouth, in the form of "tabloids". The dose is from $\frac{1}{4}$ to $\frac{3}{4}$ of a grain every third hour. I have only prescribed this drug in two cases as yet, but found its action in every way satisfactory.

In addition to these measures, it may be found still more helpful to make intrauterine applications of some astringent to the endometrium. Pigment of iodine, liquor ferri perchlor. or pure carbolic acid, borne on a Playfair's probe, dressed with cotton wool, can generally be easily introduced through the cervix, which is soft and dilatable from the constant saturation with either sanguineous or mucous discharge passing through it; the os uteri is also generally soft and patent. There is a marked difference between the menopastic uterus affected with endometritis, and the inflamed post-climacteric uterus, with all its tissues atrophied and hardened. The post-climacteric cervix is frequently almost cicatricial in consistency, and dilatation in some instances has to be undertaken with great circumspection.

Uterine drainage is often of great service in the semi-atrophic and slight hypertrophic varieties of menopastic endometritis. This is effected by first thoroughly cleansing the vagina and cervix, then using a continuous current douche freely, afterwards brushing out the vagina with a 3 per cent. solution of carbonate of soda, or with soap in hot water; next, again douching to remove the soda or soap, and finally douching with a 2 per cent. solution of lysol or of creolin or with a solution of biniodide of mercury 1 in 3000. A narrow strip of iodoform gauze is then introduced within the uterus, and the vagina is tightly packed with the same material. The uterus should not be tightly packed, but the gauze gently introduced to the fundus. In two days' time the gauze is changed,

the vagina douched, and a larger piece of gauze introduced; the cervical canal is now much more patulous. When two days more have passed the same procedure is followed. By the time that three or four dressings have been introduced the dilatation is sufficient to ensure good drainage. Intrauterine applications of iodine, iron, carbolic acid, or pure ichthyol, are now made every second or third day before introducing the gauze. The patient need not be kept in bed, but it is advisable for her to avoid cold and exertion. The treatment should be continued for about a fortnight, when the endometritis will generally be relieved. The pain of introducing the gauze the first time may be lessened by the patient wearing a cotton wool vaginal tampon saturated in glycerine for twenty-four hours before the introduction of the gauze. An anæsthetic is not required, but for sensitive patients, applying a 20 per cent. solution of cocaine to the cervix sometimes permits us to carry out the dressing without pain.

This treatment should be begun the day after the period has ceased, or even on the last day of the period; the cervix is then much more patulous than a week after menstruation, and it will not be necessary to wear a glycerine tampon.

Endometritis is sometimes cured by these simple measures, but unless the cause has been removed there will be a recurrence and personally I always prefer to curette in cases of hæmorrhagic metritis.

Authorities differ as to the best plan of effecting dilatation, which is an absolutely necessary precursor to thorough curettage. In curetting for diagnostic purposes, or for the relief of small *post-abortum* decidual shreds, the cervical canal is very frequently found so patulous that a curette can be at once readily passed. Even in these cases we should have the cervix sufficiently patent to allow of the ready passage of a No. 12 or 14 bougie.

In curetting for endometritis the cervix should generally be freely dilated so as to permit the passage of a finger within the uterus. This requires dilatation of the canal to a size equal to 16 or 18 Hegar. When there are obstacles to easy rapid dilatation, as from the presence of a fibroid in the cervical wall, from cicatricial contractions, or from the ordinary rigidity met with in nulliparous women, it has been formerly advised to commence proceedings by a partial preliminary dilatation by means of one or more laminaria or tupelo tents. The tent requires to be introduced some twelve or twenty-four hours before the operation; it may have to be removed and a larger one inserted. I have wholly dispensed with these appliances for several years. The objections to their use far out-

weigh their advantages. They frequently cause some pain on introducing them; they necessitate one or more interferences with the uterus before the full rapid dilatation; they may prevent the patient from sleeping the night before operation; and unless prepared and kept in the most careful manner are a very likely cause of septic infection.

We know that the cervix is invariably softened and relaxed and partially patulous at the end of menstruation. My practice is in accord with that of Drs. Braithwaite and Amand Routh, who advise and practise rapid dilatation the first possible day after a period has ceased.

The day before curetting, the patient should have two or three hot antiseptic douches and for twenty-four hours use glycerine saturated cotton-wool vaginal tampons, which soften and relax the parts and make the dilatation much easier; these may be applied by the patient herself, changed every four hours, and the douche used before a fresh one is introduced.

In cases of very hard unyielding os we may precede the thorough dilatation by a preliminary gauze intrauterine drainage for twenty-four hours as already described. It is rarely necessary to pass bougies to allow this to be done; if the sound can be passed a strip of gauze can be carried with it, or a fine urethral forceps may be employed instead of the sound. I confidently affirm that the gauze drainage is vastly preferable to the employment of laminaria tents, and gives equally satisfactory, if somewhat slower, dilatation.

Curetting requires for its efficient performance the following instruments, etc.: A speculum (I use Auvard's self-retaining pattern), one or two uterine sounds, a narrow intrauterine packer, a blunt volsella or double tenaculum, a set of uterine dilators, one small blunt curette, two sharp curettes (one may be a Volkmann's spoon), a long-handled scissors, a probe-pointed bistoury, needles and holder, three or four dressed intrauterine probes. Gauze-covered cotton-wool sponges previously prepared in 1 in 1000 biniodide of mercury solution, a double-channelled intrauterine catheter, a douching can and tubing complete, a new catheter, iodoform gauze, liniment of iodine, disinfectants, carbolic solution for all instruments, biniodide of mercury for the operator's hands and for the immediate disinfection of the genitals. In place of all other disinfectants a 2 per cent. solution of lysol may be used.

It is very important that all instruments, especially the volsella, curettes, probes, and forceps for bearing the gauze within the uterus, should be absolutely aseptic. I always have all my instruments boiled in a 3 per cent. solution of bicarbonate of soda immediately

before operation. The instruments are then lifted out with an aseptic cloth and covered with the antiseptic solution, carbolic or lysol. For lubricating the dilators I use mercurial vaseline 1 in 1000.

The rectum and bladder must be empty. An active purge is given the day before operation, and an enema on the morning of the operation. The vagina is made thoroughly clean. Douching is used freely; after the patient is anæsthetised the vagina should be cleaned with a sterilised long-handled brush, using soap and 10 per cent. creolin or 2 per cent. lysol, and thereafter douching with a biniodide of mercury solution (1 in 2000).

After the patient has been anæsthetised, Clover's crutch is applied; the dorsal position is unquestionably the most suitable. I never use any other for gynæcological operations.

The anterior lip of the cervix is fixed with the volsella and drawn gently down. A sound is passed to ascertain the exact depth of the uterus and the direction of the canal. A dilator is now passed; if one uses Hegar's, No. 5 will generally be easily passed; it corresponds with the diameter of the ordinary-sized uterine sound. If there is plenty of room alternate sizes may be used up to No. 10; if there is tightness each size should be used in succession. Each dilator is allowed to remain a few seconds in the canal and uterus, and as soon as one is withdrawn the next should be ready for introduction. No force is justifiable, gentleness and care are always required. A little experience enables one to estimate how far we can safely stretch the cervix. If we have not succeeded in obtaining sufficient dilatation (say up to No. 12 Hegar) to permit of the introduction of the little finger we may do one of two things, either introduce a probe-pointed bistoury or a narrow-bladed scissors within the os internum and divide the constriction antero-posteriorly with a little cut or snick; the bistoury only cuts the inside, but in some cases of extreme hardness it is better to divide right through with the scissors. A clean cut is always more ready to heal than an abraded tear. After completion of the curetting a continuous catgut suture or two or three separate ones are introduced by means of a small half-curved Hagedorn needle in a holder. Or, alternatively, one may, instead of proceeding with the operation, introduce several thicknesses of iodoform gauze within the cervix and hope for its being more dilatable next day. I prefer to finish the operation at one sitting, as being not only more agreeable to the patient, but as more ideally surgical and quite as safe. If there is constriction at the external os it should be at once snipped bilaterally with scissors and subsequently a stitch introduced on either side.

Usually we can safely dilate up to 18 Hegar. No. 16 to 18 will permit of the intrauterine introduction of the index finger. I have a prejudice against all metal dilators formed by opening blades, especially those regulated by screws. But my experience of these dilators is hardly sufficient to justify me condemning them as unsafe. After dilatation the uterus should be washed out with an antiseptic solution, the double-channelled catheter or a glass or celluloid intrauterine nozzle being used. An assistant supports the fundus uteri from the abdomen; this prevents ballooning, and the possible entrance of fluids through the Fallopian tubes.

For efficient curetting we must employ the sharp curette. The instrument is held as a pen, and used delicately. It should be wholly made of metal, so that it can be always efficiently sterilised before each operation. We wish to remove the whole thickness of the mucous membrane down to the muscular coat. Blunt curettes are useless for this purpose; they only scrape off the epithelial and softer external portions of the mucosa. The curette should be drawn vertically from the fundus to the cervix along the posterior, anterior and lateral uterine surfaces in parallel strips. Special attention must be directed to the fundus, which is most often the seat of greatest mischief, and to the upper lateral angles.

If the hæmorrhage be very free a hot douche will check it. The uterus is again douched with an antiseptic. Probes dressed with dry cotton wool are passed inside to remove any moisture or small clots, which the douche may not have wholly brought away. Probes bearing cotton wool saturated with liniment of iodine or pure liquid carbolic acid are now applied freely to the whole surface of the cavity. Iodised phenol is not to be recommended; it is not so powerful as carbolic acid, nor is it nearly so antiseptic as iodine or carbolic acid alone; the one agent neutralises the other. When applying the caustic a cotton-wool sponge should be placed behind the cervix, and both lateral sides of the vagina guarded against contact with the caustic by having them held separated by the fingers of the assistant or by retractors.

The uterus is now pretty firmly packed with iodoform gauze, which should be in a continuous piece; the vagina is also packed but not too tightly, lest the urethra should be compressed, and this might necessitate catheterism. In forty-eight hours the packing is removed, and a vaginal antiseptic douche given afterwards night and morning for a few days. The patient should remain in bed for at least a week after the curetting. In old-standing cases an intra-uterine application of liniment of iodine may be advantageously made ten or fourteen days after operation.

The immediate risk of the operation is practically *nil* if due antiseptic precautions are observed and reasonable surgical skill employed.

The results are excellent, many patients becoming wholly different in their health within a fortnight. The quantity lost at the first period after operation is often rather profuse, but subsequently to this the improved state of the mucous membrane restores the flow to moderate quantity and normally recurring times. There is no treatment of menopastic endometritis which is comparable in its good effects with curetting.

Some gynæcologists maintain that the cure of menopastic endometritis can be readily obtained by the employment of electricity, or electrolysis as they prefer to call it. It is admitted that the application of the positive pole to the endometrium, with the negative pole over the abdomen, will in many instances arrest hæmorrhage. From forty to fifty *milliampères* is the strength of current generally recommended; but it must be noted that the uterus is an organ of great functional instability, so that its sensibility varies greatly, and one day its tolerance may prove very much less than on the day immediately before or after. In every case the greatest care should be exercised when using intrauterine electricity, and the degree of intensity measured by galvanometer. In my own opinion, which is founded on observing the results of certain cases so treated, electricity, while useful as a hæmostatic influence, has little to recommend it in preference to the simple intrauterine application of liniment of iodine, liquor ferri perchloridi, or pure carbolic acid. For rapidity and efficacy of cure, electricity cannot be compared with curetting and subsequent intrauterine medication.

Glandular Polypi of the uterus are pathological results of the alteration of the endometrium, brought about by inveterate catarrhal and hæmorrhagic endometritis. There may be great proliferation of the interstitial and glandular structures in the cervix also, so that mucous polypi and follicular hypertrophy of the cervix are also lesions due to the pre-existing metritis.

The amount of hæmorrhage caused by uterine polypi is sometimes very considerable; uterine exploration may be the only means of determining whether one has to deal with a polyp, an interstitial fibroid or a malignant uterine growth.

Cervical polypi also frequently induce severe metrorrhagia. Hypertrophic enlargement of the cervix may take place, and in some cases the vagina may be almost wholly filled by the cervical growth. Removal of the intrauterine polyp is effected by the

curette or scissors after dilatation. The cervical mucous polypi are caught in forceps and twisted off, or separated by scissors. If it is considered necessary to remove the lip of the cervix on account of follicular hypertrophy, a plastic operation, such as Schröder's excision of the cervical lips or a modification of Emmet's operation, is performed at the same sitting, after removal of the polyp. If, when one removes mucous polypi, there should be free oozing, which is not unusual when the growths are numerous or sessile, the bleeding surface should be touched with Paquelin's thermo-cautery or some styptic such as liquor ferri perchlor. or tincture of matico.

To explore the uterus is usually a safe procedure, but it is always necessary to ascertain that uterine hæmorrhage is not associated with chronic tubal disease, before full dilatation and curettage of the uterus are undertaken. Dr. Savage (11) has recorded a most instructive case in his excellent paper on "Hæmorrhage from the Uterus" in the following words: "Of these inflammatory affections, persistent metrorrhagia is more frequently associated with pyosalpinx. If these conditions are not ascertained before active uterine treatment is commenced, the case may eventuate in disaster. I am reminded of a patient, years ago, who had an intractable hæmorrhage about her climacteric period; when milder measures failed, tents were used and dilatation easily effected. In the exploration, under an anæsthetic, of the uterus, sufficient, though slight, force was used to rupture a pyosalpinx that could not be felt, or at all events had not been felt in the examination, which resulted in speedy death, and whose presence could only be determined by a post-mortem examination." Any collection of purulent fluid of the tube or enclosed in a pseudo-cyst may accidentally rupture in consequence of uterine manipulations. The tendency of the climacteric is, however, to cause eventual quiescence or disappearance of these collections.

Various pelvic tumours and inflammatory conditions are likely to cause increased climacteric blood loss.

Fibroid Uterine Tumours have been clearly shown to exercise a prejudicial influence. It is true that in many cases these growths undergo marked involution some two or three years after the establishment of the menopause, and give no subsequent trouble. Whether they ever wholly disappear after the menopause has been disputed. This much is almost certain—that any woman who has an interstitial or submucous fibroid uterine tumour (the size of a Tangerine orange, or larger) will have a retarded, protracted and hæmorrhagic change of life. Very generally the age of fifty, or occasionally fifty-two to fifty-five, may be reached before the

climacteric begins; the periods are also longer than the average, lasting it may be ten days or more; the quantity lost is always increased at one time or other of the change. The situation of the fibroid will determine the probability of increased hæmorrhage. Menorrhagia and metrorrhagia are more likely if there is interstitial growth of large size, or a submucous tumour, than with a subperitoneal tumour with a long pedicle.

Chronic Pelvic Inflammations, *e.g.*, pelvic peritonitis, salpingitis, keep up vascular uterine congestions, and are therefore causative of increased discharges. But in these cases, and, indeed, in the case of tumours as well, the condition of the uterine tissues—especially of the endometrium—determines the existence of bleeding in moderation or excess. Endometritis, metritis, salpingitis, pelvic peritonitis, and pelvic cellulitis are clinically only varieties of the condition, known generally as chronic pelvic inflammation, which accounts for many cases of protracted invalidism. All these may arise either from traumatic or infective causes in the uterus itself, or in the uterine appendages; or be associated with fibroid or other tumours of the uterus, broad or round ligaments; or with ovarian or tubal growths or cysts; or with malignant or tubercular disease of the uterus or its adnexa.

Faulty Uterine Positions, especially backward and downward displacements, are also attended with increased loss at the climacteric. It has been shown by various writers that retro-displacement of the uterus causes increased periodic hæmorrhages. Herman (12) finds that of 310 cases of all varieties and degrees of backward displacements 40 per cent. is "the lowest possible estimate of the frequency of increased hæmorrhages". But of 152 patients, who mentioned no alteration, it was found to be profuse in 66; and of 141, who complained of alteration, it was increased in 123. In all, profuse in 189 out of 293, or 64 per cent. Winckel (13) found 55 per cent. in whom hæmorrhage was profuse.

I feel sure that similar observation applied solely to women at the climacteric who were the subjects of retro-displacements would show a still higher proportion of cases with increased flow.

It is quite true that complex causes would have to be estimated before exactitude could be arrived at; for instance, if women were subjects of menopastic endometritis, or if the presence of interstitial fibroids in the posterior wall were diagnosed, the retro-displacement might be regarded as a secondary, and not as the primary, cause of hæmorrhage. In another communication Herman (14) has shown that of 357 women having backward

displacements, 88·4 per cent. suffered from persistent pain; this points to the probability of co-existent inflammation.

Admitting that hæmorrhage may arise as a result of retro-displacements, we may without doubt cure or alleviate the displacement, by replacing the uterus and maintaining it in a normal position by a pessary. In times not very far past, every ache and every functional derangement was apt to be referred to uterine displacement; and if cures were not obtained by one form of pessary, another and yet another was tried. At present the tendency is towards the opposite extreme, and some modern gynæcologists are inclined to ignore mechanical causes as important; and still more deride the beneficial influence of pessaries. Plastic vaginal and perineal operations, vaginal and ventral uterine fixations, cervical amputations, shortening of uterine ligaments, are all freely practised, and the simpler or less radical pessary treatment is fast disappearing from the *rôle* of our art. We freely admit the advisability—nay, the absolute necessity—for operative interference in a considerable proportion of cases, but no operation should be lightly undertaken for a backward or downward displacement, unless there are plain indications that the uterus cannot be replaced and kept in position by a well-adjusted support. Many cases, even those with slight adhesions, may be successfully relieved by first reducing the uterine congestion by ichthyol-glycerine tampons, hot douchings, saline purgatives, and rest; and subsequent styptic intrauterine applications and the insertion of a well-fitting pessary. In such cases the Thure Brandt pelvic massage, which has also been advocated by Schultze, has been employed.

Dr. T. Savage, of Birmingham, has recommended that in cases of persistent climacteric menorrhagia, especially in those women in whom there is a small interstitial myoma or a general myomatous development of the uterus, either oöphorectomy or vaginal hysterectomy should be resorted to. He points out that the individual circumstances of the patient may, as in poor women obliged to earn their living by hard work, justify such a plan of treatment, while for other women in easy social position, who can obtain rest and remedies, no such absolute necessity would arise. The general feeling at present would hardly admit of oöphorectomy as a proper operation on a climacteric woman, unless all other means had been tried unavailingly, and even then only if an abnormal uterine growth existed. For the general myomatous condition, by which I understand Dr. Savage to mean a state of diffuse fibrosis of the uterine interstitial tissue without any encapsulation of anything resembling

a definite tumour, no operation short of removal of the whole uterus can be regarded as a certain cure. Ligation of the uterine arteries, as practised for the mitigation of hæmorrhage from fibroids, is not a difficult operation, and, as safer than vaginal hysterectomy, might first be tried in severe climacteric bleedings. To open the abdomen as well and ligate the ovarian arteries would be attended with considerably greater risk, as acute degenerative changes may follow cutting off the blood supply from both the uterine and ovarian sets of arteries. It would be safer and surer practice to perform vaginal hysterectomy.

Among **Minor Causes of Climacteric Hæmorrhages**, we may regard erosion of the os as of some importance. It has been stated that the cervix is frequently healthy in menopastic endometritis. Erosions and slight ulcerations are associated with acute vaginitis, with chronic tubal diseases, and especially with the catarrhal form of metritis. Histologically, it is seen that the normal pavement epithelium has been replaced by columnar epithelium. Some women are specially liable to erosions and cervical inflammations; others may be the subjects of severe cervical catarrh and profuse uterine leucorrhœa, and never present an eroded cervix. Some congenital condition affecting the cervical epithelium, which has been found in certain infants to be cylindrical over a portion to the outer side and on a level with the os, has been remarked on by Fischel. This may persist and originate a special proclivity to erosion and adenoma.

Further, we must not forget that true ulceration of the cervix (apart from malignant disease) is met with. This is not specially a menopastic phenomenon, as it may arise from syphilis, tuberculosis, simple ulceration, or corroding ulcer. Simple ulcers may result from any continued friction, and are especially likely to occur when, in consequence of hypertrophy and prolapse, the cervix becomes displaced outside the vagina. Corroding ulcer is very like a malignant ulcer, but is distinguished from it on microscopic examination by the presence of numerous follicles filled with mucus, and by the absence of the epithelial elements found in cancer. It has been attributed to senile gangrene, due to calcification of the internal iliac artery (15). These erosions and ulcerations occasion irregular bleedings (metrorrhagia) rather than menorrhagia.

Glandular adenoma of the cervix should always awaken suspicion of malignant disease if found in a patient who is approaching fifty years of age; and it will be safer, when permitted, to remove at least a large conical portion of the cervix, including all the affected part.

Urethral polypi and carunculæ may give rise to moderate, irregular bleedings. The former are comparatively rare, and are painless, occasioning only discomfort by partially occluding the urethra. The urethra should be dilated, the polyp twisted off, or the pedicle cut with scissors, and the site of origin touched with the thermo-cautery. Carunculæ are vascular growths formed of dilated capillaries and nerve fibres (?) with hyperplastic papillæ and connective tissue. They are found at or near the meatus urinarius. They may be pediculated, but are more usually sessile, vary in size from that of a small hemp seed to that of a cherry, occasion much irritation, and at times are very painful. They should be removed deeply by scissors, and the base touched with the thermo-cautery. Caruncles may be met with as frequently before as at the menopause, but give more trouble about the climacteric.

Malignant disease is discussed in chapter xi.

- (1) *Transact. Lond. Obstet. Soc.*, vol. xxxvi., p. 126, 1894.
- (2) *Vide* fig. 26, plate viii.
- (3) *Zur Aetiologie u. Anat. d. Endometritis Zeitsch. f. Geb. u. Gyn.*, vol. v., p. 317, 1881.
- (4) *Tafeln. f. den Gyn. Unterricht.*, Berlin, 1887.
- (5) *Traité Pratique de Gynécologie*, Paris, 1884.
- (6) Also see paper on "Chronic Endometritis," by C. van Tussenbroek and Mendes de Leon, *Archiv f. Gynäk.*, B. xlvii.
- (7) *Zeitsch. f. Geburt und Gynäk.*, Bd. 7, p. 84, 1881; *ibid.*, p. 119.
- (8) *Vide* plate viii., figs. 24 and 25. *Archiv f. Gyn.*, vol. viii., p. 97.
- (9) *Berliner klinisch. Wochensch.*, No. 7, 1895.
- (10) *Therap. Monats.*, Dec., 1895.
- (11) *Brit. Gynæcological Journal*, vol. ix., p. 38.
- (12) *Transact. Lond. Obstet. Soc.*, vol. xxxiv., p. 235.
- (13) *Die Pathol. der Weiblichen Sex. Organ*, Leipzig, 1881, S. 128. Quoted by Herman, *loc. cit.*
- (14) *Transact. Lond. Obstet.*, vol. xxxv., p. 10.
- (15) Sir John Williams, *Trans. Obstet. Soc.*, vol. xxvii., p. 9.

CHAPTER IX.

THE PSYCHOSES OF THE MENOPAUSE.

REFERENCE has already been made to the slighter nervous manifestations commonly seen at the climacteric (chapter v.). It is by no means a simple task to adequately estimate the precise relationship existing between many cases of nervous affection occurring at or about the menopause and those other cases which may properly be classified as directly due to the pathological or functional changes of the menopause. As Dr. Robert Barnes has clearly pointed out in his article "Climacteric Insanity" (1): "When a case of nervous disorder comes before us three questions arise: 1. Did the sexual disorder declare itself first? 2. Did the nervous disorder declare itself first? 3. What are the mutual reactions of these disorders?" Further, if we find antecedence of the sexual disorder, can the nervous be traced to the sexual disorder as a cause? The importance of such reflections is aptly illustrated by a recent paper read before the Medical Society of London, in which, of fifty-four cases of neurosis of the climacteric, so distinguished a neurologist as Dr. G. H. Savage (2), of Bethlem, classes seven cases of delusional insanity, two of general paralysis, and three of "mental weakness" as climacteric insanity. Delusional insanity may follow either melancholia or mania, but is not a primary or even necessarily consequent neurosis of the climacteric; and general paralysis is recognised as due to a distinct pathological brain condition, quite apart from functional psychosis.

It appears to me that in his manual on insanity and allied neuroses (3) the same authority has much more correctly judged the class of cases which ought to be associated with the climacteric.

The difficulty arises in this way: the milder cases are seen by alienists only in small proportion, the more serious cases soon pass out of the hands of the obstetric physician. So that only the graver conditions, which, unfortunately, are often too long left without adequate treatment, may be considered by the alienist as climacteric insanity; and the borderland cases, which the obstetrician treats at home, may be regarded by him as hypochondria or hysteria

of the menopause. Yet on the other hand cases of senile neuroses are not seldom classed as climacteric by the neurologists. If a woman, say of fifty-five or sixty years of age, who has definitely ceased to menstruate for several years, and who has had vague melancholic neurotic sensations during the change of life, becomes affected with distinct melancholia, mania, dementia, or general paralysis, it would, presumably, be improper to class such a neurosis as climacteric or post-climacteric. The menopause may indirectly have paved the way for the total loss of nervous stability but the whole of the correlated circumstances such as senility, heredity, alcoholism, or accidental influences must also be considered; the *post hoc* and the *propter hoc* are, as in all scientific matters, most important.

I am not aware that there is any sufficient evidence for accepting the suggestion that men have a disposition to "climacteric" insanity at fifty-five to sixty. Men have no definite climacteric. Some men of seventy are in possession not only of psychical but physical force equal to the average man of forty-five. Senile neurosis has been confused with what is wholly different, climacteric neurosis.

Psychical alterations are often perceptible; it is very difficult to define briefly wherein these consist, and on analysis their origin must be referred to a number of factors. Some of the influences are direct, such as the revolution effected throughout the whole system by the cessation of sexual life; others are indirect; the woman realises that she has arrived at a great epoch of existence; not only does she feel the approach of old age with its attendant infirmities, but she knows that she is about to lose the peculiar characteristic of her sex. The perils of the menopause have doubtless been greatly exaggerated by popular opinion, yet occurring as it does when a woman knows that she is in great measure losing her outward charm and attractiveness one can readily understand the likelihood of psychic changes. In some women these are marked by melancholy; in others by irritability and bitterness of temper, sexual jealousy, and uncharitableness; and in others, happily, by a manifestation of gentle martyr-like resignation.

Before considering the influence of the menopause in originating psychoses it may be helpful, for a clearer appreciation of the matter, to discuss some general views relative to neurotic conditions.

Hysteria in its best known form, that is with acute manifestations of convulsive attacks and nervous explosions, is much rarer at the end than at the commencement of menstrual life.

Hysteria has been defined as "a disorder of defective development of the functionally higher layers of the cerebral cortex with

manifestations of both mental and bodily phenomena in varying proportion, and occurring mostly in the female sex". It is "an important species of neurasthenia which may be regarded as an initial defect of nervous organisation giving rise, according to circumstances, to more or less specialised neurotic and mental disorders; the subjects of the less specialised forms being styled simply neurasthenics".

Hysteria is shown in exaggerated self-consciousness, dependent on undue prominence of feelings uncontrolled by intellect; that is to say, on the physical side, an undue preponderance of generally widely diffused undirected nervous discharges, and an undue lack of determination of such discharges into definite channels (4). The perverted feelings of the hysteric are usually accompanied by certain evidences of intellectual disturbance, as shown by eccentricities of conduct; but in the great majority of cases there is no clear intellectual disorder; in fact many hysterics are distinguished by marked mental ability; and it is only in the exaggerated impressionability or extreme emotion on apparently slight provocation that one can found a theory of mental abnormality.

When one seeks to distinguish between hysteria and the milder forms of mania, the leading characteristic of hysteria is that, in the majority, if not in all cases, the hysteric will admit the impropriety or absurdity of those actions which arise from hysteria and admit that she has lost control of her will-power. Cases of hystero-epilepsy are nearer to insanity, and it is oftentimes difficult to define where the one condition ends and the other begins. As has been pointed out by Charcot, alternations may occur between hysteria and insanity. In some hysterics, who are subjects of definite dyspeptic troubles, if an acute mental condition comes on, all the dyspeptic troubles frequently disappear; but on regaining a better mental balance, the nervous anorexia and troublesome indigestion will probably return.

Mercier holds that insanity results from disorder in the functionally highest layers of the cerebral centres, whose activity is accompanied by intellectual processes, such disorder rendering control impossible; while hysteria should be referred mainly to disorder in the level immediately below the highest, and "therefore potentially, and often actually controllable" under appropriate influences. In seeking to find an explanation for the causation of hysteria, recent investigation, aiming at the establishment of a pathological basis for all functional neuroses, is driven to the theory that the functional change is due to molecular change. But, if malnutrition may be held to explain cases of neurasthenia, patients

afflicted with hysteria are seldom malnourished ; and badly nurtured thin subjects are infrequently liable to active hysterical attacks.

Nor can a chemical change in the blood, which may engender a poisonous effect on the central ganglia, be proved. Experimental investigation has only partly shown the possible accuracy of this theory ; it has been noted that a fine granular substance in the nucleus of the ganglia co-exists with certain so-called functional neuroses.

Formerly paralysis agitans was believed to be a functional neurosis ; now this affection has been shown to depend on sclerosis of the tissues surrounding the vessels in the posterior column of the cord. Recent observations tend to prove that no absolute functional change exists without some morbid anatomical basis. We may, therefore, affirm that hysteria is either a nerve disease, or some form of psychosis, dependent on transitional organic changes.

Hypochondria.—Even more important in relation to the menopausal woman than hysteria is hypochondria. Some years ago we regarded hysteria as the functional neurosis of the female, and hypochondria as that of the male. Charcot and Pierre Marie (5) regard men as more liable to hysteria than women ; but this view is probably to be explained not only by race differences between French and English, but by the fact that in the lower classes men are more liable to rheumatism and alcoholism, and principally attacked by the special form of hysteria, by hysterio-epilepsy, which Charcot held to be hysteria-major. The experience of English physicians does not correspond with that of their French brethren ; for, in England, we seldom see a typical case of hysteria in males except at puberty.

Hypochondriasis affects both men and women ; it may be a (so-called) purely functional affection. From analogy it might be referred to peripheral causes of nerve irritation, acting on still lower levels of nerve centres than those associated with insanity or hysteria. The peripheral irritation probably arises most commonly from the intestinal sympathetic ; with this, malnutrition from intestinal indigestion is also associated.

As with hysteria, so with hypochondria. The gradations from slightly increased sensitiveness to actual mental derangement with delusions and suicidal tendencies, are merely links of the chain of nervous instability. Hypochondria may be, and most frequently is, an exaggerated realisation of actual organic changes, or a wholly fanciful interpretation of non-existent discomforts. But hypochondria, which could be proved to have no foundation in fact, ought to be referred to insanity.

Nervous depression and hypochondria cannot be regarded as equivalent terms; the former may exist without the latter, but the hypochondriac is always nervously depressed.

Women who lead isolated objectless lives, and are introspective, not uncommonly suffer from hypochondria before the menopause. Constipation and indigestion with malassimilation of food will be found to account for many cases. When the additional strain of the climacteric is laid on such individuals they become still more conscious of disquieting symptoms, slight troubles become enormously magnified, and these are succeeded or accompanied by others seemingly arising wholly from their analytic broodings.

Other women, who have led anxious, over-worked lives, may gradually succumb; they find themselves no longer able to overtake what they could in the past, and a sense of utter helplessness, sometimes of hopeless despair, is all that occupies their minds.

Savage has given a most admirable summary of hypochondriasis, and here I follow his classification. Hypochondriacs may be referred to three classes. (A) Head or brain hypochondria—this is met with in women at mid-age, and is not uncommon in puerperal cases; it is often associated with gout. Climacteric women suffer in like manner; the sensation of "something giving way in the head" is the most usual subjective feeling. This may pass off and give place to true melancholia or other morbid sensory troubles, *e.g.*, auditory hallucinations or perversions of the sense of smell, etc.

(B) Digestive hypochondria gives rise to disordered sensations in the epigastric or gastro-intestinal regions, or in the throat or rectum. The sensations most commonly mentioned are "a bird fluttering inside," or "a beast gnawing at the stomach," or "a constant internal pricking," or "the throat feels as if it may be closed at any moment" (which is quite a different sensation from the *globus hystericus*), or there may be a feeling of occlusion of the anus.

I would also refer pseudo-cyesis to intestinal hypochondria; I think it is quite erroneous to class these cases of imaginary pregnancy as climacteric insanity. There are cases of actual insanity in which there are delusions regarding pregnancy, but these are wholly different; for when the climacteric hypochondriac has been expressly assured after examination that she is not pregnant, the particular symptoms are, in my experience, easily got rid of. Spinal neuralgias are associated with a considerable proportion of cases of digestive hypochondriasis.

(C) Sexual hypochondria is more common in men; but in women complete suppression of the sexual instinct may cause depression

and danger. "Yet letting loose of passion by command is dangerous." In climacteric women, especially in single women at this time, who have led isolated, solitary and unnaturally quiet lives, the most extreme delusive ideas may arise. I have a long series of letters from one such patient who wrote to me complaining of the indecent suggestions made to her by a particular man "by means of his eyes, during the whole time of church service". She also heard voices telling her that the man loved her; other voices warned her against sins of impurity. Time after time she changed her church, but she felt that by so doing she had let every one know how strongly she desired this man. She "constantly saw him when she shut her eyes"; she frequently dreamt of him as sharing her bed, and felt at times "furious," at others "humiliated," when she awoke and found he was not there. In all other respects she was perfectly sensible. She acted as housekeeper to her brother, a bachelor living in the country, and never neglected her many duties or spoke of her delusions to him. She finally got rid of her erotic ideas when the climacteric was fully established. It is difficult to separate such a case from insanity, and indeed I anticipated that her delusions would assume a dangerous form at one time. Women who have borne children and have uterine discomfort are often under the belief that they are the subjects of cancer of the womb. Several patients have told me that they have increased local sensitiveness amounting at times to severe pain during coition. A patient, aged forty-nine years and four months, gave the following history when she consulted me, on 16th April, 1895: "She first menstruated at sixteen; was married at nineteen; had never been pregnant. She had always been regular until four months before seeing me, when she missed the period for the first time. She complained of sinking, fluttering pain in the left hypochondrium, which had been felt for some months; she cannot sleep or eat, is very languid, nervous and apprehensive of trouble without cause. She suffered severe pain on connection for some time (about a year, she thinks). For the last twelve months there has been no connection. She felt sure there was 'something growing inside'." A pelvic examination gave no indication of tenderness or disease, there was no leucorrhœa. I attributed all her troubles to climacteric "functional" disorder. On 23rd April she wrote to say her medicine was seemingly doing her much good.

In premature change of life, which may come on in younger single women, or in some cases of irregularity, especially those with suppression associated with anæmias, the prevailing idea is that "no one cares for her, whether she dies or lives does not matter, she

is tired of everything and everybody". These cases are often likely to give rise to anxiety. Alcoholism, masturbation, etc., may complicate or arise from these ideas.

How, then, are we to differentiate hysteria, hypochondria and insanity of the climacteric?

Hysteria may, as has been said, be confused with slight maniacal attacks; the distinctions to be established are the patient's potential control of her conduct and her rational realisation of its absurdity when the hysterical attack has passed.

As we shall presently see, climacteric insanity assumes the melancholic type in the great majority of cases.

Hypochondria is very nearly allied to melancholia; it is distinguished from it by the persistence with which the patient assigns her malaise to bodily disease and by the degree of intensity of her thoughts regarding her bodily condition. Between the hypochondriac and the melancholic every possibly conceivable gradation of discomfort and distress exists. Hypochondriacs, like the Athenians of Scriptural reference, are "ever seeking after a new thing"—irresistibly fascinated to try every new remedy advertised, every fresh physician heard of attracts them; they are ever hopeful of cure and always open to persuasion that something not yet tried is the certain panacea for all their ills.

The melancholic is hopeless and despairing; she, so to speak, revels in the depths of her misery. She neither cherishes nor dreams of relief, like the hypochondriac, nor desires comfort, sympathy, or indulgence, like the hysteric. But, if melancholia is correctly defined as "a feeling of misery in excess of what is justified by the circumstances in which the individual is placed," how is the physician to justly appraise the precisely justifiable degree of misery? The self-accusation may, in some cases, be fully warranted; a woman may have impulses to lie, to slander, to drink, to cheat, to indulge in neurotic sexual practices; she may have good grounds for doubting her husband's conduct, for fearing impending ruin; ample cause of dissatisfaction with her children her servants, or her friends. The whole circumstances must be taken into account and the diagnosis only arrived at after these, so far as they can be ascertained, have been carefully considered. Those cases in which one can find no disturbing mental or physical cause, and in which, despite her profound depression, the patient still eats and sleeps fairly well, are attended with a bad prognosis.

The lesser degrees of melancholia may be associated with indefinite physical causes; for example, one variety is classed as "*melancholia flatuosa*," which is only a synonym of hypochondria.

We have cases of hysterical or hypochondriacal apepsia, distaste for or repulsion against food ; cases influenced by the abuse of alcohol or morphia, or chloral ; and, finally, cases of mental disease, more or less pronounced, with symptoms of anæmia and malnutrition.

Anæmia with neurasthenia or nervous exhaustion, or "general nervous breakdown," is held to be a distinct affection from hysteria, although it is generally found that the neurasthenic has at least certain evident hysterical symptoms. But, as has been shown by Dr. William Playfair, shock or overstrain as from disappointment by loss of relations, position, money, etc., may directly incite neurasthenia.

Neurasthenia is for the most part a disease of younger women. But there are borderland cases which may be found in climacteric women.

The neurasthenia of the unmarried has been attributed by many writers to unfulfilled sexual aptitudes. Dr. Balls Headley, of Melbourne, in his recent work on diseases of women still maintains this wholly theoretical doctrine.

Heredity may determine the alternation of various conditions of nervous instability. On the other hand, there is no doubt that the less strongly marked and less persistent neuroses of the menopause are largely influenced by chloranæmia and imperfect metabolism.

Additional light may be thrown on the subject by examining it from the other side. What influence does menstruation exert on chronic psychoses ?

At a meeting of German alienists at Dresden, in 1894, Dr. Naecke, of Hubertsburg, discussed this subject with much clearness. The material of his investigation consisted of ninety-nine cases of chronic insanity, mostly from thirty-one to forty-five years of age, generally from forty-one to forty-five ; 34·4 per cent. were hereditarily directly and indirectly affected, eleven were very unruly, seventeen unruly, seventy-one occasionally unruly, seventeen suffered from paranoia, forty from paranoia and imbecility, twenty-three from secondary mental disturbance with hallucinations, ten from secondary imbecility apparently succeeding to mania or melancholia, seven from idiocy and higher imbecility, and two from periodical mania. Both the periods and the intervals between the periods were on the whole regular ; when any irregularity occurred the patient was generally over thirty-five, in which age also the menses were freer. The climacteric appeared on the whole to set in earlier than usual. The symptoms accompanying the menses were not more frequent than in healthy women. Menstruation had

some direct influence, almost certainly in sixteen or eighteen cases, questionably in sixteen, generally in the form of motor and psychical unrest, congestion or delusions, more rarely hallucinations. Erotism was rare. The influence of the menses is, therefore, far less in chronic than in acute psychoses. The menstrual period seems to exert an actual direct influence upon psychoses, only or principally in those cases when pain arising from some genital trouble reacts on the system.

Alienists are agreed that delusional insanity is compatible with regular menstruation. In dementia the periods are generally regular; of forty-two cases only eight had amenorrhœa.

In melancholia the uterine functions are usually more or less disordered, in the majority menstruation is arrested. Complex conditions may explain both the mental and physical condition; for example, anæmia may account for the dual condition of arrested menstruation and melancholia. In cases of insanity accompanied by metrorrhagia, erotism of mild degree is not infrequent. On the other hand Charcot has pointed out that hysterics are not actively sexually erotic; they are erotomaniacs or brain sensualists, not nymphomaniacs or genital sensualists.

In epileptic maniacs menstruation increases the excitement and severity of the seizures.

Of eighty-nine epileptics, in twenty-seven the fits were more numerous or occurred only during menstruation; in eleven maniacal excitement was observed; in twenty-eight both the excitement and fits became worse. Only four women had amenorrhœa, of these three had passed the climacteric. Only three of these eighty-nine patients lived long enough to reach the menopause (6).

Of ninety-nine maniacs excitement was greater in eighty-eight during the catamenia, in eleven before the onset of the flow, at periods varying from one to seven days.

Esquirol (7), to whom all modern writers are indebted largely, wrote: "*L'époque des retours menstruels est toujours un temps orageux pour les femmes aliénées, même pour celles dont les menstrues ne sont pas dérangées*". While he thus states the mal-influence of menstruation in the insane, he also mentions that he has seen women who remained insane during the whole time of menstrual life, but became "spontaneously" cured immediately after its complete cessation.

Esquirol also held that in patients who had a hereditary predisposition to madness, and in whom insanity might be immediately determined by accidental causes, the menses would usually be suppressed at the beginning of the illness; menstruation quickly

became re-established, but without improvement. If menstruation continued regular, without mental improvement, the prognosis was bad ; but so long as the menses were not re-established the patient's recovery was more hopeful.

Sudden suppression of menstruation has been regarded as a cause of insanity. Former authorities theorised that the retained blood in the system acted as a direct nerve poison.

Brierre de Boismont held that the quality of the blood had much to do with these conditions (8).

If he had regarded the anæmic and not the congestive condition as explaining both suppression and insanity, his views would be in agreement with those of many modern alienists and obstetricians.

Tilt (9) mentions nervous irritability, cerebral neuralgia, "pseudo-narcotism," hysteria, epilepsy, and insanity as the neuroses of the climacteric. Modern opinion cannot accept epilepsy as a climacteric affection, except in certain rare instances in which there is a reversion to seizures which had been customary before the menopause. Alcoholism has also a decided influence in determining epilepsy or hystero-epilepsy in these cases. "Pseudo-narcotism" is described as a distinct nervous affection ; according to Tilt's own description of the most typical cases, he said the "cerebral affection" is not a single but a complex set of symptoms. Modern psychology now refers such cases to vaso-motor disturbances. Even temporary loss of consciousness, mental aberrations, and automatic actions are recognised as due to so-called "functional" disturbances ; such conditions are found, not only in climacteric women, but in women at all ages and also in men.

There are some cases which cannot be classed as insane, yet the symptoms only differ in degree from maniacal outbreaks. The following is one of the best examples I have seen :—

Mrs. D. consulted me on 18th May, 1894. The patient was aged forty-one ; had six children, five living, the youngest born five years ago.

Family history—Father died at seventy ; was healthy. Mother had "spinal disease" ; was confined to bed for twenty years ; died at sixty. Present illness of patient began nine years ago. Before the onset of each period she suffered from nervous excitement and irritability ; she also had the same symptoms during each lactation. Within the last two years she has become much worse. The attacks of excitement are more frequent and much more violent. She gets into violent paroxysms of anger which last four or five hours. During these attacks she has constant loquacity, is unkind to her children and husband, destroys the furniture, and

feels quite unable to control herself. The periods have been irregular for over a year, recurring every six to eight weeks; the quantity is much less. She complains of "soreness" at that time. The patient, an intelligent-looking woman, described the attacks thus: "They usually come on during the night; I do not feel ill particularly, but cannot stand the slightest noise, and then become violently excited, from the slightest cause or without cause". During her last confinement she was "very nervous"; has been "much worried" by losing friends from death.

Physical condition—Perinæum deficient, cervix chronically inflamed, right ovary prolapsed.

Her doctor was anxious that I should remove the ovaries, hoping that the cessation of menstruation would benefit her neurotic state. I did not, however, consider this justifiable, and advised treating the cervical inflammation, after she had had an entire change away from home for not less than three months.

The doctor's letter, dated January, 1895, best illustrates the wisdom of my decision: "Mrs. D. went down to the seaside and was away the whole summer and I thus lost sight of her. Since her return she has only for a day or two come under my treatment, and this was owing to her sister, who was staying with her, committing suicide by cutting her throat, resulting in death the same day. This upset Mrs. D. a little, but she has not had such bad attacks since. She, however, thinks she is pregnant! Being afraid of expense she does not let me see her often."

Doubtless many practitioners, especially alienists, would consider this a case of insanity—maniacal attacks of recurrent nature. But if the distinction already drawn between hysteria and mania is justifiable, then we must regard these attacks as mostly hysterical. *She was fully aware of the unreasonableness* of her conduct, profoundly ashamed of and sorry for it after the attacks, and most willing to try and get well. She was not hypochondriac, for, apart from these attacks, she was not excited about her health or depressed. That there was a distinct neurotic predisposition is evident from the history related of the mother and sister. That the treatment advised, which included neither operation nor restraint, was judicious may be allowed; even the terrible shock she must have received by the tragic death of her sister did not upset her mental balance. Under any circumstance one would not be justified in instancing this as a pure case of climacteric insanity. Although the menopause intensified the attacks, menstruation, parturition, and lactation had seemingly caused attacks for nine years. In this case the climacterium began comparatively early, and it

will be interesting to note if after its cessation we find, as we might expect, that Esquirol's experience of "spontaneous cure" takes place. I might explain that I do not believe that the establishment of an artificial menopause by oöphorectomy would have benefited this patient. It is just the sort of case some would advise oöphorectomy for. It might have done good; on the other hand, it is quite as likely that insanity of a definite, possibly incurable, variety might have resulted.

A summary of my views regarding these points is as follows:—

1. A proportion (clearly a small one) of patients whose genital organs are removed may as a consequence or sequence develop neurotic symptoms of great severity, even amounting to temporary or permanent insanity.

2. Patients who have been subject to marked antecedent hysteria are more likely to suffer from neurosis than others, even than women with a hereditary history of mental instability, but personally of more equable temperament.

3. If insanity is due to or even aggravated by uterine or tubo-ovarian disease of a *demonstrable nature*, about 20 to 30 per cent. of these cases may derive great benefit from operation.

4. It is morally and surgically wrong to operate either for slight or pronounced neurosis unless one has distinct clinical evidence that the pelvic organs are structurally affected (*10*).

The question of oöphorectomy for neurosis at the climacteric will seldom arise. If operation during active menstrual life is seldom justifiable, it should be still less so when the cessation is at hand. It is illogical to attempt to relieve a neurosis due to a general physiological change by accentuating the evil which may be regarded as the originating cause. And if the sudden arrest of menstruation would benefit the neurosis with certainty, the ligation of the uterine arteries by the vaginal operation would probably be equally efficacious, and would certainly be attended with less risk than removal of the ovaries.

Climacteric Insanity.—I have already stated that many psychoses met with at the climacteric should not be classified as insanity; for example, quasi-hemiplegia, giddiness, vertigo, severe headaches, great depression of spirits, hysteria, hypochondria, epilepsy, etc.

Even at the risk of prolixity I again draw attention to the error of confounding climacteric and senile insanity. Dr. Clouston, of Edinburgh, has contributed most valuable additions to the literature of climacteric insanity; but his recorded deductions are rendered less valuable for our purpose, inasmuch as he includes thirty-two

male patients aged from fifty-five to sixty-five in his series of 228 cases of "climacteric insanity". Of the entire number, 146 were melancholic; 82 were maniacal. Of the 196 women, 56 had acute symptoms; half of the number were mildly suicidal (11). The proportion of cases of climacteric insanity has been expressed in tabular form by Mr. Bevan Lewis (12).

Source.	No. of Cases of Insanity.	Percentage of Climacteric Insanity.
Reid, Hanwell - - - - -	703	1.1
Tilt - - - - -	—	3 to 4
Skae, Edinburgh - - - - -	558	11.1
Clouston, Do. - - - - -	1549	12.6
Merson, West Riding Asylum - - -	1054	14 to 15
Bevan Lewis, Do. - - - - -	1808	4.4

The evident discrepancy between these figures is explained by the fact that some of the authorities quoted have assigned all cases to the class of climacteric insanity in which the menopause exercised "a causative or modifying influence".

Dr. Merson (13) writes: "The history of the cases investigated points to the conclusion that the change of life is not often of itself the immediate cause of insanity". Merson regards the period between forty and fifty-five years of age as the time during which women are most prone to insanity. After fifty-five the proportion is suddenly diminished. The change of life is not the only or the immediately determining factor to be considered; it should rather be regarded as a predisposing influence. Hereditary predisposition, acquired nervous instability, alcoholism, domestic troubles, the sense of loss of marital fitness and such like must be thought of.

The most common type of climacteric insanity is melancholia. Dr. Skae graphically depicts the condition as "a monomania of fear, despondency, remorse, hopelessness, passing occasionally into dementia". Now this is climacteric insanity from an asylum point of view. And, indeed, alienists of to-day rather differ from this too exclusive definition. Dr. James Shaw (14) states: "It is distinguished from other depressive insanities by the previous history of flushings, heats, perspirations, formications, vague pains, headaches, feelings of fulness and swimming of head, paræsthesiæ, gastro-intestinal disturbances, irregular or deficient menstruation, dysmenorrhœa or menorrhagia, facial muddiness, pigmentation and hirsuties. The emotional depression is much less intense than in typical melancholia, and the suicidal attempts are silly, half-hearted, and undecided. Severe insomnia is a characteristic feature, and morbid apprehensiveness is frequently present. Married women, who have

had few or no children, or at all events no children for many years before the climacteric, appear to be especially vulnerable. Sterility, absolute or relative, has been a feature in the history of nine-tenths of the cases that have come under my own observation."

Bevan Lewis found that, of all classes of mental depression taken together, quite 60 per cent. were actually suicidal; but of climacteric melancholics, about 44 per cent. only could be so considered.

Clouston writes: "The very loss of courage and vigour of will operates against any effectual attempts at suicide".

Yet we know that, in some of the worst cases, desperate and repeated attempts at self-destruction are sometimes made. If the patient has an alcoholic tendency, the danger of suicidal or homicidal impulsiveness is greatly increased. Indeed, apart from any precedent emotional disturbance, or marked intellectual change, purely impulsive insanity may arise during the climacteric, and in these instances there is the most reason to apprehend suicide or homicide.

A few winters ago I saw, with Dr. Norman MacCaskie, a patient who had been depressed and somewhat melancholic, yet these symptoms were not severe, and were referred to her climacteric condition. One night the woman left her bed, and deliberately got inside the cold water cistern in her night-dress. The action of the intense cold caused her to scream, and she was rescued in time. After this her mental condition deteriorated rapidly, and it was found necessary to send her to an asylum.

In his recent lectures, delivered before the College of Physicians, Dr. Fielding Blandford (15) has briefly, but most clearly, indicated some of the most important considerations thus:—

"We come now to another of the epochs of life, that known as the climacteric, an epoch of transformation when various important functions of the body with their corresponding nerve organisations come to an end, sometimes quite suddenly. When we consider what all this involves, it is not surprising that we find it to be eminently a period of nerve instability, when the various chances and accidents of life may exercise an undue influence over the nervous system, and bring about an overthrow of the mental balance. The climacteric and the cessation of the menstrual function are put down as causes of insanity. It would be more correct to say that the whole climacteric period is one of instability in which other causes, moral or physical, exercise a power which would have been resisted at another time, and would have passed by without serious harm. In some cases the change of life will, by itself, produce

mental disorder in persons prone by inheritance, or in those who have no object or aim in life, no occupation, duties, or work. What is the prognosis in these cases? The form of insanity incidental to this period of life is melancholia, more or less acute. It is an opinion, common to many, that the religious melancholia of this time is peculiarly hopeless and that few recover; but this is not so. The melancholia of women is almost always religious, but many recover. Comparing the statistics of various writers, we may reckon upon 50 per cent. of recoveries. In forming our prognosis, we take into consideration the duration of the illness, the question of early treatment, the number of previous attacks, the health of the patient, and the cause, such as alcoholic indulgence. Many recover, but such disorder is far slower in its progress to recovery than the maniacal seizures of earlier life. There is a popular notion that the climacteric change of life will bring relief, or even cure to those who are already disordered in mind, or have suffered from periodic attacks, which, it is hoped, will disappear after the new lease of life is taken up. I fear such hopes are doomed to disappointment. In my experience all such patients are not better, but worse, at the time of the cessation of menstruation, and I cannot see how such an important change and the disturbance of such functions can have a beneficial effect on an unstable nervous system."

Dr. Savage (16) states that "it is common for women of about forty-five years of age to complain of feelings of heat and oppression on the crown of the head, and of feelings of heat and cold all over the body. It, however, requires the insane person to explain these feelings by saying she has something hot and alive in her head, or that chloroform, chloride of lime, or ammonia, is thrown over her." "The climacteric is associated with changes in the reproductive functions, and as a consequence there are frequently hallucinations of smell. I am impressed with the fact that when we have ovarian troubles we may expect to find hallucinations of smell and touch."

Impulsive conditions may alternate with melancholia or wholly occupy the mind. The more usual forms of impulsive climacteric insanity are kleptomania, dipsomania, morbid jealousy, and less commonly, suicidal or homicidal monomania and erotomania; the last named is more frequently found in insanity accompanied by metrorrhagia than during the climacteric. Pyromania (17) is more usual at puberty, but menopastic cases have been recorded. Alcoholism is in some cases a result of the nerve instability, but in all cases of climacteric insanity the risks attending it are great.

Mania may follow an attack of melancholy, depression and insomnia. In many cases there is epigastric discomfort and a

craving for stimulants, then a sudden outbreak of acute mania follows. Such attacks may be short and never recur, or, especially if there is a neurotic family history, may become recurrent. An association of epilepsy with mania should be regarded as most dangerous. In these cases there is a great probability of suicidal or homicidal actions.

The medico-legal questions which arise in connection with determining the responsibility of individuals at the climacteric are likely to be in many instances very difficult. Krafft Ebing (18) considers that the mental condition of a woman during her menstrual period should always be taken into account in medico-legal investigations; this is more necessary when there has been any precedent moral or nervous disturbance or peculiarity in behaviour at the period. If a crime has been committed during a menstrual period by a woman who at this epoch had been affected by mental disturbance, especially if the act be of an impulsive character, the accused should be deemed irresponsible (18). These remarks apply with still greater force to climacteric women. Icard (19) also points out that in the capacity of witness or accused or prisoner much weight must be attached to the possible and probable mental disturbances during menstruation (19). The distinctions between moral and legal responsibility must be made. It is difficult to generalise on this subject, every individual case must be considered on its own merits.

The prognosis is on the whole favourable as compared with all varieties of mental disorder. From 50 to 60 per cent. of climacterically insane women regain their mental health in varying periods of from three months to three years. In a proportion of these, however, there is a certain enfeeblement of mind left. Secondary conditions, such as dementia or general paralysis, may follow, but it is open to argument if these conditions ought to be regarded as consequential to the insanity of the menopause.

The treatment of the psychoses of the climacteric must depend on the existing symptoms. The general indications are to give tonic and restorative drugs, such as iron, arsenic and strychnia, and "Easton's syrup". Dyspepsia must be combated. For gastric irritations, bismuth, rhubarb, nux vomica, gentian, calumba are indicated. Constipation must be seen to; cascara or cascara-dine (Le Prince's tabloids), or aloes and myrrh pills, or some simple saline, or one of the mineral purgative waters should be prescribed. After dyspepsia is removed, the chances of successful treatment by ample feeding will be greatly improved. In certain patients one finds great difficulty in prohibiting alcohol; for these, tincture of

nux vomica, compound tincture of lavender, tincture of capsicum and compound tincture of gentian may be administered.

For sleeplessness, we may have to resort to one or other hypnotic; such drugs as depress the nervous centres, *e.g.*, bromide of potassium, are not to be preferred. The hypodermic administration of morphia should never be resorted to except for the relief of acute pain or in acute mania. Hyoscyamine is better in the latter condition. If insanity is actually established, some patients will sleep better after a draught of stout or ale than after sulphonal, paraldehyde, chlorobrom, or such like.

For dysmenorrhœal pain, the liquid extract of salix nigra or of viburnum may be tried; if these fail, antipyrine, belladonna and compound tincture of chloroform may give relief. For the general nervous exhaustion felt after the periods, aleteris cordial and celerrina have often proved beneficial.

Patients who suffer from narcosis induced by the abuse of morphia, chloral or alcohol must be treated by isolation and modified Weir Mitchell treatment, *i.e.*, rest in bed, massage combined with electrical applications (the interrupted current is best) and overfeeding. The method of overfeeding which is practised consists in giving a very liberal carbonaceous dietary and also a considerable amount of nitrogenous food; in addition to this, a tumblerful of milk, *i.e.*, about ten ounces, is to be given every three hours. At least eighty ounces of milk should be taken during the twenty-four hours; some may take eventually over 100 ounces a day.

In certain menopastic women who are neurasthenic and very stout a different plan of dietary is advised. The patient rests in bed and has gentle massage applied. Her diet consists of two quarts of skimmed milk in the twenty-four hours, given in small quantities every two hours. By-and-by this is brought down to a pint in the twenty-four hours. If weakness comes on, beef tea, beef peptonoids, or good soup is substituted for milk. I find, however, that the reduction of fat may be obtained with far less privation to the patient and in truth with much less risk. For these cases I now suggest rest in bed, massage, frequent aperients, a *limited* diet, but this can be varied, amounting in all to about one half of the total quantity formerly consumed during the twenty-four hours; and also thyroid extract, beginning with one or two grains thrice daily, increased up to five or ten grains thrice a day. As little liquid as possible should be taken, and the patient should only drink fluids one hour after eating. Turkish baths three times a week may be taken for a further period of three or four weeks, after the six weeks in bed.

In generally considering the psychic phenomena of the menopause we must always recognise the importance of prophylaxis. The disposition often changes in the climacteric years, and may assume a melancholic character; we may find that slight depressions may develop into serious mental maladies. It is true that the development of grave climacteric psychosis is most often seen in women predisposed by heredity or temperamental tendencies towards mental instability, but it is also observed in women who are not thus predisposed. Change of scene, suitable occupations, and as much out-door exercise as possible, short of bodily over-fatigue, will unquestionably avert many probable progressive mental maladies.

Local gynæcological treatment should not be needlessly or lightly undertaken; it may increase the neurotic evil by specially directing attention to purely functional conditions, and thus act prejudicially on the weakened nervous system. In some cases, however, of cervical or uterine affections, local treatment, which affords relief from pain and severe leucorrhœal discharges or from congestions or displacements, will act most beneficially in convincing the patient that her condition is less serious than she apprehended (20). In such circumstances the discreet gynæcologist will not only cure the local affection but probably greatly ameliorate the mental condition.

The more serious cases of climacteric mental disorder must be treated in the same way as other mental disorders, that is to say, sent to an asylum or kept under strict skilled surveillance elsewhere.

- (1) *Dictionary of Psychological Medicine*, edited by Hack Tuke, vol. i., p. 234.
- (2) *Transactions Medical Society of London*, vol. xvii., p. 31, 1894.
- (3) *Insanity and Allied Neuroses*, p. 73, London, 1884.
- (4) Donkin, Hack Tuke's *Dict. of Psychol. Med.*, vol. i., p. 618.
- (5) *Ibid.*, vol. i., p. 639.
- (6) Sutherland, *ibid.*, vol. ii., p. 801.
- (7) *Traité des Maladies Mentales*, t. i., p. 163, 1838.
- (8) *De la Menstruation*, p. 321.
- (9) *Lib. cit.*, p. 160.
- (10) *Vide Brit. Gynæcological Journal*, part 39, p. 396; also *Rev. Med. Chir. des Malad. des Femmes*, September, 1894.
- (11) *Clinical Lectures*, p. 560.
- (12) *Text-book of Mental Diseases*, p. 398, London, 1889.
- (13) *West Riding Lunatic Asylum Medical Reports*, vol. vi., p. 85.
- (14) *Medical Annual*, p. 333, 1895.
- (15) "The Lumlian Lectures on the Diagnosis, Prognosis and Prophylaxis of Insanity," lecture ii., p. 913, *Lancet*, 13th April, 1895.
- (16) *Lib. cit.*, p. 73.
- (17) *Archives de Neurologie*, p. 41, Jan., 1887.
- (18) *Jahrbuch f. Psych.*, Bd. x., 2-3, 1895.
- (19) *La femme pendant la période menstruelle*, pp. 164-185, 1890.
- (20) *Vide Rohé, Journ. Amer. Med. Assoc.*, 12th Oct., 1895, and Summary, *Brit. Gyn. Journ.*, March, 1895 (Leith Napier).

CHAPTER X.

FIBROID UTERINE TUMOURS (FIBROMYOMATA) IN RELATION TO
THE MENOPAUSE.

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(For other and more detailed references see end of chapter.)

FIBROID uterine tumours are, as we have already mentioned (*vide* chapter viii.), one of the important causes of hæmorrhage at the menopause.

It has been recognised for many years that the existence of a fibromyoma prejudices the smooth course of the climacteric. The late cessation of menstruation does not always depend on pathological conditions. Not a few strong healthy women of markedly feminine type have the climacteric beginning as late as fifty years of age.

On the other hand, so cautious a writer as the late Matthews Duncan has thus expressed his opinions: "A uterine myoma is not like an apple, attains a certain size and then ceases to grow. In a life it may grow no bigger than an apple, or may reach the umbilicus." With reference to the prognosis he states: "I am sure the number of fatal cases is greater than is generally supposed. A woman with an enormous fibroid will not live to be an aged woman."

Mangiagalli states as the result of his personal experience that

uterine fibromata may cause fatal hæmorrhage at the climacteric ; he adds : " They may also be fatal from fatty degeneration of the heart ; or by interfering with the urinary tract, giving rise to cystitis or pyelo-nephritis. They impair the resisting power of the system, making it an easy prey to intercurrent diseases. . . . Not infrequently, both at the menopause and after it, the hæmorrhage they cause is serious ; and the transformation after that occurrence into malignant tumours is not very uncommon. Sphacelus of the tumours, with serious peritonitis, often takes place, and sometimes fibro-cystic changes occur. The very tendency to atrophic involution may be the cause of these changes ; or fatty degeneration of a sub-peritoneal tumour may occur and the corresponding zone of the uterus may participate in the change, leading to the exfoliation of the peritoneal epithelium, and the formation of adhesions which still further complicate the condition."

Personally, I believe that fibroids are more likely to become sarcomatous than carcinomatous, but this I shall have occasion to refer to again.

There is a common belief that the prognosis of a uterine fibroid depends greatly on the age of the patient ; and that the near approach of the menopause is a favourable condition. Some fibroids do cease to grow after the menopause, and some become so small two or three years after the climacteric has been passed that they may be said to disappear wholly. But that all uterine fibroids cease to grow with the advent of the menopause or after it, is wholly erroneous. Rapid growth after the menopause is not very common, but is by no means so rare as most previous writers have formerly believed.

The biology of uterine fibroids has been studied with less success than their clinical history.

It has been sought to determine their genesis by referring this to various hypothetical causes. Velpeau attributed it to " a morbid interstitial parturition, the result of a drop of blood or plastic lymph, or even of pus, in the meshwork of the uterine tissue " ; many writers copied this wholly fallacious assumption. German writers, among whom Klebs and Kleinwächter may be referred to, have attributed the origin of fibroids to connective tissue growths from the neighbourhood of the blood-vessels. The former thinks that they arise from proliferation of the connective and muscular tissues of certain vessels, the various nodules then coalescing to form a tumour ; Kleinwächter is of opinion that they are developed from certain round cells found in connection with the capillaries ; these cells are first transformed into fusiform bodies and then

become grouped into nodules which generally coalesce. But no attempt has been made by him to determine the reason for the initial change.

It is not improbable that the elements of many fibroids are to be referred to congenital causes, to imperfection of the original connective tissue cell formations in the uterus. If the observations of Arthur Johnstone may be relied on, it is still easier to understand the genesis of uterine fibroids. He has thus summarised his observations: "The hyaline layer with its various modifications is the matrix of all epithelial tissue. The endometrium may be regarded as a local hypertrophy of this structure formed for specific purposes. The one great pathological doctrine to draw from this is that we have at last a key to what cirrhosis really is, because the hyaline layer, with all its reduplications in the capsules of the secreting organs, can easily, as a result of slight irritation, instead of forming secreting cells, take another course and form connective tissue." Applying this doctrine to that of Kleinwächter, we obtain a most suggestive addition to our appreciation of the explanation of the growth of fibroids. If these two views are amalgamated, a fibroid might originate from some slight irritation in the hyaline layer; as the consequence of this, there result the round cells of Kleinwächter, which undergo transformation into fusiform bodies and become grouped together. The unstriped muscle fibres of the uterine tissue become closely mixed up with the new connective tissue formation—for it is well known that normally the uterine mucous membrane is most intimately connected and intermixed with unstriped muscle fibres—and whether the original site of growth is within the uterine muscular tissue, in the tissues of the mucous membrane, or in the tissues immediately beneath the serous uterine membrane, the same elements of muscle and connective tissue cells will be found.

The muscle elements predominate in some of the intramural tumours, the connective tissue elements in others; in the subperitoneal tumours, the connective tissue is always predominant; and in the submucous the growth is not infrequently almost equally composed of muscle and connective tissue elements.

As we shall have occasion hereafter to mention more fully, it is the soft (or so-called red) fibroids which are most unmanageable at the menopause. It is probable that this variety is morphologically different from the hard or white fibroid. The "soft fibroid" may arise independently of any pre-existing hard fibroid, and is not, as was formerly held, generally the result of degenerative or inflammatory processes in a hard fibromyoma. Its origin is to be sought in

a perversion of glandular growth; it may arise in some cases from glands in the neighbourhood of the broad ligament; in others it is almost certainly originated from perverted glandular changes in the uterine glands. As yet, sufficient pathological details are lacking to establish the certainty of my belief. So far as I am aware, Johnstone was one of the first writers who referred to this important distinction between growths which are clinically quite distinct. The soft inflammatory tumour is different, in *macro-* and *microscopical* appearance, from the hard growth which has become myxomatous in some parts of its usual structure. The œdematous fibroid is not to be mistaken for a fibro-cystic tumour. I have examined tumours removed by operation when quite fresh, and found in some instances examples of the soft, of the hard, and of degenerated hard tumours, all existing in one patient. Meantime we can best estimate the soft tumour by regarding it as a new adenoid, or glandular growth, comparable to goitre. Some cases are found multiple and pseudo-cystic, others are diffuse. These tumours are but seldom favourably influenced by the cessation of menstruation.

It is of some importance to consider here the pathological and clinical relationships existing between fibroma and endometritis. In an exhaustive paper regarding the alterations of the endometrium in cases of fibroma of the uterus, Marchesi (1), after discussing the views of many observers, concludes thus:—

“1. The presence of an interstitial fibroma, whether it be large or small, or the fibrous degeneration of all the uterine parenchyma, induces in the uterine mucosa simply hyperplastic or hypertrophic alterations, chiefly affecting the glands, but not sparing the connective tissue, which, in a few cases only, attains a high degree of hyperplasia. Not infrequently the appearance of the mucosa may be compared with that of a mucosa affected by fungous glandular endometritis.

“2. The slight inflammation which often accompanies such alterations always manifests itself towards the deeper layers of the mucosa, and is probably of a mechanical and infective nature, but this cannot be absolutely affirmed.

“3. The greater development of the connective tissue, mentioned by the majority of authors as usually existing on the site of the fibroma, exists, according to our researches, only in rare cases, the same alterations in cases of large interstitial fibroids extending to every part of the mucosa.

“4. Until they become entirely intrauterine submucous fibromata produce alterations similar to those caused by interstitial

fibroids, but then cause atrophy in the immediate neighbourhood of the tumour, keeping up hyperplasia in the rest of the mucosa. When they have passed into the state of fibrous polypi, and when, the cervical cavity being dilated, the tumour partially passes into the vagina, the parts exposed assume an investing epithelium like that of the os uteri. These tumours, more than any others, are subject to a true inflammatory process, owing to the influences to which they are exposed from their situation.

"5. In the case of subserous fibromata, the mucosa is subject to changes identical with those of interstitial fibroma, but in our cases there were other causes, which by themselves kept up the alteration of the mucosa, in one retroflexion, in the other a totally fibromatous condition of the uterus."

On referring to what has already been written concerning endometritis of the menopause, it will be evident that the form of endometritis which is specially notable is that which Marchesi finds frequently associated with interstitial fibromata. It is by no means clear whether the endometritis is not the cause, rather than the consequence of the growth, or, at any rate, of the not infrequent rapid increase of growth of the uterine tumour. In almost all cases of uterine fibroids, the endometrium was found by Wyder (2), v. Campe (3), and Borissoff (4), to be undergoing interstitial or glandular hyperplasia. The glandular form is usually found when the tumour is some distance from the uterine cavity; the interstitial, or a mixed form of interstitial and glandular hyperplasia, when the tumour is near the uterine cavity. These conditions give rise to vascular engorgements, and explain the hæmorrhages associated with fibroids. Inflammation of the lining of the tubes from spreading of the endometritis and effusions of blood into them, from uterine reflux, is not uncommon.

It is not improbable that the converse mode of propagation happens, so that a salpingitis spreading down to the uterus sets up or intensifies an endometritis, and consequently increases the irritation of the uterine tissues in the vicinity of the fibroid, and tends to promote its growth. I have no data to show whether a salpingitis or salpingo-metritis does act directly as a primary stimulant to tumour growth, but it is by no means unlikely; it has been observed clinically, that these conditions act secondarily.

Frequency of Fibroids.—It has been estimated that after the age of thirty-five one woman out of every five is the subject of fibroids. I am not aware whether any other observer has sought independently to verify this estimate of Bayle's, which, having been recorded in 1813, is somewhat in need of revision; but it appears

to me that many tumours then regarded as fibroids would now, with our present knowledge, be classified differently. One writer after another has copied the statement, until from its antiquity it has become classical. From my individual observation I believe Bayle's statement to be an exaggeration of facts. But if even one woman in twenty is the subject of a fibroid after attaining thirty-five years of age, the condition must be regarded as a very common one. If so it may be held that with advancing years there is an increasing tendency to the development of fibroids, for the nulliparous woman is equally, if not more, liable to such growths than her parous sister.

The existence of a small interstitial or subserous growth is in the great majority of instances of little moment provided that the woman's general health is good and her endometrium and uterine appendages healthy. Whether it is due to some one or other of the inevitable circumstances of advancing civilisation, it is manifest that the considerations of uterine fibroids have of recent years tended to increase in importance; possibly only since our knowledge of uterine disease has become more perfect have we realised that there are very great differences in the life-history of these growths.

The belief that a fibromyoma of the uterus is an innocuous condition, which only under very exceptional circumstances requires more than symptomatic medical treatment, still lingers in the minds of some practitioners. Further, many observers whose work on allied subjects entitles their opinions to great respect, assume that the dangers of fibromyomata almost invariably are checked or wholly removed by the menopause. A careful perusal of any recent text-book of gynaecology will dissipate the first belief. The second demands more particular consideration. If it is correct, there must be some firm basis of facts supporting it, which, so far as I know, has not yet been made public; if it is only partially true, or in great measure incorrect, we also require facts, not simply expressions of opinion, to establish the inaccuracy of such theorising.

Alban Doran (5) is of opinion that fibroids are nearly always subject more or less to a process of involution at the menopause, and suggests that the spontaneous disappearance of these tumours at an earlier age may represent a premature menopause. Doran quotes from Barnes, Meadows, Playfair, McClintock, Pozzi, Courty, Schröder, Gusserow, Schorler, De Sinety and Kleinwächter in support of his belief that fibroids do become, under certain conditions, spontaneously absorbed. According to De

Sinety, "pregnancy and the menopause appear to exercise an influence on these retrograde phenomena, although they have been observed in nulliparous women, and during the most active period of sexual life".

Doran is sceptical concerning Kleinwächter's observation that "it is quite exceptional for a fibroid to diminish or even remain quite stationary before the menopause, or that it is likewise quite exceptional for fibroids to grow less after the menopause".

It is admitted that fibroids involute usually after parturition; and also as a consequence of injury and inflammations; as the result of degenerations of well-defined character; and, finally, in some cases after the menopause, as part of the atrophic process. Bland Sutton (6) writes: "The occurrence of uterine myomata before puberty is unknown; these tumours are rarely recognised before the age of twenty-five; from this age they increase in frequency, which attains the maximum between the thirty-fifth and forty-fifth years. . . . A myoma which during the sexual period of life reaches to the umbilicus or higher, will sometimes shrink so much after the menopause that it will retire into the pelvis, and fit that cavity so completely as to give rise to symptoms of impaction." Sutton recognises the fact, although he regards it as rare, that a myoma may rapidly enlarge after the menopause (7).

Pozzi adopts Schorler's opinion, that after the climacteric the growth of both fibrocystic and simple fibromyomatous tumours as a rule becomes notably retarded. His own view is thus expressed: "By far the larger majority of fibromata only give rise to vague symptoms, and are often overlooked. Even when they have caused serious troubles during the generative life of the woman, the greater number have a natural tendency to atrophy, or at all events to diminish in size by a kind of involution and induration process after the menopause" (8).

The views expressed by the author of "Uterine Neoplasms" in Baldy's *Text-book of Gynæcology* (9) are: "The occurrence of the menopause has a favourable effect upon these growths, but it often never occurs, and is always postponed by the tumour. Again, most tumours begin to produce marked symptoms at a time when the menopause should naturally occur. Moreover, the menopause may merely check the bleeding for a time, it recurring after a few years."

Hegar and Kaltenbach (10) write: "The menopause does not by any means check the growth of tumours in all cases. The tumours sometimes attain a colossal size very rapidly at this period, because they undergo fibrocystic or other degeneration or are nourished by newly-developed vascular adhesions."

Börner (11) in the same work writes: "The most important fact of all is the circumstance to which attention has already been called in former pages, to wit, increase in size of fibromata during and after the climacteric".

Lawson Tait agrees: "The growth of the fibrous tumour does not cease in every case with the cessation of the menses".

Kleinwächter (12) has presented the clinical histories of forty cases in detail. Many of these are so brief that they do not convey much information; in some instances the fibroid growth was so insignificant in size that it possessed only slight clinical interest. I have published a verbatim translation (13) of this article, so that it may be readily accessible to all. I here submit in tabular form (pp. 214 *et seq.*) fifteen cases, which within a comparatively short time I have had under my personal observation. Kleinwächter holds that fibromyomata only in the minority of instances come to a standstill or diminish at the climacteric. Ergot may account for the diminution in a few cases. So far as his record affects our present consideration, we quote his own words:—

"Among eighteen cases given (by him), Schorler (14) mentions three that occurred in the climacteric years, *i.e.*, from forty-four, and thinks these should be excluded from generalisation, as tumours at this time grow more slowly than usual, in fact sometimes decrease".

"The observations and discoveries of the last few years show, however, that according to this calculation there are almost too many exceptions to be calculated. The cases above cited prove this. In twelve cases the women at the commencement of their treatment were in the climacteric years, *id est*, from forty-four to fifty. These cases (15) are V., XI., XII., XIII., XV., XIX., XXIII., XXV., XXVI., XXVIII., XXXIV. and XXXVI. An exception may be made in the case of No. V., for four and a half years later, when the uterus, after the first examination, did not seem to be enlarged, a tumour as large as a musket ball, as well as an unevenness of the posterior wall of the uterus, was discovered; it is therefore impossible to decide within what time these changes took place. The remaining eleven cases, excepting XXXVI., may be divided into two groups according to the more or less rapid growth of the uterus. To the first group belong Cases XI., XII., XIII., XIX., XXV. and XXVIII.; to the second, Cases XV., XXIII., XXVI. and XXXIV."

"It is only in the minority of instances that the climacteric exercises a staying influence on the growth of the tumour, and we therefore refrain from distinguishing these cases from the rest."

Dr. T. Jabez Johnstone (16) has published notes of five cases of fibroid showing marked post-climacteric increase.

One, a lady of fifty-six, nullipara, ceased to menstruate at forty-five, had a fibroid noticed first when she was fifty-four years of age. Another patient, aged over sixty, who had ceased menstruation about thirty years of age, had an increasing tumour, "estimated to weigh at least forty pounds". She was treated by electro-puncture. A year after, the tumour was getting larger. A third case, giving her age at sixty-one but looking twenty years older, was admitted with a large fibroid. She had carried the tumour over thirty years. She said she had not menstruated for twenty years, and that within the last five years the tumour had doubled in size. She died in a few weeks after admission. Post-mortem examination showed that the growth was partly calcareous, partly cystic, and that she had had pyelo-nephritis. Another patient, aged fifty-nine, had a large fibroid for twenty years. Climacteric at forty-seven. Abdominal hysterectomy necessary. Death on fifth day. The last case, like the three preceding ones, a coloured woman, was aged apparently over fifty, had occasional menstrual periods, and was the subject of an immense fibrocystic tumour. A tumour of forty-four pounds' weight was removed. The patient died from shock.

Johnstone writes: "I have within the past five years seen at least a dozen women with large, growing and troublesome fibroid tumours of the uterus who were over fifty years of age, some of them over sixty" (17).

Spencer Wells, in his book on *Uterine and Ovarian Tumours*, reports twelve cases of operations for fibroid and fibrocystic tumours in women over fifty years of age. Full particulars of some of these are given in his more recent work (18).

Of the fifteen cases I have recorded, reference to the table will show that Cases I., III., IV., V., VI., VII., VIII. and X. were examples of rapid and considerable tumour development at the menopause. So urgent were the symptoms of III., IV., V., VI., VII. and VIII. that hysterectomy had to be performed. In IV., V., VI. the malcondition of the patients and the severity of the necessary operations were such that there were fatal terminations.

Case I., aged forty-eight (II.-para), had losses every fourteen days, continuing seven days. She was treated medically. The hæmorrhage became less, but the tumour developed from the size of a marble to many nodular, interstitial and subperitoneal growths. No operation.

Case II., aged thirty-nine (V.-para), had been under treatment

for tumour nearly ten years. During this time she had given birth to five children. She was delivered of her sixth child in November, 1890, when during labour a tumour fully the size of a goose's egg was felt. Six months after no tumour could be felt; but in November, 1892, she attended complaining of profuse loss, and the uterus, which was much larger than before, was the site of many hard multiple nodules.

Case III., married, but nulliparous, was forty-five. She had noticed the tumour for over eighteen months, during which time menstruation had occurred every fourteen days, was very profuse and painful. The tumour became softened, and, on operation, was found to consist of multiple nodules, several of which were undergoing cystic changes.

Case IV., aged forty-seven, had a large fibrocystic tumour which had been noticed for at least two years, but had increased rapidly for over a year. There were very extensive adhesions, and the patient, who was in a most unfavourable condition for operation, succumbed from shock in a few hours.

Case V., aged forty-six, had been formerly the subject of diabetes, and had severe nervous symptoms. Prior to operation the tumour was regarded as a fibrosarcoma. The pain was so severe that the patient had become a morphomaniac. Death from shock. Post mortem revealed chronic Bright's disease.

Case VI., aged forty-nine (III.-para), had suffered severely for over five years. There was rapid increase of the growth. Intra-peritoneal hysterectomy. Patient subsequently died from intestinal obstruction.

Case VII., a virgin of forty six and a half years, had suffered from a fibroid for four years at least, but within a year prior to operation the pressure symptoms and losses became so great that an operation afforded the only relief. She is strong and well in June, 1896.

Case VIII., aged forty-five (III.-para), had suffered from violent hæmorrhages for over a year. Rest and medicines relieved this, but the pressure symptoms became so urgent that hysterectomy was performed. Recovery.

Case IX., aged forty-two (VI.-para, youngest child nine years previously), was an unquestionable example of premature menopause. She had had very profuse losses for six years, and grave anæmia. Medical treatment did little good. She was curetted in July, 1893. In June, 1894, the cervix was the site of a small fibroid. She is now (1896) forty-five, and the losses are controlled by hydrastis.

Case X., aged forty-six (XIII.-para), had a very large tumour which caused severe blood losses. She also had peritonitic attacks. Hydrastis and vaginal plugging ordered. The patient was not in a favourable condition for operation.

Case XI., a single woman aged forty-two. For eight years had flooding at the periods: tumour discovered by Dr. Playfair six years previously. The case was diagnosed as one of fibroid with cystic degeneration. Patient declined operation. Later, the general condition had much deteriorated.

Case XII., aged forty-six (VIII.-para), evidently had a post-partum endometritis with subsequent procidentia, cystocele and rectocele. A polyp was removed in 1890, and in the year following no periods had been seen for several months, she then being aged forty-seven.

Case XIII., aged thirty-nine (II.-para), had a retroverted hyperplastic uterus and a submucous polypus. She declined operation. Rest in bed, ergot and strychnia, restrained the hæmorrhage. Doubtless this case was eventually operated on by another surgeon.

Cases XIV. and XV. are given as illustrations of (*a*) post-climacteric fibroid development, and (*b*) malignant transformation of an old uterine fibroma.

These cases demand special consideration, and I shall revert to this again.

Cases II., IX. and XIII. were aged thirty-nine and forty-two, so that unless they are, as I claim, to be regarded as premature menopastic examples, I should not perhaps have included them.

From analysis of these cases, it seems to me that I am warranted in endorsing Kleinwächter and Müller's opinions that the influence of the menopause on fibromyomata is not always so favourable as has been hitherto believed.

I have excluded from my table all cases of fibroids which were not specially marked at the menopause by increased severity of symptoms, such as hæmorrhage, or pressure on contiguous parts, or by rapid growth.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD.

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
I.	Dr. Stanley.	1890	E. C.	48	M. Ch. 2.	Recur every 14 days. Duration 7 days. Profuse for 6 months.	Present illness began about 6 months before visit. Her doctor treated her with hydrastin, and then ergot, which for a time restrained the bleeding. Uterus enlarged, sound enters 3½ inches. Fibroid growth about size of large marble on posterior wall.	Over 2 years.	Uterus larger. A number of nodular masses felt. Considerable interstitial and subperitoneal growths. Hæmorrhage somewhat less.
II.	Dr. Stanley.	1890	A. C.	39	M. Ch. 5.	Has had no period for 13 months, except in February, 1890. Last confinement, 5 years ago.	Treated at Samaritan Hospital for uterine tumour 8 years ago, then in Royal Free Hospital 4 years ago. On examination in July, 1890, uterus found enlarged to size of 4 months' pregnancy. A hard nodular swelling dipping into Douglas's pouch, and also partly occupying left quarter of pelvis, evidently closely attached to uterus.	10 years.	Parturition, 18th Nov., 1890; very moderate hæmorrhage. A tumour fully the size of a goose's egg felt during labour. Six months after the growth could not be felt. In Nov., 1892, attended. Said her period just passed had continued 13 days. Size of abdomen considerably increased. Uterus enlarged and hard; many hard nodular swellings can be distinctly felt. Both ovaries enlarged and prolapsed.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD—(continued).

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
III.	L. N.	1891	E. M.	45	M. Ch. o.	First at 13. Regular until a year ago. Always had severe pain. Duration 6 days. Menstruation — Now recurs every 14 days, continuing 6 days. Married 23 years. Never pregnant.	Large tumour in hypogastrium, central in situation. Uterus slightly retroflexed, generally enlarged, and evidently forming part of tumour. Sound enters $3\frac{1}{2}$ inches. Clitoris enlarged and congested. Now suffering from pressure on bladder. In 1892 the pain was less, but the flow had in no way diminished in quantity or frequency of recurrence. Hydrastin, ergotin, hamamelis, nux vomica had been given; also applications of cocaine and morphia over clitoris. The tumour feels generally hard, and moves with uterus. There is now some tenderness complained of on examination, and fresh nodular outgrowths—some of them soft—can be felt.	1 year and 9 months.	Extraperitoneal hysterectomy—multiple fibroids, one large interstitial. Some central softening. Recovery.
IV.	Hospital.	1892	R. D.	47	S. Ch. o.	Menstruation very profuse and painful. Pressure symptoms very severe for nearly 2 years.	Firmly fixed large fibrocystic growth, which of late has increased greatly. Patient's general condition unsatisfactory.	Over 2 years.	Extraperitoneal hysterectomy. Many and difficult adhesions. Death from shock in a few hours.
V.	Sent to Hospital by Dr. Weldon.	1892	A. B.	46	S. Ch. o.	When first seen, periods profuse and very painful. From March to June, 1893, no period for $3\frac{1}{2}$ months; but always had much pain, increased at usual times of periods.	At one time had diabetes. Uterus retroflexed. Cervix softish and virginal. A hard rounded orange-sized uterine swelling in anterior wall, going up from and above fundus. In September, 1893, the growth was much increased, and the patient had become a morphomaniac. Had been taking large doses since January, 1892. No sugar now in urine. Tumour <i>very hard</i> . Inguinal glands enlarged.	Over 2 years.	The patient was unable to leave her bed on account of the pain. Symptoms pointed to sarcomatous changes. Extraperitoneal hysterectomy. Died from shock and suppression of urine. P. M. No peritonitis, but signs of chronic Bright's disease.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD—(continued).

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
VI.	Dr. C. Hall.	1892	J. W.	49	M. Ch. 1. Ab. 2.	First at 14. Very profuse and painful for nearly 2 years past. Always painful. Duration for last year 10 to 12 days, using from 100 to 120 diapers.	A swelling observed in lower abdomen for last 5 years. Now increasing very rapidly for 18 months. Medicines and rest in bed fail to control hæmorrhage. For a time there was improvement. There is now much difficulty on micturition. Large tumour occupies abdomen, and uterus lies in its substance. Tumour passes deeply in pelvis on left side, in which portion uterus lies. Another large growth to right side reaches about 1½ inches above umbilicus. Patient has troublesome cough and irregular cardiac action.	5 years.	Intraperitoneal hysterectomy in April, 1892. Patient recovered from immediate effects of operation, but subsequently died from acute obstruction of bowels.
VII.	Dr. Hutchin-son.	1893	H. B.	46½	S. Ch. o.	For past 2 years has been poorly every fortnight. Duration 6 to 7 days. Considerable pain.	Multiple fibromyoma filling up pelvis. First noticed 4 years ago when under treatment for nephritis. There are evidently multiple growths sub-peritoneal and interstitial. In May, 1894, suffered from profuse hæmorrhage and violent pains. Wholly incapacitated from her occupation, that of a professional nurse. Examined under anæsthetic June, 1894. Tumour the size of a large Swedish turnip. Vagina virginal; too small to permit easy vaginal hysterectomy.	4 years.	Hysterectomy, June, 1894. Very smooth convalescence. Quite well and feels fit for all her duties, 1895. "Perfectly well," March, 1896.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD—(continued).

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
VIII.	Dr. Hill.	1892	Mrs. W.	45	M. Ch. 3.	For past year very profuse every fortnight, and continuing 8 to 9 days. Has used from 100 to 125 diapers. No relief from rest or medicine, etc.	For past 2½ years a swelling noticed in lower abdomen. Now increasing rapidly, and seems softer in centre. Sound enters 5½ inches, and uterus moves with growth. Pressure symptoms very distressing.	2½ years.	Hysterectomy, March, 1892. Recovery.
IX.	Dr. Wilks.	1893	Mrs. H.	45	M. Ch. 6. Young'st 9 years.	Puberty at 15. Never had much pain. Menorrhagia for 6 years. Much worn lately. Clots passed. Now painful. Duration 65 to 70. Duration of periods 14 days. Interval only 14 days. Bladder irritation.	Uterus enlarged and retroflexed and prolapsed, and ovary prolapsed. Uterus not adherent. Treated medicinally from March to July, 1893. Curetted after dilatation in July. Hæmorrhages then decreased considerably; generally 35 diap., at most 50. Interval 26-28 days; duration 3 days. In June, 1894, a cervical fibroid the size of a pigeon's egg was discovered. Hæmorrhage rather more. May, 1895: Periods every 28 days; duration 6 days. From 35 to 40 diapers required. Has anæmic turns every 3 months or so.	Nearly 2 years.	The cervical growth does not seem to increase materially, but it has unquestionably appeared within the past 2 years, and its future is as yet undetermined. The endometritis was of the climacteric type, and has not returned since the curettage.
X.	Dr. Wartenburgh.	1894	Mrs. F.	46	M. Ch. 13. Young'st 2½ years.	Periods irregular since birth of last child. She missed 3 months about 2 years ago, and had then a flooding. Was again regular till 3 months ago, when blood and matter were passed.	About 3 months before attendance Dr. Lewis discovered a growth of the uterus. Examination shows a very large subperitoneal fibroid, the top reaching half way between umbilicus and epigastrium. The uterus lies high, and no part of the tumour is in the pelvis.	3 months?	Meantime this tumour, although large, does not call for interference; but that it has recently greatly increased is evident.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD—(continued).

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
XI.	L. N.	1894	M. G.	42	S. Ch. o.	Eight years ago had floodings. Periods greatly increased of late. Now every 21 days. Duration 4 days, then come on again for a day or a day and a half.	Six years ago had rheumatic fever, when the tumour was discovered by Dr. Playfair. Growth has increased considerably of late. On examination, uterus nulliparous, and of normal size, retroflexed; behind uterus, and overlapping it into abdomen, is a softish tumour. A hard lump occupies Douglas's pouch; this cannot be raised out of pelvis. Diagnosis a fibroid with cystic degeneration of upper part, or possibly a complicating dermoid.	7 years.	Patient declined operation. In December, 1895, the general condition much deteriorated. Tumour increased. Menses irregular and rather profuse.
XII.	L. N.	1890 (Fibroid polyp.)	E. D.	46	M. Ch. 8.	Has been very irregular for several months. Now losing considerably.	After last confinement, 4 years ago, "something came down in passage". On examination, uterus found procident, eroded and ulcerated, cystocele. Fibroid polyp protruding from cervix. This was removed, and pure carbolic acid applied to endometrium. In end of 1890 examined. Uterus partially prolapsed; cystocele.	Over a year.	Examined at end of 1891. Uterus in good position; normal size. No period for several months. Cystocele of first degree.
XIII.	Dr. Mackenzie.	1892 (Fibroid polyp.)	Mrs. C.	39	M. Ch. 2 and 1 mis.	Very irregular and painful for past nine months; previously regular. Youngest child 10. Miscarriage 7 years ago.	Uterus displaced downwards and backwards; feel generally hyperplastic. Sounds enters fully 4 inches. An intrauterine polyp can be diagnosed.	?	Patient was averse to operation. She had remained in bed and taken ergot and strychnia, which partially restrained hæmorrhage. As she left London shortly after visiting me I could not obtain subsequent history.

DR. LEITH NAPIER'S CASES OF FIBROID TUMOURS OBSERVED ABOUT CLIMACTERIC PERIOD - (continued).

No. of Case.	Medical Attendant.	Date.	Initials of Patient.	Age.	Civil State and Family.	Menses.	Condition of Uterus and Complications.	Time Tumour under Observation.	Final Condition Noted.
XIV.	L. N.	1893	Mrs. B.	60	M. Ch. 3.	Menses ceased between 5 and 6 years ago. Was never aware of any pelvic or abdominal growth.	Uterus senile, an erosion on posterior lip of os. A small "lump," the size of a kidney potato, can be felt in abdomen, and to the side of uterus is a hard rounded body attached to supravaginal cervix. In July, 1893, had flatulence and diarrhoea. On 17th July the "lump" in abdomen could not be distinctly felt, but the ascending and transverse colons were distended. In August, 1893, she had a slight vaginal blood loss for 2 or 3 days.	2½ years.	In 1895 her general health was good. The uterine tumour remained the same, causing no inconvenience.
XV.	L. N.	1890	Mrs. M.	64	Widow. Ch. 3.	Climacteric at 48. Considerable pain from 44 to 48. Profuse blood discharge 4 months ago. Purulent discharge 2 months ago.	Twenty years ago, a large uterine tumour had been discovered to left of uterus. Examination discovered large epitheliomatous cervical growth extensively involving vagina and parametrium, and evidently corpus uteri, and tumour now quite fixed. Rectum and bladder not seemingly involved.	20 years?	Palliative treatment. As patient wished to return home to Devonshire she was not seen again.

Fibroids may increase at any age. I have seen several showing very rapid development in earlier life than those just considered. For example, I may quote the following :—

Mrs. S., aged thirty (primipara), married at eighteen, child aged twelve years. Eight months before first note had profuse hæmorrhages, and shortly after patient observed "a lump" in abdomen. During 1893 the tumour continued to grow; the hæmorrhages were restrained with comparative ease. In June, 1894, the tumour had increased largely, the measurements being—

	In April, 1893. Inches.	In June, 1894. Inches.
Symphysis pubis to ensiform cartilage - - -	9½	15½
" " to top of tumour - - -	6½	9½
Rt. ant. superior spine to left ischial spine - -	8	12½

The patient was now markedly anæmic. Periods for past eighteen months every three weeks, loss free; dysmenorrhœa.

Physical examination showed the tumour to be centrally situated. Palpation gave a solid non-elastic feeling; the growth was now somewhat fixed, and the enlargement was mostly to the right side.

Per Vaginam.—The cervix almost fixed; the tumour encroaching on left fornix, anteriorly, and in pelvis; main mass of tumour to the right side in abdomen. Sound passes six inches.

Hysterectomy on 18th July, 1894. Non-febrile recovery. Fibromyoma with central cystic degeneration of tumour. April, 1895: Feels strong and well. Smooth, healthy cicatrix; no tendency to hernia. Has no inconvenience whatsoever at time of former periods.

If earlier operative treatment had been adopted in my cases Nos. IV., V., and VI., the results would probably have been more satisfactory.

It is a grave responsibility to assume that every case of fibroid will become ameliorated at the menopause.

Another point deserves notice, *viz.*, the contention that if cases are watched sufficiently long after the menopause, the fibroids will be found to decrease. It is perfectly correct to state that this happens in a certain proportion of cases, although it is very doubtful if absolute disappearance ever happens. I have personally had the supervision of several cases in which no diminution took place; but, as my notes are not sufficiently exact regarding the early history of several of these, I have not included them in the table. One lady, who was aged over seventy-six when I first saw her, about twelve years ago, on account of total retention of urine, was found to have an enormous fibroid which was mostly in

the abdomen, but partly dipped into the pelvis. She had had six children, and had never had any trouble with her confinements. The tumour was first observed two years before I saw her, by Professor Simpson, of Edinburgh. From time to time, with intervals of six or eight months, she had attacks of cystitis, but she lived till she was over eighty, when she suddenly died of heart failure.

Another old lady of over seventy was the subject of a huge fibroid. She had had three children. There was no history of climacteric troubles, and so far as I could ascertain the tumour was not discovered for many years after the menopause. She had formerly been a patient of Dr. Graham Weir's, of Edinburgh. From 1878 to 1885 I saw her very frequently; beyond the inconvenience consequent on the enormous growth which prevented her from doing more than walking from one room to another, the tumour did her no harm. She died very suddenly of cardiac syncope. I mention these two exceptional cases, as illustrative of the certain fact that large fibromyomata may exist many years after the climacterium; as showing the strong probability that they may develop after the menopause, and as indicative of the still more debatable contention that there are some post-climacteric fibroids of large size which do not seriously prejudice the life of the woman. For one case of this sort which escapes disaster there are probably fifty which fall victims to one or other immediate or remote complication.

It is of clinical importance to determine, so far as our present knowledge permits, the probabilities of increase or decrease of fibromyomata at or after the menopause. We have seen that in some instances there is the one, in others the exactly opposite change. It will aid us in forming a correct appreciation of the prognosis if we bear in mind certain general laws which, while applicable to fibroids at an earlier period of life, are specially pertinent to our present essay. We will, therefore, further consider the biology of these growths, but particularly with regard to the probability of their diminution or growth at and after the climacterium.

The position of the tumour or tumours in relation to the uterus is important. Fibroids are found to originate within the uterine muscle—intramural or interstitial; in the muscle tissue of the uterine mucous membrane—submucous; in the muscle tissue below the serous membrane—subperitoneal or subserous. In addition to these distinct tumour formations, there is a general fibrosis or increase of the uterine tissues which, histologically, is usually

found to affect the connective tissue mainly, but clinically presents all the features of a typical fibromyomatous growth.

So far as the position of the tumour affects its probabilities of growth or decrease, we find that the subperitoneal formations, especially those with longish pedicles, seldom continue to grow after the menopause. They are usually multinodular and may be pedunculated or sessile. Those growing on the anterior uterine wall may displace the bladder and cause uterine retroflexion. The submucous tumours not infrequently increase greatly in size and find their way into the uterus or vagina; the endometritis which is found with them is probably the cause of their augmented size. Usually, severe hæmorrhage is the first sign of their presence. Some may attain considerable size; with these the uterine cavity is generally enlarged, and hyperplasia of the uterine tissues takes place. Sessile submucous tumours give rise to greater severity of symptoms and are less easily treated than those with pedicles long enough to permit of their extrusion from the uterus. Intramural tumours are often accompanied by general fibroid enlargement of the uterus. The actual size of the growth or growths, for they are frequently multiple, bears no calculable ratio to the symptoms of pain, or even of hæmorrhage, which may be present. This variety is more likely to grow, for, in consequence of their position, their vascular supply is in many instances very considerable. A uterus may bear all three varieties of growths. It is not unusual to find the intramural and the subserous together, in which case the latter are generally small and multiple, and it is not improbable that in many instances they have been originally intramural.

The constituent elements of fibromyomata are muscle and connective tissue. If the former predominates, as it is more likely to do in intramural and submucous than in the pedunculated subserous tumours, the possibilities of relative increase or decrease are much greater.

Clinically, we may distinguish the hard, which pathologically are the white or fibrous or mainly connective tissue growths, and the soft, which correspond to the red or "muscular" and vascular growths. The hard variety is usually multinodular, encapsuled and concentric; it is specially found in subserous tumours. It also exists in the intramural, but in this situation there is far greater proneness to inflammation of the capsule and to degeneration of the growths themselves. So that, although an intramural tumour or tumours may be originally hard, it is not unlikely to soften and increase considerably in consequence of inflammation or degeneration. But unless the hard white tumours become subject to such

changes it is unusual to find them increasing in size after the climacteric. The soft red tumours, which have less marked encapsulation and are either intramural or submucous in origin, frequently grow after the menopause and are also specially liable to inflammatory and degenerative changes.

Both hard and soft growths may co-exist in one woman; the intramural growths may be red, soft and rapidly growing, and alongside of them or in the subserous layer may be found clusters of hard white fibroids.

General fibrosis of the uterus has also been found to increase after both the artificial and natural menopause.

Just as one finds that oöphorectomy very seldom effects a radical cure for the red soft fibroid, so also it is found that general fibrosis may increase, and hæmorrhage continue as severely after removal of the appendages as before. As this fact is hardly sufficiently realised, I may refer to some illustrative examples. Mr. Christopher Martin exhibited two specimens, one of which was a "fibrosed uterus," at the British Gynæcological Society on 13th June, 1895, which appeared to me to support this view. Mr. Martin's own explanation was that in neither case had the menstrual nerve been removed. The following is extracted from the official record (19):—

"TWO SPECIMENS OF UTERI REMOVED BY HYSTERECTOMY IN CASES OF PREVIOUS REMOVAL OF APPENDAGES. By CHRISTOPHER MARTIN, F.R.C.S., Birmingham.

"Case I.—This patient, when first operated on two years previously, was twenty-six years of age, and was suffering from double pyosalpinx and acute peritonitis. After the operation, at which the appendages of both sides were removed, the patient made a satisfactory recovery, but she began to menstruate irregularly and very profusely, each period lasting ten to fourteen days. Swabbing with iodised phenol, curetting, hydrastin, ergot, and other means were employed with no result. The dilatation and exploration of the uterus revealed nothing but a little thickening on one side.

"After some hesitation he took her into the hospital, and performed vaginal hysterectomy. The uterus was found to be normal, but on one side a piece of an ovary with small cysts was present. She made a good recovery, and had had no hæmorrhage since.

"Case II.—This patient two years ago had double ovariectomy performed for cystic tumours; at that time a good many adhesions had to be broken down. She was an unfavourable subject, as she suffered from tubercular joints and glands, and had to go about on

crutches. After the operation she menstruated regularly, each period lasting five days, and not very profuse; but she suffered intensely at these times. He dilated the cervix, and tried douches and intrauterine applications with no result. He therefore decided to remove the uterus, and because she was a virgin and the vagina was narrow, and because of the adhesions at the first operation, he decided to operate through the abdomen. He totally extirpated the uterus, bringing the ligatures down through the vagina. She made a good recovery. On examining the specimen it was found that the Fallopian tubes had not been entirely removed at the first operation, and were distended with fluid. There was a small myoma in the anterior wall, and the cavity was a little dilated.

"Now, in both these cases menstruation continued; in the first case this might be attributed to the presence of a piece of ovary; in the second, to the remains of the tubes, but he held that the two cases balanced each other, and showed that menstruation was due neither to the ovary nor to the tubes, but was to be explained by the fact that in each case the broad ligament was not entirely removed, and consequently the menstrual nerve was left.

"Hysterectomy under parallel circumstances had been done several times. The case of hæmorrhage was now cured. The second case was operated on only a month ago, and so it was as yet too soon to speak of results. So far at any rate she had suffered no pain.

"Dr. Leith Napier called attention to the thickness of the uterine wall in the second case, and asked if a microscopical examination had been made. The appearances were to him suggestive of fibrosis, which often caused a continuance of hæmorrhage even after the ovaries had been completely removed.

"Mr. Taylor (Birmingham) said that these cases were very good examples of a class of cases in which hysterectomy had a place. When the appendages had already been removed, and pain or hæmorrhage continued, hysterectomy was often the only cure. He congratulated Mr. Martin on the way he had dealt with these two cases.

"Mr. Martin, in replying, said no microscopic examination had been made of either specimen, but the second case was undoubtedly myoma. He quite agreed with Mr. Taylor that in cases of previous removal of the appendages this operation has a great future before it. He believed they were indebted to Mr. Lawson Tait for it."

Mr. Martin at my request kindly agreed to have a microscopic examination of the specimen made, which was done by Professor

Allen, of Birmingham, who reported that the specimen was, as I anticipated, one of marked general increase of the connective tissue.

Dr. Cullingworth, of St. Thomas's Hospital, has also favoured me with the particulars of the following example of non-capsulated fibrosis of the uterus:—

"E. H., married, aged fifty-five. Menstruation at fourteen, always painful and profuse. Married twenty-nine years, three children at term, one miscarriage. Last child born in 1879, since which date the uterus is believed to have been larger than normal. In 1888 she consulted a doctor on account of an abdominal swelling with increased menorrhagia and dysmenorrhœa. From that time she had been obliged to remain in bed, on account of the hæmorrhage and pain, during the whole nine days that the flow lasted. In 1891 she consulted Dr. Cullingworth. She being then fifty-one, he advised her to wait for the menopause. The symptoms, however, increased, and in January, 1894, there being no indication of the cessation except the missing of a single period, she was admitted into St. Thomas's Hospital. On examination the uterus was found generally thickened, the anterior wall was occupied by a firm tumour bulging into the uterine cavity. The sound passed four and a half to five inches. The cervix was dilated, the uterus curetted, and some soft villous growths removed. The patient left the hospital fairly well; three weeks later she had a severe hæmorrhage which continued through the whole of August. Severe hæmorrhage in October, and a still more serious one in January, 1895. She became profoundly anæmic. She was re-admitted to hospital, where Dr. Cullingworth removed the uterus and appendages on 14th March, 1895. The Fallopian tubes were normal. Both ovaries were small and atrophied. The uterus measured three inches vertically, three and a quarter inches antero-posteriorly, four and a half inches transversely, eleven and a half inches in circumference. On the right of the main growth was another, small hard, fibroid which was readily enucleated. The main mass consisted of a fibromyomatous growth infiltrating the whole uterus and extending from the mucous membrane to the peritoneal coat. There was no evidence of any normal uterine tissue, it was impossible to enucleate the mass from its peritoneal covering."

On examining the tumour after its removal there was no appearance of a capsule.

A careful microscopic examination of a portion of the growth, given me by Dr. Cullingworth, was made by Dr. Shaw Mackenzie, who reported to me as follows: "These sections show the typical

fibromyomatous tissue. Bundles of muscular tissue are seen, some cut transversely and others longitudinally. Bundles of connective tissue also are seen scattered between the muscular bundles. Vessels are few and small, and are seen imbedded in the connective tissue mass. In places the muscular fibrils appear to be undergoing fatty degeneration. In this specimen the muscular elements are in excess of the connective tissue. No glands are visible in the sections which have been taken from the deeper portions of the uterus."

It is interesting to add that of the only two of this woman's sisters who have hitherto reached the age of fifty, one continued to menstruate until fifty-three, and the other until fifty-eight (20).

The vascular nourishment of fibroids has much to do with their persistence after menstruation. Some tumours seem to have no direct arterial supply except to their capsule, and it is difficult to realise how some of the subserous tumours with long pedicles increase and flourish as they do. After the menopause their vascular supply becomes greatly limited, and the muscular elements disappear, in consequence partly of an involution, partly of a temporary increase of connective tissue growth; and shrinkage of the whole mass eventually occurs. The same observation applies to hard intramural fibromata; in these there is frequently a modified myxomatous change in the substance of the growths.

On the other hand, some intramural fibroids are extremely vascular; they are covered with enormous veins, and on cutting the capsule of such tumours the hæmorrhage is very profuse. In addition to the surface vessels the soft tumours may be supplied throughout their substance with huge dilated capillaries; this is the tumour Virchow named *myoma telangiectodes seu cavernosum*, or *telangiectatic myomata*.

The submucous growths are only markedly vascular when in close relation to the uterus; their pedicles rarely contain arteries.

The intramural growths therefore are those which, being in some instances very vascular, tend to increase after the climacteric. They have a more or less independent blood supply, which is not always affected by the diminished vascularity of the uterus.

Ligation of the uterine arteries, or of the uterine and ovarian arteries also, per vaginam has been practised. I have had some experience of the first-named procedure. In certain instances there can be no doubt of the benefit. In one case I assisted my friend Dr. Schacht, who was successful in deligating the uterine artery on one side, but was unable to make sure of the other. Twelve months

later the fibroid, which had been formerly increasing symmetrically, was found to have decreased greatly on the side on which the uterine artery was tied; on the other side the growth had become considerably larger.

Ligation of the ovarian arteries per abdomen, low down on the broad ligaments, as is now aimed at when performing oöphorectomy, probably influences the retardation of growth of medium-sized intramural tumours, more than removal of the appendages without special attention to this precaution.

The irritation occasioned by a persistent endometritis is in some cases explanatory not only of uterine hæmorrhages but of increased tumour growth. This is proved clinically by the arrest of the bleeding and the diminution of a tumour after curetting in some cases of interstitial fibromyomata.

Both hard white and soft red fibroids are subject to certain degenerations. Fatty degeneration of the muscular elements may occur, but this is seldom a marked change. It may be observed, to a limited extent, in interstitial growths, and probably may account for the comparatively rapid disappearance of some soft myomata after the menopause. Gusserow, a high authority on fibroids, however, only admits its microscopic appearance in two cases. In these the tumours did not lessen in size. Pedunculated myomata have in one or two cases contained a localised collection of fat.

Cystic or pseudo-cystic degeneration is frequently observed in large growths. Different processes explain these changes. The most usual is a form of mucoid or colloidal degeneration which is found between the muscular fibrils. This is frequently preceded or accompanied by a more or less general œdema of the tumour. Œdema may be in certain cases the first stage of gangrene due to septic or simply to retrograde changes.

An ingenious, if somewhat theoretical, explanation of diffuse œdema has been offered (21). "The veins are easily compressed, as between the tumour and the pelvis, or by angling in the growth of the tumour, or by partial rotation. There may thus be some obstruction to venous return. The pampiniform plexus of the ovarian veins, much enlarged in pregnancy, is similarly increased in this (fibroid) condition." In consequence of the above-mentioned influences these veins become varicose, cause a distal effusion of serum, and thus an œdematous state, which is likely to be increased by similar compression of the lymphatics.

A tumour that has been very freely nourished, and has grown vigorously, is peculiarly apt to have its vessels obstructed from

congestive conditions. Large single myomata of mature age are specially the subjects of œdematous infiltration and dilated cystic cavities.

There are, however, some cases of general fibrosis, probably those in which there is predominance of connective tissue elements, and which do not become "œdematous" fibroids, which involute, in the same manner as the hard white tumours usually do, after the menopause.

Œdema is distinguished from the mucoid degeneration by the absence of mucin, and of proliferating nuclei and round cells, in the interstitial tissue. Both these conditions are anatomically different from the cysts formed by the dilatation of lymphatic spaces.

The great distinction between pseudo- and true fibrocystic formations is that in the former there are no distinct walls to the cysts, which simply form lacunæ or spaces in the midst of the interstitial tissue.

The formation of true fibrocysts has been attributed to the distension of previously existing cavities, *viz.*, the intermuscular lymph spaces (22).

A mucoid degeneration of a fibromyoma may so thoroughly invade and destroy the substance of a tumour that the whole tissues become liquefied within the capsule. This is not anatomically a fibrocystic tumour, but clinically there is not always need for subtle pathological distinctions.

The terms "molluscum fibrosum" and "molluscum uteri" are sometimes erroneously applied to degenerated fibromata. Molluscum fibrosum is a skin disease characterised by the formation of soft fibrocellular tumours. What is described as "molluscum fibrosum" of the uterus is actually œdematous infiltration of a fibromyoma; the term "molluscum uteri" was applied by the late Matthews Duncan to the fleshy submucous intra-uterine fibroids. Both terms are misnomers and should be abolished.

All forms of cystic degeneration occurring during or after the menopause occasion, at least temporary, increase of a fibroid. Most continue to increase, and demand interference.

Septic infection, which gives rise to œdema and infiltration of leucocytes and inflammatory cells, not infrequently ends in gangrene of the whole growth. Exceptionally there may be a free discharge of purulent fluid into the uterus and excretion through the vagina.

Other cases are marked by rapid enlargement and general signs of septic peritonitis. Some cases of this nature have been found to present features characteristic of sarcomatous change.

Subperitoneal subserous tumours and submucous polypi occa-

sionally become calcified. The calcareous material consists of salts of phosphate and carbonate of lime, which may be found either as an incomplete infiltration of the interstitial tissue, or as stone-like lumps, sometimes situated within the uterine cavity. These changes are far from common, and are more frequently observed in the post-mortem room than on the operating table (23).

Malignant transmutation also causes increased growth.

The carcinomatous degeneration of fibroids has been much questioned, but the observations made by Wahrendorff are according to Pozzi (24) conclusive. Alban Doran (25) has shown that sarcomatous degeneration of the meshwork of a fibroid sometimes takes place. The interstitial tissue becomes infiltrated with round-celled sarcoma, which invades and destroys the muscular fibrils. It is often difficult for the pathologist to differentiate between the earlier appearance of spindle-celled sarcomata, and the unstriped muscular fibres found in fibroids; the former are occasionally found transversely striated. A good illustration (after Pernice) is given by Bland Sutton in his work on tumours (26). These myosarcomata may become cystic either by softening and effusion of blood within their substance, or from distension of lymphatic spaces. They then grow rapidly.

Summary of Biological Courses and results of menopastic fibroids :—

1. A fibromyoma may remain stationary during the menopause; if submucous or intramural, and of about the size of a small apple or larger, it will almost certainly cause menorrhagia and metrorrhagia, even although no such symptoms have been previously noted. The menopause is generally late and protracted.

2. The tumour may decrease in size after a period, and increase before its advent from vascular engorgements, etc.

3. An interstitial or subperitoneal fibroma may generally and steadily decrease from involution, cirrhosis, etc., during the latter part of the menopause; if the growth has not diminished during the menopause, it may still do so some two or three years after cessation of menstruation, and give no further trouble. The shrinkage of such tumours probably involves various complex processes. Of these cirrhosis, limited mucoid degenerations, the non-production of new cells (due to the stimulus of the menstrual function having ceased), and general uterine atrophy are most important.

4. Limited mucoid degeneration is common, so is limited oedematous infiltration. Fatty degeneration is very rare; calcareous change is more common, but is also rare.

5. The involution of a large tumour, which before the climacteric was mainly in the abdomen, and in consequence of its decreased size has become intrapelvic, may cause it to become impacted, or occasion cystitis, pyelonephritis, hydronephrosis, peritonitis, etc.

6. Increase of a fibromyoma during or after the menopause is not very rare; it may be due to inflammatory, septic, degenerative, or malignant changes. Pseudo-cystic degenerations are specially apt to cause enlargement of these tumours at the menopause.

7. Post-climacteric enlargement of old fibroids, the menopause having been completed two, three, or more years, should awaken suspicion of malignant, especially of sarcomatous, transformation. Cystic changes will, however, occasion at least equally rapid increase in the tumour.

8. In certain instances a premature menopause is associated with the presence of fibroids; in these cases glandular endometritis with offensive leucorrhœa is usual.

9. Death may result from hæmorrhage; asthenia; cardiac degeneration (brown degeneration and fatty transformation); kidney diseases, such as pyelitis, pyelonephritis, hydronephrosis; hepatic fatty changes; necrosis of the growth, causing septic peritonitis, etc.

Treatment of Fibromyomata at or after the menopause must be guided by the urgency of the symptoms.

The leading indications are to check hæmorrhage, relieve pain, obviate impaction, and maintain the general strength. Rest in the recumbent position during the flow, reasonable exercise at other times, restriction of stimulants and dark meats are generally advised.

Medical Treatment.—Ergot of rye, until recent years, was the only drug regarded as specially serviceable for uterine hæmorrhage. It may be given by the mouth or hypodermically. It will be better, if hæmorrhage is free, to continue its exhibition in the intervals between the periods over several months. During the periods it should be given freely. Many approve of ergot; among its advocates Hildebrandt, Schröder, Leopold, Byford, and Knowsley Thornton may be mentioned. Others are as strongly of opinion that no good results follow its use. The good effect that is sometimes obtained from a long course of ergot in fibroids is somewhat interfered with by the frequent experience that the menopause may be retarded. Strychnia should be combined with the ergot. My own experience is in favour of alternating ergot with *hydrastis canadensis*, or of giving the two drugs in combination.

For continuous use between the hæmorrhages I am in the habit of prescribing tabloids of hydrastin, ergotin and cannabis indica. During the profuse flow increased doses may be given, or a few hypodermic injections of either ergotin or hydrastin administered. Extract of cotton-root bark in drachm doses sometimes acts beneficially when ergot, hydrastis, and hamamelis fail to arrest the bleeding. Clinically, we may assume that ergot and salipyrin exert their influence on the muscular elements, so that if the tumour is mainly connective tissue, or if it has become the subject of mucoid changes, these drugs will not be of service. Hydrastis, hamamelis, and cotton-root bark act mainly on the endometrium, and especially through the vessels.

Certain tumours present such apparent risks when one has to consider operative interference that it is permissible, even on slight grounds, to refer to a method of medicinal treatment which, although mostly theoretical as yet, has already been practised.

Thyroid extract appears to have a resolvent action on the soft adenoid tumour (the soft red fibroid), which is the most usual variety found increasing at and after the menopause. Dr. Jouin (27) has recorded the notes of six cases treated by this method. The last two cases cannot be considered, as the treatment had only been used for six days. Of the other four, three received great benefit; the fourth was not improved. Case I. was aged forty-six, had been under observation over ten years. A uterine fibroid commenced three years before record. During the past eighteen months the size of the tumour became so largely increased that abdominal hysterectomy was proposed in June, 1894. The size of the tumour was then equal to that of a gravid uterus of the sixth or seventh month. For family reasons the operation, which was agreed to, was postponed. Patient was sent to Biarritz. In the following September the tumour was slightly reduced in size, but still reached well above the umbilicus. The patient was very obese, and to reduce her fat was ordered to take thyroid extract. The drug was taken for about twenty days in each month, and the lady felt so much better that the operation was still further postponed. In April, 1895, she was examined. The tumour now scarcely extended above the pubic brim. The periods, formerly very profuse, now lasted four days, and were moderate in quantity. The symptoms of weight, pain, and difficulty in walking had all disappeared. No operation was now considered necessary.

Case II. was aged forty. She had a fibroma, the size of a foetal head at full term. Distressing menorrhagia, neurasthenia, and the general symptoms of pain and pressure were experienced. She

distinctly improved ; the menses greatly lessened, from fifteen days' duration to normal, and the size of the tumour decreased.

Case III., patient aged forty-six. Fibroma the size of a fist. It appeared to be pedunculated but close to uterus. Patient had had several attacks of peritonitis. Menorrhagia troublesome. She also distinctly improved in four months. The menses, formerly lasting ten days, were normal.

Case IV. (age not stated) had a fibroma the size of a foetal head. Slight menorrhagia and "down-bearing" pain. No benefit.

Jouin accidentally discovered the beneficial action of the drug, and has not as yet had sufficient opportunity of ascertaining its exact clinical value. Judging, however, from the effects in Basedow's disease, and remembering the relations which exist between the thyroid gland and the uterus, it is not unlikely that thyroid extract may prove equally useful in treating soft glandular fibroids. One thing is evident, the reasonable administration of thyroid can do no harm. This is more than one dare say of electrical treatment, or of surgical interference. If the thyroid were pushed too far, symptoms of insomnia, anorexia, intense thirst, general lassitude, weakness necessitating remaining in bed, accelerated pulse, and increase of temperature may result (28). I can from personal experience vouch for the appearance of many of these symptoms as a result, for after a too free course of thyroid I myself suffered from most of them. One should therefore begin with about five grains thrice daily, increasing gradually to ten, fifteen or more, and the treatment should be interrupted if symptoms of thyroid intoxication appear. In hard fibroids, even when softening, I would not expect benefit in the same degree.

For maintaining the general strength iron is sometimes recommended. It is sometimes apt to cause increased hæmorrhages. For this reason it must be used cautiously. Arsenic, in my opinion, will give much better results. If the anæmia is not pronounced small doses of mercury are of service.

The dysmenorrhœa attending fibroids may be relieved by a few doses of antipyrine and bromide of potassium (gr. x. and gr. xv.) ; if this fails, the cervix should be dilated.

The usual drugs given as hypnotics, such as bromide of sodium, morphia, etc., are sometimes required for relief of the occasional acute pain.

Minor Surgical Treatment.—Cervical dilatation and intrauterine treatment may be used for relief of pain and hæmorrhage.

Local applications to the uterus after dilatation up to Nos. 10 or 12 cervical dilator are serviceable. If the cervix is involved in

the growth, an anæsthetic should be given, and the dilatation carried to No. 16. Uterine drainage, as described in the chapter on hæmorrhage, is also beneficial in relieving the endometritis.

Curetting the uterus (29) will prove still more satisfactory.

I have already expressed my lack of faith in electrolysis as a curative agency in fibroids ; it may properly be regarded as a topical hæmostatic.

Impaction of a tumour in the pelvis may occur, or severe pressure symptoms from pressure on the bladder or rectum without incarceration may demand relief. We may be able to displace the tumour upwards out of the pelvis. The patient should be put in the genupectoral position, or in Sims' position, and pressure on the tumour exerted by the fingers in the vagina and rectum. If there is much difficulty or tenderness, an anæsthetic should be given ; in this case the patient lies on her back ; the lithotomy position, with the pelvis well raised, facilitates the reposition.

In some instances I have afforded patients much relief from compression symptoms by the introduction of a vaginal ring pessary. When celluloid or block tin rings cause pain, a glycerine filled india-rubber ring may be found better. In illustration, I would refer to the following : " At present I have two cases of considerable interest in one family. The mother, a lady of seventy-six, has a large single subperitoneal fibroid, which was only noticed two years ago. She suffered from irregular attacks of cystocele and cystitis with retention. Different forms of pessaries have been tried, but from the existing condition it has been found that any pessary large enough to give support interferes sooner or later with urination, and is more influential for evil than good. Rest in bed for a few days from time to time relieves the curious congestive attacks of the tumour, and for many months she has been free from cystitis or other troublesome symptoms and enjoys good vigorous health. This lady's daughter is single, and now about the menopause. She has suffered from large multiple fibroids for nine years. Formerly she lost enormous quantities of blood at the periods. In her case the uterus was forced low down in the pelvis and much retroverted. An elastic ring pessary, introduced through a circular unruptured hymen, has given very great comfort, and the hæmorrhages and feeling of weight are vastly improved. This lady has been several times examined by eminent gynæcologists who all declined operation. The relief of downward pressure experienced since wearing the pessary is, in her own words, " the greatest blessing I ever received from the profession " (30).

Major Surgical Treatment.—It must be premised that the sur-

gical treatment of fibroids generally is not here dealt with ; it is the surgical treatment of menopastic and of certain post-climacteric tumours which at present concerns us.

As has been already said, the subperitoneal tumours rarely call for very active treatment. Their biology is such that unless they have very short pedicles, or have from special causes formed many vascular adhesions, one may usually anticipate that, unless impaction and pressure symptoms call urgently for relief, their course will be one of quiescence and gradual retrogression.

Submucous tumours may, although of very small size, occasion symptoms of severe hæmorrhage. Measures already referred to, *viz.*, dilatation and curettage, may suffice for the small polypoidal growths ; those of larger size require removal by surgical intervention. The pedicle is to be divided by scissors ; sometimes torsion will suffice for the separation of polyps with long thin pedicles. Slitting the cervix bilaterally will prove very helpful in expediting the delivery of a large intra-uterine polyp. I believe, whenever practicable, the tumour should be removed at one sitting. A sloughing fibroid, partly in the vagina, partly occupying the uterus, often gives rise to sepsis ; the sooner it is removed the better the prognosis. I do not regard *morcellement*, or piecemeal removal of a fibroid, as at all suitable for menopastic fibroids. The uterine wall may be so thin in several places, owing to localised atrophies, that the danger of entering the peritoneal cavity is considerable. Should this happen, it will frequently be advisable to remove the whole uterus ; when possible, the vaginal operation should be employed.

Soft or softened interstitial fibroids are those of most surgical importance. It may be difficult at first to determine whether the softening is not significant of a partial spontaneous disappearance. But when softening is accompanied by a distinct increase in size, my experience, acquired from an observation and study of a good many cases, is clearly in favour of early interference. Oöphorectomy in the vast majority of cases has little, if any, effect on soft, œdematous or fibrocystic tumours. Tying of the ovarian arteries and removing the appendages may prove of no value in arresting the hæmorrhage or retarding the growth of such tumours. A summary of the results of the removal of the ovaries for myoma by Hermes (31) gives the views of leading German gynæcologists, which are practically in agreement with those now mentioned. Nor can oöphorectomy be relied on for general fibrosis of the uterus.

If the tumour is a slowly growing one, ligation of the uterine arteries may be practised ; possibly, despite the theoretical objection

that the tumour and uterus also may become gangrenous, the ovarian arteries also should be tied. Generally, it will be necessary in presence of a large fibromyoma to open the abdomen to tie the ovarian arteries; if this is done, the appendages may be removed at the same time.

The cutting off of the blood supply to the uterus and tumour will probably reduce the growth of a fibroid as effectually as oöphorectomy. Sufficient cases have not, as yet, been treated in this way to warrant our forming reliable deductions. From the observations of Gottschalk, Küstner, Rydygier, Franklin, Martin, Byrom-Robinson, and Japp Sinclair, it is probable that fibroids in earlier life, which do not admit of a more radical method of treatment, may be beneficially influenced by this procedure. I have previously mentioned a corroborative personal observation. I am not, however, sanguine that oöphorectomy, or ligation of vessels, or cutting across the uterine plexus of nerves will be of much use in menopastic fibroids. Lawson Tait, the greatest advocate of oöphorectomy for fibroids in England, is of opinion that soft fibroids should be treated by removal of the growth and uterus. August Martin holds that a number of cases continue to bleed after oöphorectomy, and that myomata often begin to grow more rapidly after the physiological menopause. Hofmeier considers oöphorectomy contraindicated in very large myomata, especially if fibrocystic and when pressure symptoms are marked.

As a rule, therefore, we may assume that when any major surgical operation is imperative hysterectomy will be required. Myomotomy for interstitial softened fibroids is not applicable to menopastic cases.

Vaginal hysterectomy may be employed for tumours of relatively small size—say, up to the size of a large fist, or, in special circumstances, a little larger. Symptoms warranting operation are unrestrainable hæmorrhage or serious compression of the ureters, bladder, rectum, or pelvic nerves; and especially if the tumour is also manifestly increasing in size.

Abdominal hysterectomy may be practised either with the extraperitoneal method of treating the pedicle, or total extirpation (the combined vagino-abdominal method) may be used.

The advantages of the extraperitoneal operation are the comparative facility and rapidity with which it can usually be done. The arrest of hæmorrhage is certain. The amount of shock is probably less, as shorter time is occupied. There is until the separation of the pedicle a certainty of drainage.

On the other hand, total extirpation is ideally preferable. There

is no pedicle left in the middle of the abdominal wound, which before it separates must mortify. There is no risk of subsequent ventral hernia. If sepsis occurs, it is easy to open up the wound through the vaginal route and thoroughly irrigate the abdomen. If there are fibroids in the cervix, these are wholly removed, so that there is no possible risk of their future growth or degeneration. In event of any possibility of malignant transformation of the tumour or uterus having taken place, all removable parts are taken away. We must, however, repeat that the immediate risks to the patient from shock and intestinal paralysis are greater ; and unless the surgeon is very expert, the operation will involve more difficulty than the extraperitoneal method.

Mr. Bowreman Jessett has kindly furnished me with the following brief account of his method of panhysterectomy :—

“ A free incision in the middle line below the umbilicus is made

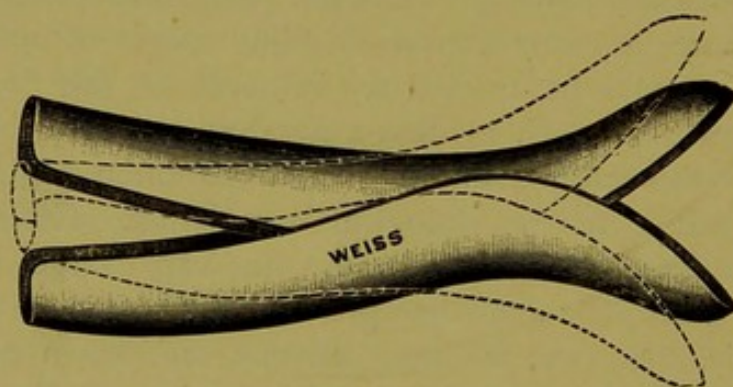


FIG. 27.

long enough to enable the operator to deliver the tumour at once. The broad ligaments on each side are ligatured externally to the ovaries and tubes, long clamp forceps are applied between these and the uterus, and the ligaments divided. Anterior and posterior flaps of peritoneum and subperitoneal tissue are made and reflected from the tumour, the anterior flap being made about an inch above the bladder and extending from the end division of the broad ligament on one side to a like point on the other. The posterior flap is made from the same point behind. Thus far the steps of the operation are identical with those adopted by the subperitoneal operation.

“ An assistant now passes the long bivalved speculum (*v.* fig. 27) into the vagina and pushes it well home ; by pressing the proximal ends together, the blades in the roof of the vagina separate, and these parts are put on the stretch ; it is then an easy matter to cut down on to the ends of the blades in front and behind the cervix

and os uteri. A finger is introduced into the openings thus made into the vagina and the tissues separated laterally; by this means the ureters are pushed out of the way and the uterine arteries can readily be felt pulsating, and are ligatured by passing a needle with double thread through the tissues on each side and tying one ligature above and the other around the vaginal portion. The parts between the ligatures and the cervix are now divided, and the uterus with its tumours lifted out.

"The peritoneal flaps next claim attention. All bleeding points are caught and tied; these usually consist of a few small vesical branches on the anterior flap and a vaginal branch of the uterine artery behind; long sutures are now passed, some four to six in number, by passing the needle first through the anterior flap from raw surface to peritoneal surface and then over and through the posterior flap from peritoneal surface to raw surface. Each suture is tied at the end so as to form a long loop, these are caught in an instrument (fig. 28) which I have had made with a snap catch at the end, and long enough to pass well through the speculum; when the



FIG. 28.

loops are all caught they are drawn down through the speculum, and the peritoneal flaps are thus everted into the vagina, which is then plugged with iodoform gauze, and if there has been much oozing a glass drainage tube may be passed between the peritoneal flaps through the vagina. Finally, the abdominal wound is closed in the usual way.

"By adopting this method a large abdominal hysterectomy is practically converted into a vaginal hysterectomy.

"The ligatures around the uterine arteries are left long and conveyed through the vagina, the other ligatures on the broad ligaments are cut short."

I am convinced that the results of hysterectomy would be immeasurably better than they are if we would realise the great importance of operating before the patient's health has become undermined and repeated attacks of peritonitis have firmly fixed the tumour.

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CHAPTER XI.

MALIGNANT DISEASE AT AND AFTER THE MENOPAUSE.

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(For other references see end of chapter.)

WHILE there are many debatable questions regarding the etiology and pathology of malignant affections, there is no difference of opinion that there is a special proclivity to malignant disease during the fifth decennial period of life. All competent observers agree that cancer in women is much commoner from forty to fifty than at any other age. Next in number of cases is the period from fifty to sixty. Although it has been advanced that the relative proneness to cancer increases with each successive decade after twenty up to seventy-five, this is shown by other considerations to be erroneous. It is much more usual to find cancer in women aged from thirty to forty than in those over sixty years of age. In Bowreman Jessett's (1) table of 1460 cases of uterine cancer, which

includes 860 cases recorded by himself and 600 recorded by Clement Godson, 456 occurred between forty and fifty ; 389 between fifty and sixty ; 285 were over sixty ; 269 were aged from thirty to forty, and 61 were from twenty to thirty.

Jessett's cases, from the records of the Cancer Hospital, and Godson's, from those of St. Bartholomew's Hospital, are in practical agreement, except that the proportion of Godson's cases, aged from forty to fifty, was much higher, and the proportion at later ages much lower, than Jessett's. Godson had, of 600 cases, 233 from forty to fifty ; 165 from thirty to forty, and only 36 aged over sixty years.

This is in accord with the well-known figures of Gusserow (2), who has tabulated 3385 cases compiled from his own records and those of Säxinger, Lebert, Scanzoni, Bayle, Lever, Chiari, Tanner, Meyer, Beigel, Winckel, Schröder, Schatz, and other clinicians. Of these 3385 cases—

1169	were aged from 40 to 50.
856	„ 50 to 60.
770	„ 30 to 40.
533	„ above 60.

A more recent return furnished by Mangiagalli (3) refers to 400 cases observed by himself. Of these—

157	were aged from 40 to 50.
97	„ 50 to 60.
86	„ 30 to 40.
45	„ above 60.

The mean age of uterine cancer is about forty-five years.

The same period of life shows the highest proclivity to mammary cancer. Roger Williams (4) has calculated the numbers in 500 cases. He finds the mean age to be forty-eight for breast cancer in women. Of 500 cases—

36 per cent.	were aged from 40 to 50.
25 „	„ 50 to 60.
14.4 „	„ above 60.

It is important to notice, therefore, that malignant disease is not markedly, or even properly, considered a senile affection. It seldom begins in extreme old age. In Sir George Humphry's paper on "The Maladies of Old People" (5), which is based on accounts of 824 persons, it is stated "the severe forms (of cancer) are rare". Two hundred and two individuals (of whom 110 were females) were aged over ninety ; of these none had malignant disease. Of the others, five women between eighty and ninety had cancer of the breast, one had epithelioma, and one had rodent ulcer.

Other statistics might be referred to in support of this fact ; but, without dwelling longer on the point, it may be given as an undoubtedly correct statement that malignant disease is in the great majority of instances a disease of that period of life which is characterised by instability of tissues and low powers of resistance against morbid influences. Nervous, vascular, and especially glandular structures are all markedly deficient in vitality at the climacteric, and hence the fact that malignant disease is then most common.

It is a well accredited fact that the proclivity to cancer is far greater in females than in males.

Sir J. Y. Simpson's returns, based on the report of the Registrar-General for the years 1847-61, give 91,058 deaths from cancer ; of these over 64,000 were females, under 27,000 males. The statistics of Walshe, from the Registrar-General's returns of 1200 cancer deaths, gave 879 females, 321 males. Ogle's report on the Registrar-General's returns for 1884 gives 10,398 males and 15,117 females dying from cancer.

This brings us to the point that cancerous disease is steadily increasing in England. "In 1840 there were 2786 deaths from cancer, being 1 in 5646 of the total population, or 1 in 129 of the total mortality ; in 1890 the deaths from it numbered 19,433, being 1 in 1480 of the total population, or 1 in 28 of the total mortality" (6). There is an apparent fallacy here, as the last figure was estimated on the census for 1891 ; but the figures for that year (1891) show 20,117 cancer deaths, being 1 in 1445 of the total population, or 1 in 29 of the total mortality.

In Scotland the increase of cancer deaths in twenty years, *viz.*, 1861-5, 1881-5, was 136 per million living. In Ireland there was practically no increase from 1870-80 (7).

With this fearful general increase there are some comforting reflections, *viz.*, that the increase does not affect women in anything like the same ratio as men—for example, the female cancer death rate per million living in 1851 to 1860 was 434, the male death rate for the same period was only 195 ; the ratio therefore was 1 to 2.2. In 1890 the female cancer death rate had increased to 830 per million, and the male to 512 per million, a ratio of 1 to 1.6. In other words, the percentage increase for women was 91, and for men no less than 167 (8). Further, the commoner sites of the disease, *viz.*, the uterus and female breast, show the least increase ; the greatest increase has been shown in the intestines, liver, rectum, etc. (9).

There are certain other general considerations which cannot be ignored. Race has been declared to predispose to malignant

disease. Billings, Barker, and Chisolm hold that cancer is nearly twice as common among female whites as among negroes; the following proportions have been given, 35.4 per 100,000 for the former and 19.3 per 100,000 for the latter. It is, however, somewhat significant that more recent statistics, giving the cancer death rate of the city of Charleston, South Carolina, for fourteen years (10), show that there is hardly any difference in the mortality rate of the two races. Here the negroes live under practically identical conditions of existence with the whites, and the inference naturally is that the former comparative immunity they enjoyed should be attributed more to their conditions of existence rather than racial exemption. But that there are many unexplained factors is evident when the topographical distribution is studied. R. Williams, in a most valuable chapter, has collected many facts and opinions which deserve careful consideration. In Australia cancer is common, especially in Tasmania, but less so than in England. In Africa it is rare, especially in Egypt, Tunis, Algiers, etc. At the Cape of Good Hope cancer is common among the whites, but very rare among the natives. A remarkable sex distinction has been noted in New Zealand. Of 1772 deaths from cancer, 893 were males, only 879 females; of 233 patients under treatment in Dunedin Hospital for cancer during the same period, 140 were males, only 93 females. This is a curious contrast to the proportion in England, where of 7297 cases of primary cancer 2669 were males and 4628 females. In China cancer is very prevalent; in India, Syria, Persia, and Arabia it is rare. But precise information is still lacking in corroboration of some of these assertions. The topographical variations in England are exceedingly difficult to explain. Dr. Haviland (11) has sought to determine the topographical variations of cancer by the geological configuration of the different districts, and the presumed hygienic influence exercised by this. His general observation is, that low-lying and marshy soils afford the highest, and high-placed dry soils the lowest ratio of cases. There seem, however, to be many exceptions to this rule.

Among the alleged causes of cancer, nearly every text-book supports the doctrine that poverty and privations are predisposing causes. Class differences are said to exist, and it has been generally accepted that women in the poorer ranks of life are more liable than those who are in better circumstances. Now, while it is true that poverty and the struggle for existence, inattention to personal cleanliness, and possibly indulgence in stimulants, with the consequent eventual mental depression, are likely to favour deficient vitality, yet the general increase of cancer seems to affect the races,

nations and districts which are most removed from actual want. Women living in certain agricultural districts furnish, proportionately, a higher ratio than most town dwellers.

Civilisation, despite its many hygienic advantages, appears to be a predisposing agency. Uncivilised races, especially those existing in an almost savage condition, are vastly less liable than nations and citizens possessing the greatest general comfort. Even the greater modern care bestowed on parturient women has in no way borne such good results as one would have hoped for. Frequent childbirth—especially parturition attended with injury to the cervix—still remains an important factor in determining malignant disease. If a recent author is to be followed, "other things being equal, there are no more potent factors in the causation of cancer than high feeding and easy living". This suggestion probably partly explains the general increase of cancer and more particularly the special increase of gastro-intestinal cancer among men which we have already referred to. But that it is generally correct is more than doubtful. Wholly opposite theories with reference to food as a factor of cancer have been advanced; at best they are purely speculative. Some writers hold that flesh diet is a provocative to malignant changes, and that vegetarians are seldom, if ever, affected. On the other hand, it has been asserted, with even less show of probability, that certain vegetables and fruits, *e.g.*, tomatoes, are more likely to increase the cancerous proclivity. This rests on no scientific evidence.

Heredity is much less important than was formerly believed. According to Gusserow, heredity was only proved in about 7·6 per cent. of 1028 cases. Schröder's figures are 78 cases, out of 948, giving a percentage of 7·1. As has been remarked, however, many such statistics are derived from reports of hospital patients, who know little about the former history of their families beyond their own parents. From other observations it appears that the predisposition to malignant disease may pass over one generation and reappear in the next (atavism); or it may be noticed in collateral branches of a family. Inherited cancer seems to affect females more frequently than males, even although the taint has been derived from the paternal side.

Various special diatheses have been regarded as associated with proclivity to malignant disease. Among these gout and rheumatism, tuberculosis and syphilis are most dwelt on. It is very questionable if all that has been advanced can be accepted seriously. All constitutional hereditary diseases may be regarded as due in part to deficient metabolism and lowered vitality; and

the alleged special proclivity of certain descendants of tubercular ancestors to become subjects of cancer may be best explained in this way.

Local predisposing causes of uterine cancer are principally laceration of the cervix, and the consequent cervical metritis. But it is absolutely clear that these conditions, without a previous special tendency, cannot of themselves be held to cause malignant disease. Malignant changes may also take place in the corpus uteri from structural vitiation in the endometrium, in interstitial fibroids, and doubtfully from decidual diseases (12).

Traumatic injuries occasionally seem to originate mammary cancer. This is, however, more common in younger women, who were presumably predisposed.

For practical purposes we may state that malignant disease at or about the climacteric includes uterine and mammary cancers in such overwhelming numbers that no other situations require special consideration.

Of 4628 cases (13) in females, the percentages were : Breast cancer, 40·3 ; uterine cancer, 34 ; external genitals, 3·4 ; rectum, 4·3 ; skin, 4·1 ; stomach, 2·8 ; liver, 2·5 ; tongue and mouth, 2·18 ; intestines, 1·06 ; all other localities, 5·36 ; so that in this large number 74·3 per cent. of these cases were either mammary or uterine in situation.

Whether the former belief held, that the uterus was most commonly attacked and the breast next to the uterus, has been upset by these figures, or whether we should ascribe Williams's data partly to his individual opportunities and specialised interests or not, is hardly of material importance. We are all agreed that the uterus and breast together are by far the most common—indeed the only common—sites of malignant disease at the menopause.

Carcinoma of the Uterus is in 90-95 per cent. situated at the cervix. When the corpus is primarily the site of malignant disease it is found that sarcoma is more usual than carcinoma.

We may dismiss the term medullary (encephaloid) and scirrhus cancer in a line ; these terms were previously applied to structural modifications of one condition ; in the former the cellular elements predominated, in the latter the fibrous stroma.

Cervical Cancer.—Two types of malignant disease are met with in the cervix, *viz.*, glandular (columnar, acinous, malignant adenoma, or duct cancer) and epithelial cancer, or epithelioma.

Carcinoma of the first type (fig. 29) may begin in any part of the cervical canal, but is most frequently situated in its lower half. It is found histologically to be made up of irregular typical

glandular structures. It generally extends downwards and involves the vaginal part of the cervix; less commonly, it spreads upwards from the start and involves the body of the uterus; in its ultimate stage it generally attacks the whole uterus. It has a marked early tendency to spread into the lateral connective tissues, and to affect the lymph glands in the vicinity of the uterus. Rapid ulceration takes place, the vaginal walls become affected, and fistulæ into the bladder and rectum are common. As secondary results, cystitis, hydro-nephrosis (from compression on, or spread of the disease to, the ureters), hydrosalpinx, and pyosalpinx, from spreading to the Fallopian tubes; and deposits in the liver or lungs, or more rarely in the pelvic bones, have been observed.



FIG. 29.—Infiltrating Carcinoma of the Cervix (Winter).

Epithelioma or epithelial cancer of the cervix (fig. 30) begins in the vaginal portion of the cervix, where the epithelium is squamous and of a lower type structurally. It may begin at any point from the os uteri to the vault of the vagina. It does not commonly at first extend upwards to the supravaginal portion of the cervix, but

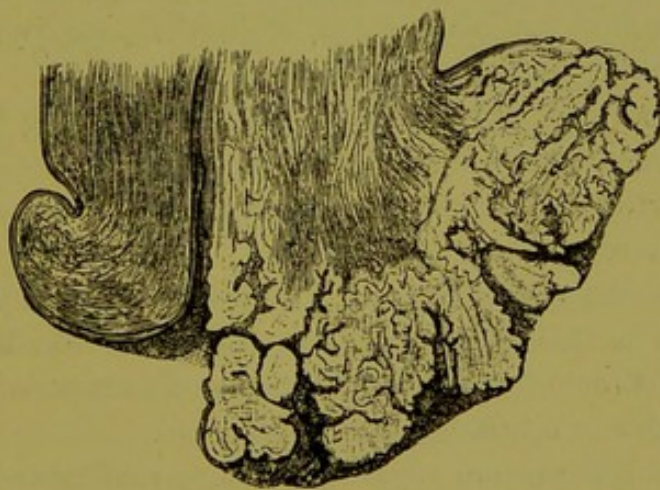


FIG. 30.—Cauliflower Excrescence of the Cervix (Winter).

soon invades the connective tissue of one or both broad ligaments and ere long involves the vaginal walls.

It is unfortunate that a common nomenclature has not yet been decided on by writers on cervical cancer; much confusion results in the minds of students as to what is exactly meant by some descriptions.

I would further point out that purely anatomical classifications

are generally of little value by the time a patient comes to consult her physician, and it is often impossible to determine where the disease originated. Ruge and Veit believe that carcinoma can develop (I.) on the outer portion of the portio-vaginalis; this is "cancroid," or superficial epithelioma, which affects the squamous epithelium. (According to the views of others, this begins in newly formed glands and then may dip deeply into the muscular tissue of the cervix without affecting its mucous membrane or more of its outer surface.) (II.) In the cervical mucous membrane; this is the glandular or columnar variety already described. (III.) In the parenchyma of the cervix; this would correspond to a stage of (I.), if the views quoted in parenthesis are tenable; but by others it is regarded as distinct in origin.

The first form seldom attacks the cervical mucous membrane, but specially affects the vaginal walls and the connective tissue surrounding the cervix. The second spreads upwards to the endometrium and speedily attacks the corpus uteri. The third may break out on the external surface of the portio, or ulcerate rapidly within the canal, and in either case speedily involves connective tissues, vaginal walls and contiguous pelvic organs.

The name "cauliflower excrescence" is applied to epithelioma which has formed a large papillary growth. "Rodent ulcer" of the cervix is a slowly growing flattened epithelioma. "Cancroid" is applied by some to an early stage of epithelioma, by others it is used as an alternative term.

The practical clinical importance of differentiating between carcinoma and epithelioma rests with those surgeons who hold that in many cases partial operations should be preferred to complete removal of the uterus.

Sarcoma of the cervix is rare. Cases have been recorded by Spiegelberg, Winckler, Pernice, Pfannenstiel, Mundé, Winckel and a few others. Winckel's case was of a mixed nature, and suggested a transition between epithelioma and sarcoma.

The clinical practitioner regards all these varieties of malignant growths as cancerous.

Prognosis.—All forms of cancer, if not operated on, end fatally. But the duration of life in certain varieties is much longer than in others. Cancer of the cervix beginning after the menopause frequently runs a much slower course than if the invasion has occurred earlier. I have had experience of some cases which lasted five years. Courty and Emmet mention having seen cases last from seven to eight years. The non-vegetating hard variety of the excavating form of cancer progresses most slowly. Vascular forms,

beginning at or about the menopause, may be said to have an average life duration of about eighteen months. I have known death to occur in six months after the first discovery of the condition in a lady aged thirty-eight. She was in good circumstances, the wife of a doctor, and had never had any previous symptoms of uterine disease. Another case died in five months after the very earliest discoverable sign was observed. The average duration of the disease, from its beginning to the patient's death, has been estimated by Gusserow at twelve months, by Lebert at sixteen months, by Courty at sixteen to seventeen months, by Matthews Duncan, 17·3 months, and by Simpson at from two to two and a half years.

Diagnosis.—It is an easy matter in the majority of cases to diagnose cervical cancer; unfortunately many patients do not come



FIG. 31.—Benign Adenoma of the Uterus (Beyea).

under observation until the disease is so far advanced that diagnosis is no longer doubtful, and treatment can only be palliative. The cases that present real difficulty are those of chronic cervical adenoma ("granular erosion") (figs. 31 and 32). This condition presents itself as a flat, glandular growth. It may be as large as a two-shilling piece and may wholly surround the os uteri, or may be limited to one lip or part of the lip of the os. One characteristic difference is that the erosion is indefinite; there is no sharp line of demarcation between the abnormal and the normal tissues. Extending beyond the deep scarlet patch of disease into the healthy surrounding tissue are isolated spots of new growth, and running through the main mass may be seen strands of healthy tissue. The erosion is more regularly raised and may have a yellowish-red aspect in some parts, in which glandular yellowish-white nodules

appear. There is no tendency to sloughing, but the inflamed glands in some instances penetrate deeply into the substance of the cervix. Small cysts containing a thickish albuminoid, white-of-egg-like fluid may be found in connection with the reddened patch. The cervix is hard, irregularly nodulated and sclerosed, suggesting malignancy. These glandular retention cysts (named *ovula Nabothii*) may become as large as a cherry. They arise from the mucous membrane lining the cervix, and may present themselves as intravaginal pedunculated tumours. Puncturing the cervix and emptying these cysts relieves the congestion and hardness and dissipates the fear of cancer. The erosion is generally soft and apt to bleed on examination. In post-climacteric erosions the surrounding tissues are so hardened from atrophic changes that a digital examination may often give the impression of hardening such as one meets with in carcinoma.



FIG. 32.—Malignant Adenoma of the Uterus (Beyea).

In cancer of the cervix, epithelioma, or malignant adenoma, one finds a more marked line of separation between the healthy and diseased tissues; the edge of the growth is sharper. Ulceration is earlier; the colour is darker, being purplish-red, but is not uniform. In various places patches of ecchymosis, or little spots of greyish sloughs, will be seen. Excavation of the surface is easily caused. Perhaps the most distinct early sign is the extreme friability of cancer, as compared with erosion. An examining finger-nail, or a blunt curette, will break off a piece of the cancerous tissue, but only cause bleeding from the benign erosion. Broca has pointed out that the exposed cancerous surface is covered with fine capillaries, which are easily ruptured. Both growths are flat at the beginning, but even then the edges of a malignant growth are

harder than those of a simple erosion, and the centre is relatively softened.

When cancer begins below the surface, the first sign is an inflamed purplish spot, the surface of which is quite smooth. If rubbed this spot will bleed. At a later stage there is a nodular feeling. Shortly these patches are the sites of increased hæmorrhage within the growth, and thereafter ulceration occurs.

In seeking to establish a differential diagnosis, considerable importance must always be given to the effect of treatment. Erosions tend to heal under astringent applications; cancers spread in spite of treatment.

Reddened spots, without erosion, may be noticed on the cervical mucous membrane, but the surface is smooth, and bleeding does not result from rubbing; these spots are probably the remains of former granular erosions which have spontaneously healed.

Spiegelberg pointed out the importance of the alteration of the superficial tissues of the cervix, due to cancer growing beneath the mucous membrane; when the finger is rubbed along the affected part, the superficial tissues seem more fixed than normal, "like passing the finger over wet indiarubber". This is by no means a pathognomonic sign; I doubt its value, as almost any chronic cervical inflammation may give rise to a similar sensation.

In cases of glandular cancer beginning within the cervix, it is often, if the disease is situated high up in the canal, most difficult to establish an early diagnosis. I always dilate the cervix in suspicious cases, and use the sharp curette to any doubtful surface.

Any form of cervical ulceration may be mistaken for malignant disease and conversely. Simple true ulceration is found with procidentia uteri. The colour of the surrounding tissue is bluish-purple, and the edges are hard; there is no swelling of the inguinal glands, but in such a case there need be no difficulty; for treatment soon establishes a difference by effecting a cure. If there is any reasonable room for doubt, the case should be treated as if it were malignant. I only speak now of the menopausal or post-climacteric patient, to whom the loss of her uterus is a totally different matter than it is to younger women.

Syphilitic ulcerations not infrequently may be mistaken for malignant disease; primary chancre of the cervix is rare. We have often a history to guide us, and in default of this, antisyphilitic remedies will clear up the diagnosis. Tuberculosis may appear as nodules, or these breaking down may appear as ulcerations. Tuberculosis of the cervix is very rarely primary; generally we find some pulmonary disease has preceded it. An examination of a section

of the tissue would show the totally different structure, and probably the bacillus.

Lupus is more likely to affect the external genitals, or the vagina. I have not seen a case primarily involving the cervix.

The so-called "corroding ulcer" (14) is not often seen; except in very old women it may be said to be very rare. It has many of the characters of epithelioma, and may infiltrate into the bladder or rectum. Its nature may be established by the microscope, as the growth shows absence of proliferating epithelium. The treatment is the same as for cancer.

A broad yet sound basis for differentiation between benign growths, due to papillary hypertrophy, and malignant papillary growths, is that the former have a narrow and the latter a broad base.

A small cervical fibroid may give rise to the suspicion of nodular cancer, but its smoothness, its regular outline, its non-fixation, will establish the difference. Yet if chronic cervicitis is present, all these distinctions may be masked. There is, however, no warty outgrowth, no bleeding on examination, and only rarely ulceration. Should a fibroid of the cervix or a pedunculated benign polypus become strangulated or adherent, necrosis occurs, and speedily symptoms of hæmorrhage, foetid discharge and sloughing of the growth appear. Always seek for the external os, which in the case of the degenerated fibroid can be felt as a distinct surrounding ring; in a case of cancer, the edge of the os will be thickened and ulcerated.

Little value can be placed on wasting and cachexia. Diagnosis should be made before these have become prominent features.

In order to establish a clear diagnosis, one should in all doubtful cases examine a piece of the suspected tissue microscopically. Practical surgeons often find that the results of microscopical examinations are only negative. In my own experience sections from several cases of cervical cancer, regarding which there was no clinical doubt, presented no undoubted characteristic appearance; but this may be partly due to the manner in which a piece of the tissue is sometimes removed. Curetting the surface of an epithelioma or the cervical canal in case of a suspicious infiltration is useless. A fair-sized wedge should be cut out of the cervix, selecting the part most manifestly affected, and going deep enough to secure a portion of muscular tissue. There is very slight pain caused, so that an anæsthetic is hardly necessary. The wound will be apt to bleed, especially if the growth is malignant; the edges should be united by suture, or an application of Paquelin's thermo-cautery may be made.

I have known a gentleman who was pathologist to a special hospital for women, and who justly has an excellent reputation as a microscopist, pronounce a strong opinion that a specimen submitted to him was malignant. The patient consequently was advised to have her whole uterus removed. Another clinical opinion having been sought in consultation, it was agreed to delay the operation. This lady never required an operation; the ulceration proved to be non-cancerous, and healed under simple treatment. It is only warrantable to regard a case as cancerous on purely histological grounds, when atypical epithelial processes are found dipping into the muscular tissue.

In a very valuable and practical paper, Mr. H. G. Plimmer (15) has pointed out some excellent guides to the recognition of cervical cancer by microscopy.

"The first point of importance is, that every one who examines tumours of the uterus should be perfectly acquainted with the normal histology of the uterus, not only of one part, but of the various parts—os, cervix, internal os and body; and not only at one period, but at all ages, before, during and after the period of menstrual life, and especially during the various intermediate periods of the latter, *i.e.*, just before, and just after, and during menstruation, during pregnancy, and after childbirth. For what, for instance, would be normal in a woman over the menopause, would be pathological in a woman of thirty; so that the exact knowledge of the various histological differences of these various periods is most important, and many mistakes have been made through inexact knowledge of them.

"Then, also, it is best that those who undertake such work should use one method of fixation of the tissues, so as to be able to compare accurately, in their own minds, the various and changing appearances of the manifold uterine conditions. Many errors have been made by the indiscriminate use of various methods, so that workers, who are not purely histologists, get no one standard appearance under any given condition.

"Where time is not of great consequence the following method gives the best results, and it is easy enough to be generally applicable.

"A piece of the tissue to be examined should be placed at once after removal in the following solution for twenty-four hours:—

Mercuric chloride	-	-	-	-	-	To saturation.
Sodium chloride	-	-	-	-	-	7.5 gr.
Glacial acetic acid	-	-	-	-	-	10 c.c.
Distilled water	-	-	-	-	-	1 litre.

It should then be washed in running water for two or three hours, and placed in 50 per cent. alcohol for twenty-four hours, then in 90 per cent. alcohol for twenty-four hours, then in absolute alcohol for twenty-four hours. It should then be either cut with a freezing microtome or passed through cedar oil into paraffin, and cut with a rocking or other paraffin microtome. This latter method gives the best result; and in the case of scrapings, which are often very soft and pliable, it is the only method which gives anything like a certain result; moreover, with the paraffin method it is possible to get an exact orientation of the piece you have to cut, and, as will be shown later, this is sometimes of great consequence.

"The best stain for such sections is hæmatoxylin, and the best form in which to use it is in the so-called hæmalum of Mayer. This can be used either alone or, better still, with a counter stain of Congo red, which, besides being an excellent ground stain, has, in one condition at least, a selective action. The sections are then dehydrated in the usual way, and mounted in balsam. By this method uniformly good results are obtained, both as regards normal and pathological conditions, and the various elements—cells and nuclei, vessels, muscular and fibrous tissues—come out with a distinctness and certainty obtainable by no other method.

"But sometimes there are cases in which the few days this method takes are too long, and some quicker method has to be used. The following method I have often used, and find that the fixation is good, and the staining quite easy, so that it may be used when there is any urgent hurry.

"Place the piece of tissue—it must be in this case the smallest possible piece in order to get the best results—in a 30 per cent. solution of formalin for from three to twelve hours, then dry it on filter paper, and place it in absolute alcohol for at least an hour, and then into aniseed oil till it sinks.

"These last two stages are more effectually done if the bottle is placed in an incubator at 37° C. The piece is then taken out of the oil, and frozen and cut on a freezing microtome (oil of aniseed freezing quite firmly enough, as has been pointed out by Kühne). The sections are taken from the razor and placed at once into spirit, then into fresh spirit to get rid of the oil; and then they can be stained, as before described, by hæmatoxylin alone, or with it and Congo red. With care, this quick method—which can be got through the same day as the piece is removed—gives very good and clear sections, with very little alteration of the cellular elements.

"The sections, in cases of suspected cancer, should be made very thin—some as thin as possible—for in early cases of cancer, where

the growth is rapid, and there is much round-celled infiltration, unless the section is very thin the round cells hide the cancer cells, and so are apt to be overlooked; but if the sections are very thin the epithelial cancer cells will stand out quite clearly from the round-celled growth."

After indicating the possible errors which may be made in mistaking the general appearances of a new growth from obliquely or transversely cut sections of normal tissue, Mr. Plimmer goes on to differentiate the conditions which may be mistaken for cancer, and points out an important diagnostic method of staining, which, so far as I am aware, has not been referred to in English text-books.

"First of all with regard to simple inflammation. In this there is, of course, a considerable small-celled infiltration. The vessels, especially the capillaries, are enlarged and filled with blood, and new capillaries will be seen in process of formation, about which the round-celled infiltration will be most marked. The inflammatory process, as a rule, diminishes as you go deeper into the tissues, until at the muscular layer, or just within it, the round-celled infiltration ceases. Often you can see the formation of granulation tissue just beneath the epithelium, and you can trace the round cells into spindle and even epithelioid forms. But since we know that primary inflammation of this part of the uterus is very rare, it is very important that we should find what it is secondary to, and therefore the patient in whom such conditions as the above alone are found, ought to be kept under observation, and a small piece ought to be removed for further examination if the symptoms do not quickly disappear. In ectropion with inflammation, much the same appearances are seen as in simple inflammation of the cervix. In the early stages the glands are unchanged, and only a few leucocytes are to be seen between the epithelial cells. But of this acute stage we very rarely get a specimen to examine, nor does it come in as an alternative diagnosis to cancer, but we often see it in the chronic form, in which the characters are much more marked. Then the glands become enlarged, or even increased in number, and there is a hyperplasia of the glandular epithelium. But in mere inflammation these changes are confined entirely to the superficial part of the mucous membrane. In this condition we get sometimes so much round-celled infiltration that the gland canal becomes compressed, and perhaps stopped up, so that you may find small cystic spaces.

"But sometimes the inflammatory process causes only a hyperplasia of the gland epithelium. Then the gland, instead of having one single layer of columnar epithelium, is filled up with several

layers one on the other, so that they lose their original columnar form and get flattened. Then if the section happens to be oblique or transverse, these columnar epithelium cells look just like squamous epithelium, and give you the impression that you are dealing with an early stage of carcinoma. But in such a case as this we cannot be too careful; and we must not on any account diagnose this as a cancer without further evidence, such as is to be got from serial sections, and the state of the surrounding tissue, the quantity of mitoses, etc. As a help in the differential diagnosis of this condition from cancer, I may here mention the selective action to be obtained by counterstaining the section with Congo red, which I mentioned before. It differentiates the gland epithelium from the atypical epithelium, which, in some cases of cancer, grows into the glands and fills them up, destroying thereby, little by little, the gland epithelium, and differentiates it in this way, as has been pointed out by Aumann. The gland epithelium is stained strongly red; the protoplasm of the cancer cells, on the contrary, remains almost uncoloured, so that by the difference in the colour we can easily see in a gland whether we are dealing with a hyperplasia of its epithelium, or with an ingrowth of atypical cancer cells.

"On examining a specimen of cancer, we see that the cells are irregular, atypical in form, and are not confined to the tissue in which they arise, but that they spread in any direction, destroying the glands and the walls of the vessels, and penetrating into the muscular layers, till eventually little or nothing is left of the original tissues (fig. 33). But the tissues react, too, against this invading growth by an enormous infiltration of small round cells, much greater in quantity than in any other disease of this part. So the principal characteristics of cancer may be summed up into (*a*) the atypical proliferation of the epithelium of the mucous membrane or gland; and (*b*) an intense small round-celled infiltration, by which the boundaries of the various parts of the tissue are wiped out, altered, or destroyed. The irregularity in the shape and size of the cells is of great importance; the nuclei, too, are usually larger than in the normal epithelial cells, and are very variable in form, and there are often from two to five or more in a single cell. The protoplasm of the cells differs in quantity very much, sometimes forming quite a large zone round the nucleus, sometimes quite a small one.

"With regard to another sign of cancer, namely, the presence in the cancer cells of bodies regarded by others as well as myself as parasitic protozoa. I have not failed to find them in every case of cancer of the cervix which I have examined, but they are somewhat

difficult to find in some cases, and require patience as well as special methods of staining for their demonstration. They are not to be found in the older or degenerated parts of a growth, but must be looked for in the growing part, especially at its extreme edges (16). In doubtful cases their presence is, I think, a complete proof that the growth is cancerous; moreover, they are best found in the early period of a case, just when we sometimes want every confirmatory sign to enable us to be quite sure of our diagnosis. They occur as round bodies, with a nucleus, most often in the protoplasm of the cell, but sometimes in the nucleus, and they have quite distinct staining reactions from the rest of the cell, for a description of which readers must refer to the papers before referred to."

Personally, I am unable to discuss the distinction last men-



FIG. 33.—Glandular Carcinoma of Cervix (Winter).

tioned. I know histologists differ in their interpretation of these bodies. I have therefore thought it better to quote at length from the original paper than to try to summarise such clear and practical observations.

Symptoms.—The early symptoms of cervical cancer are so slight that one rarely sees a patient at the very beginning of the invasion, except so to speak accidentally. Usually the first symptom is slight hæmorrhage following coition, or the use of the vaginal syringe. Or the patient comes to consult us on account of increased periodic losses or for slight irregular bleedings, or on account of "reappearance of the periods" after cessation. Various neuralgias, especially sciatica, seem common. Leucorrhœa, slightly

mixed with blood, is also common. As the climacteric woman believes that irregular bleeding is not unusual, and as her family attendant may not readily obtain permission to make an examination, unless there are distinct symptoms of uterine trouble, the case may run on for weeks or months without attention. It is of the utmost importance to examine every case in which there is the least doubt. So rapid is the advance in some cases that in two or three weeks after ulceration and excavation have commenced, a case which, when first seen, presented favourable conditions for radical cure, may then be beyond all hope. Involvement of the inguinal glands is less common in the early period in middle-aged and elderly women than in younger women. On making a vaginal examination, one may feel the uterus to be movable and the lateral connective tissue normal, but a rectal examination may show that there is some retro-uterine fixation, some tightening of the utero-sacral ligaments, and presumable infiltration of the pelvic glands. The different forms in which cervical cancer presents itself clinically are the papillary, the nodular (fig. 34), and the excavating or perforating. Theoretically, it is assumed that the papillary or cauliflower excrescence begins on the surface of the vaginal cervix, the nodular in the parenchyma of the cervix, and the excavating in the mucous membrane of the cervix. In some rare cases the primary site is in the vaginal wall in Douglas's pouch. But we lack a sufficient number of precise records to establish



FIG. 34.—Nodular Cancer of the Cervix.

- (a) Os Internum.
- (b) Os Externum.
- (c) Cancerous Nodule.

these observations.

Menopastic and especially post-climacteric women are subject to a form of atrophic granular erosion which is apt to be mistaken for early malignant disease.

Apropos of this, Raciborski (17) wrote: "These hæmorrhages may be due to chronic affections of the cervix, which, after having remained for a long time stationary and almost latent, cause metrorrhagia after the cessation of normal menstruation. In this class are to be found certain soft engorgements of the cervix, presenting a fungous appearance, which bleed on the slightest touch, and which are not readily distinguished from certain varieties of cancer."

In some cases these adenomata are originally benign, but subsequently become malignant.

The diagnosis has already been fully referred to. Several cases of non-malignant disease have come under my care which presented

many of the symptoms of early cancer. As illustrative of these I record the following :—

Mrs. S. M., aged fifty, married thirty years, V.-para, whose last pregnancy, seven years before, ended in abortion, consulted me in May, 1894. She had been subject to increased menstruation since her abortion. She had menstruated since then every two or three weeks, till November, 1893, when she had hæmorrhage continuously for three weeks. In March, 1894, she again had hæmorrhage for five weeks, and at this time passed clots. Period on 11th to 18th May, after which there has been a continuous thin, watery discharge. Patient complained of great irritation and dysuria, had frequent micturition and frequent desire to defecate; stools very hard and small; appetite impaired; legs swollen. Physical examination—Cervix hardened, enlarged, and thickened; no visible ulceration; uterus generally enlarged.

In the beginning of June she complained of darting, lacerating and burning pain in the vagina and left iliac region. The vaginal orifice was very sensitive; the os uteri was not eroded or ulcerated. The sound could not be passed except with great difficulty; bleeding was free. On 18th June, under anæsthesia, the cervix was dilated up to No. 16 Hegar and the uterine cavity and cervical canal freely curetted with a sharp curette. Bleeding was very free. Liniment of iodine was then applied to the curetted surfaces, and the lower part of the uterus and vagina packed with iodoform gauze. Forty-five hours after operation the gauze was removed; there was no bleeding. Period began on 22nd, and continued moderately for six days; for some days there was a slight brownish discharge; patient went to seaside on 9th July. On microscopic examination of the debris from the uterus, no trace of malignancy was found. The patient reported herself in August, and then stated she felt better than she had done for years. The uterine hardness was gone; there was no evidence of disease. She continued well, October, 1895. In March, 1896, she wrote stating that her menstruation had continued regularly till two (?) months ago. This case was very suggestive of the early stage of high-seated excavating cancer of the upper part of the cervix and corpus uteri. It was evidently an ordinary menopastic villous endometritis.

As a contrast with the above, I relate a case of epithelioma cervicis with a typical history. Mrs. J. H., aged fifty-two, married twenty-five years; primipara twenty-three years ago, climacteric seven years ago. Admitted 23rd September, 1893. Was well until three months before admission, when a profuse blood loss occurred. The

hæmorrhage had continued off and on ever since ; when it ceased there was a profuse watery discharge, but the discharge had no mal-odour. There was no urinary trouble. She complained of great and increasing weakness ; was very anæmic ; there was no appreciable loss of flesh.

Vaginal examination discovered a large "cauliflower" excrescence, which was very friable, and bled profusely on examination ; the broad ligaments were not involved. The vagina was packed with iron wool, and a tonic of iron and arsenic prescribed. On 28th September, I performed supravaginal amputation of the cervix, and in fact removed the greater part of the senile uterus, getting well clear of the disease. The peritoneal cavity was necessarily opened, the edges of the uterus and peritoneum were sutured with No. 2 chromic catgut. The patient recovered well from the operation. 5th October.—The wound in the vaginal roof was quite healed, except a small portion at the extreme left angle ; the edges were quite adherent all round. No pain nor discharge. 9th October.—Parts perfectly healed. 21st October.—Pretty free vaginal blood loss of light colour, which gradually lessened and ceased by 25th. Examined on 28th.—Wound well healed. A slight warty excrescence on anterior lip of wound, was burned with Paquelin's thermo-cautery, and the edges of the wound were also cauterised. The patient remained perfectly well until the following July (1894), when she again attended. I examined her in August, and found recurrent disease in the pelvis ; a minute vesico-vaginal fistula was now established. The old cicatrix was quite healthy. The new growth was free of the broad ligament, and evidently involved the bladder wall and intestine. I did not, of course, advise further operation. In this case the cancer seemed well clear of the upper portion of the removed growth, and the recurrence was by no means in the usual situation ; otherwise the history is, as I have said, typical.

I must here interpolate that many hospital cases claimed as cures after operation are evidently classed as such only because they recover from the operation ; not a few are dismissed from hospitals in a fortnight or less, and are then lost sight of. The after histories should always be followed when possible.

When cancer is well established the symptoms are so unequivocal, and so fully described in text-books, that it is unnecessary to describe them here.

Treatment of Cervical Cancer.—In every case when practicable we should aim at a radical cure. When the disease is limited to the portio vaginalis, and there is no circumuterine extension,

either amputation of the cervix, or vaginal hysterectomy, may be practised. Opinions have been, and to some extent are still, divided as to which procedure should be followed. The advocates of the partial operation claim that the immediate risks are less, and the ultimate results as good as, if not superior to, those attending total removal.

There are many familiar arguments in support of the partial operation; but opinion is now tolerably agreed that the scope for "intravaginal" amputation of the cervix is limited to cases of very circumscribed papillary cancer (epithelioma), which is clearly confined to the portio vaginalis. If the uterus is in the least degree fixed, or if there is any shadow of doubt about the disease having spread, the low cervical amputation should not be thought of. It is always preferable to use scissors. The ecraseur, the galvano-caustic wire loop, and the galvano-cautery, have been employed; but while very good results have been obtained from these by certain operators, it is evident that a clean-cutting instrument is superior to such agents.

Supravaginal amputation is advised for more extensive cancer. If the disease has extended up to the level of the vaginal *cul de sac*, it is manifest that to get beyond it the operator must at least remove the supravaginal portion of the cervix. For successful results, one must make certain that the corpus uteri is not affected, that the uterus is movable, so that it may be pulled well down, and that there is no infiltration in the vaginal walls, or into the broad ligaments.

Supravaginal amputation has been advocated strongly by Schröder, Sir J. Williams, Byrne, Reamy, Baker, Thornton, Jessett, Hofmeier, etc., etc. (18), as being thoroughly efficacious in all cases of cancer confined to the cervix, and as having not only a lower immediate mortality, but presenting fewer instances of recurrence (19).

In all cases of supravaginal amputation, it is advisable not only to remove the neck of the uterus, but to excise a good-sized cone from the uterus itself. The amputated part must be well above the site of disease. The technique of the operation is no easier than that of vaginal hysterectomy; and if it is always desirable to remove two wedges from the uterus beyond the cancerous tissue, it is difficult to understand how supravaginal amputation can be much less dangerous than total hysterectomy. The method of operation may be thus briefly described. After thorough disinfection of the vagina (in some cases preliminary removal of any large cauliflower growth has been effected, a day or two before the operation) the

cervix is drawn well down, an incision is made with a scalpel on its anterior aspect as high above the diseased tissue as practicable, but carefully avoiding the utero-vesical pouch; the connective tissue between the cervix and bladder is then separated by the handle of the scalpel and fingers; the posterior *cul de sac* is made tense by pulling the cervix forward, and the posterior vaginal wall incised; the connective tissue is stripped off. The anterior and posterior incisions are united by a circular sweep, and the cervix freed from its connections by the points of the fingers. When the sides are cut, the cervical branch of the uterine artery will probably be divided, and should be secured by forceps or ligatured. If the growth is very vascular, it is better to pass a ligature at once round the divided bleeding vessels. The anterior lip is then incised, a conical wedge, with its apex in the uterus, being cut out by scissors or knife; the posterior lip is treated in the same way. Before removing the posterior portion, a stout silk suture may be carried across the rawed anterior *cul de sac*, and the uterus drawn down; by this means the posterior amputation is made easier. After the posterior portion has been cut out, another suture is introduced, which, passing through the face of the rawed surface, unites it with the vaginal wall.

Douglas's pouch is often necessarily opened, as otherwise the amputation would not reach high enough to clear the disease. It may be necessary to secure the uterine arteries to arrest the hæmorrhage.

Personally, I have still an open mind regarding supravaginal amputation, considered generally in cancer of the cervix. I have no doubt that to a beginner the operation will be found quite as difficult, if not more so, than vaginal hysterectomy; yet, having practised both methods, my predilection is in accord with those who argue that for all cases of uterine cancer in which the supravaginal operation is warranted, total vaginal hysterectomy should be preferred.

In no other part of the body is it advised to perform a partial operation for a malignant disease when a complete operation is feasible, and why, therefore, in the uterus? The consensus of opinion to-day favours vaginal total hysterectomy, especially when malignant disease occurs at or about the menopause, or after the climacteric.

Some cases are so widely spread that no radical cure is possible; as, however, not only the cervix but the corpus uteri and circum-uterine tissues are then involved, we may more properly consider these later.

Cancer of the Body of the Uterus.—The proportion of instances in which the body of the uterus is the first seat (fig. 35) of malignant disease is about five per cent. of all uterine cancers. Three types of corporeal cancer have been distinguished, *viz.* :—

1. Epithelioma or carcinoma of the endometrium.—This begins in the utricular glands, and then spreads to the other structures of the mucous membrane, involving the muscular wall, and sometimes spreading down to the cervix, or outward to the Fallopian tubes. This is essentially the cancer of the menopause, during which period, or after it, it is most frequently seen. Cases of glandular menopastic endometritis may pass from a subacute condition to one of typical benign adenoma of the mucous membrane; subsequently degeneration causes the change to non-typical malignant adenoma, the primary stage of cancer. Recklinghausen holds that adenomata of the uterus are not derived from the glands of the uterine mucosa—that their gland tubes are descendants of the Wolffian bodies. But he believes in the metamorphosis of adenoma, and its association with cancer (20).

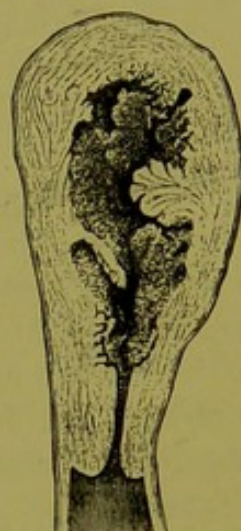


FIG. 35.—Diffuse Carcinoma of the Body of the Uterus (Winter).

2. Sarcoma of the endometrium.—This has hitherto been described as the cancer of young women. If, however, one studies the records of a series of cases it will be found that patients of fifty years and upwards are frequently the subjects of sarcoma uteri. Indeed it is probable that primary sarcoma is even commoner than primary carcinoma. Bowreman Jessett writes: "I think it will be found that a large number of cases of malignant disease of the uterus are sarcomatous, much more so than is generally imagined. Of those which I have operated on two-thirds were pronounced by the pathologist to be suffering from sarcoma" (21). In his appendix of cases we find sarcomatous uteri in women of thirty-three, thirty-five, fifty-seven, sixty-three, etc.

In certain instances mixed growths, having the histological characters both of carcinoma and sarcoma, have been observed.

Sarcoma begins in the interglandular tissue or in the walls of the vessels, and may become diffuse, involving a considerable part of the whole mucous lining, then spreading into the muscular wall; or in other cases it is said that it may assume a polypoid shape. It is more probable that these cases are instances of polypi that have undergone sarcomatous transformation.

3. Sarcoma may originate in the uterine wall, in the paren-

chyma.—These cases are due to malignant changes in interstitial fibroids, or in generally fibrosed uteri, or to primary growths from the interstitial connective tissue, or in the blood-vessels (22). Further, sarcoma may attack subperitoneal or submucous fibroids.

From Gusserow's (23) statistics it appears that the age of proclivity is the same for sarcoma uteri as it is for cancer generally.

From 40 to 49 there were 28 cases.

„ 50 to 60	„ 18	„
„ 30 to 39	„ 15	„
Above 60	„ 3	„

Diagnosis and Symptoms of Corporeal Cancer.—During the menopause the increase of hæmorrhage, the existence of inter-hæmorrhagic serous discharges (which is often laid undue stress on as a sure sign of malignant disease), and the generally increased size of the uterus may all be due to menopastic or post-climacteric endometritis. A decomposing fibroid may occasion a much fouler smelling discharge than corporeal cancer in its earlier stages. Cachexia is no guide to the condition until the disease has passed beyond the uterus. When the inguinal or pelvic glands are affected, the case is pretty well advanced. Even when the cervix is dilated and the curette used to remove scrapings of the diseased lining, so that a microscopic examination of the curetted substance may be made, the diagnosis may still remain indefinite. If only one or a few small patches of the mucous membrane should be involved, a partial dilatation and superficial curetting may not afford any characteristic fragments. One should, in a doubtful case, dilate sufficiently to be able to pass the finger all round the interior of the uterine cavity. A sharp curette carefully employed will not only give us a better chance of removing the deeper glandular tissues, but in my opinion is safer to use than a blunt instrument, for the latter would have to be used with more force and might therefore more readily perforate the uterine wall at a weakened spot. And, as in judging between benign and malignant cervical adenoma, so in uterine corporeal adenomata one must regard the effect of curetting and the application of iodine, etc., as partly diagnostic. If, after thorough curettage and intra-uterine styptic applications, hæmorrhage and other significant symptoms persist, the case should be regarded with suspicion and an exploration made from time to time.

The following case perspicuously illustrates the advantage of early radical operation. The specimen was shown to the British Gynæcological Society on 14th November, 1895, and the following account is taken from the *Journal* (24):—

"UTERUS REMOVED BY VAGINAL HYSTERECTOMY FOR MENOPASTIC ENDOMETRITIS AND SARCOMA. By LEITH NAPIER, M.D.

"*History.*—The patient from whom this uterus was removed was aged forty-four; had been married seventeen years; had four children born alive, the youngest being nine years of age; she had had three miscarriages.

"She had suffered from endometritis in February, 1894. In March she had severe hæmorrhage, which gradually ceased, and she subsequently had no appearance of vaginal discharge until July, 1894, when hæmorrhage again recurred and continued more or less up till November, 1894. Mrs. C. stated she was an in-patient at St. Thomas's Hospital during June and July of last year.

"*First Curettement.*—In November Mr. Flynn curetted the uterus with Thomas's dull wire curette and applied iodised phenol to the endometrium. After this, menstruation continued regularly and in moderate quantity until May, 1895, when a profuse flooding appeared and bleeding persisted more or less continuously up to the second operation. When the hæmorrhage was not present there was an almost constant bad smelling uterine discharge. On July 14th, 1895, she passed about a teacupful of purulent fluid per vaginam; this discharge had ceased for about a week when it recurred, pus being discharged in gushes.

"When the patient was examined in September, 1895, the local conditions were—perinæum lacerated, vaginal walls relaxed, cervix large and hard, the mucous membrane covering the cervix was not adherent, uterus generally enlarged, movable backward direction, no tenderness, no thickening of uterine ligaments. Attention was directed to the heart in consequence of rapid and irregular cardiac action; there was a softish systolic murmur and some evidence of dilatation, without compensatory hypertrophy.

"*Second Curettement.*—On 27th September the uterus was again curetted by Dr. Leith Napier. Dilatation to No. 10 Hegar was effected, and a wedge-shaped piece of cervical tissue removed for microscopic examination. The hæmorrhage was very free, so much so that the actual cautery was applied to the cervix; the uterine cavity was thoroughly explored, the sharp curette used, and pure carbolic acid and eventually perchloride of iron applied to the endometrium. The patient stood the operation well and went home on 10th October, 1895. Examination of the piece of cervical tissue gave negative results, but the debris from the curetting was suggestive of malignant changes.

"*Vaginal Hysterectomy*.—Patient again came under treatment a fortnight later, when, on 23rd October, Dr. Leith Napier performed vaginal total hysterectomy. There was considerable tendency to hæmorrhage from the smaller branches of the cervical and uterine arteries, and the patient lost more than an average quantity of blood, although every care was taken to ensure immediate hæmostasis. The tubes and ovaries were not removed.

"Drainage by a glass tube in the peritoneal cavity and iodoform gauze packing; the peritoneum and anterior and posterior vaginal walls were sutured in the usual manner. The operation lasted, in all, nearly forty-five minutes.

"*Subsequent History*.—The drainage tube was removed in twenty-four hours. The gauze was removed on the fourth day, and the vagina douched with boracic solution. The patient was never sick after operation. The bowels were moved on the fourth day.

"The highest temperature reached after operation was 100° F.

"The pulse, which had been very much above the average, continued fast even after the patient was quite recovered.

"She was up for the first time on 7th November, and four days later went home well. She was then much less anæmic and was putting on flesh.

"*Microscopic Examination of the Uterus* shows sarcomatous infiltration at the fundus, which evidently is springing from the neighbourhood of inflamed utricular glands. In March, 1896, the patient was strong and well, in marked contrast to her preoperation condition."

After the menopause, if profuse hæmorrhage occurs, we should be still more ready to undertake radical measures. The most probable condition, then, giving rise to uterine hæmorrhage, if we find the cervix to be normal or softened, is intrauterine malignant disease.

Exceptional instances, however, occur; I have seen several cases of post-climacteric metritis very difficult to differentiate from cancer.

At a more advanced stage, foetid discharge and lacerating pains with uterine fixation and surrounding hardness are present.

The differential diagnosis embraces glandular endometritis; degenerating fibroids of all varieties; results of metritis, *e.g.*, hydro, physo, and pyo-metra; foreign bodies in the uterus, etc. One would be very unlikely to confuse malignant disease with pelvic inflammation, even when this had caused pus formation.

Treatment.—The only satisfactory treatment is total removal of the uterus.

The utility of vaginal hysterectomy has been greatly limited in the past by the uncertainty of early diagnosis. As a working rule, it should be laid down that to ensure success the disease must be strictly confined to the uterus. If there is any extension of malignant disease into the broad ligaments or pelvic glands, recurrence, or more properly persistence, after operation is certain. Even with favourable conditions recurrence is unhappily the rule, not the exception. In all probability the disease has existed to an inappreciable extent elsewhere, although what appeared at the time of operation to be the entire area of disease had been removed. Yet, on the other hand, there have been, in my personal knowledge, exceptional cases operated on in which there was thickening of one broad ligament, and no subsequent recurrence. In such the infiltration was manifestly only inflammatory. So that all the circumstances must be weighed; and, when at all justifiable, operation should be recommended. The fatal result may be postponed, if only for a few months, in cases in which there has been a limited extension.

It does not enter into the scope of this work to describe the technique of major surgical operations; such information can easily be obtained by those who require it by referring to gynaecological text-books. But brief references to the main features of operations recommended are permissible. The method of vaginal total hysterectomy is so far identical with supravaginal amputation of the cervix. The preliminary separation of the circumcervical tissues is made in both. After the peritoneum has been opened posteriorly, an aseptic sponge, to which a strong thread is attached, is placed in Douglas's pouch to prevent soiling of the peritoneal cavity and to maintain the intestines inside the abdomen. The base of one broad ligament may be secured by a stout silk ligature or clamp forceps, and the ligament divided up to the area thus controlled; a second and a third ligature, or another pair of forceps, are applied higher up, and one side of the uterus freed; the left side is generally first divided. The same procedure is repeated on the right side, and the uterus is then wholly separated. It is better in separating the tissues to proceed with short snips made with blunt-pointed scissors curved on the flat. The lower portion of both sides of the broad ligaments should preferably be freed before the final divisions of one side, as the uterus is thereby more readily pulled down. The difficulty which is sometimes experienced in passing the ligatures may be greatly lessened by using long-handled curved needles (fig. 36). The cervical branches of the uterine arteries are secured by the first ligature, the uterine

arteries by the second, and the ovarian arteries by the upper ligature.

When the ovaries and tubes can be easily removed this should be done, for there is no certainty that the disease has not invaded them even if they feel atrophic. I recall one case in which I removed the appendages of one side and had pulled down those of the other, but, as they felt normal and in some way disappeared from the field of operation so that they could not again be easily secured, I completed the operation without removing them. In this instance the upper and even the middle part of the corpus was healthy, as were the appendages removed; but despite this, recurrence took place in the pelvis in six months, and the patient succumbed in less than a year from widespread cancer. I have, therefore, since felt that when the appendages can be easily removed (as they usually can) this is always advisable.

Abdominal Hysterectomy, as at one time practised by Freund and Schröder for cancer, is simply extraperitoneal, or it may be

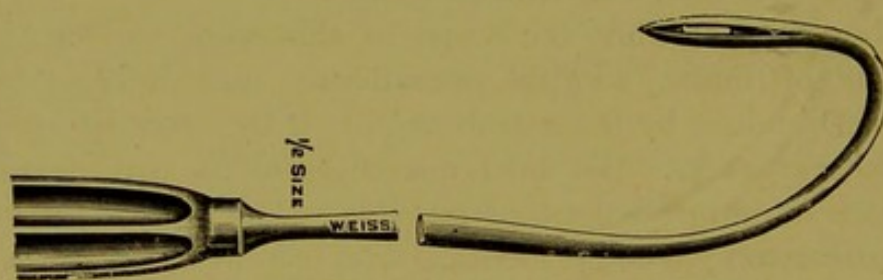


FIG. 36.—Bowreman Jessett's Needle for Vaginal Hysterectomy.

intraperitoneal (subperitoneal) hysterectomy. Unfortunately, one cannot count on a sufficiently long healthy cervix to perform the extraperitoneal operation; and the intraperitoneal operation is open to the objection that there is considerable risk of not being certain that the cervix is absolutely free from disease. Theoretically this method might be applicable to a case in which the uterus was too large to be removed by the vagina, and in which it was believed that the disease was sarcomatous and confined to the body of the uterus.

Total extirpation by a combined vaginal and abdominal operation, as practised by Martin, Rydygier, Bardenheuer and others, is a formidable proceeding at best, and has been attended with a high immediate death rate. Still, with the recently improved methods of operation, I hold it to be preferable to the alternative procedure, sacral hysterectomy. Hegar, of Freiburg, has modified his surgical colleague's (Kraske's) operation for removal of a cancerous rectum, and in this way extirpated a malignant uterus. An in-

cision is made on the posterior surface of the sacrum, which is temporarily thrown upward, the rectum is detached, the broad ligament ligatured, the uterus freed and removed, and the sacrum, etc., then replaced.

One may, however, postulate that generally a cancerous uterus which cannot be removed by the vagina cannot be removed with a good prospect of recovery, even from the immediate effects of the operation, by any other route.

What percentage of cases may be said to be saved by operation? Leopold (25), of Dresden, records the results of operation by vaginal total extirpation in 190 cases. Of these, the immediate mortality was 5.2 per cent. The statistics furnished as to the ultimate result are based on 164 patients—the others, 26 in number, having been operated on after preparation of the paper. Of Leopold's 164 cases, 10 died soon after the operation; 11 died later of other diseases; 50 died later of recurrence. Of those who died of recurrence the average duration of life was 19.7 months.

Of the patients living at the time of the report and healthy, there were 52.9 per cent.; of those living with recurrence, there were 11.4 per cent.; and 35.7 per cent. died of recurrence.

The ultimate effect of operation cannot be judged by recovery from the operation. The immediate mortality of vaginal hysterectomy and supravaginal cervical amputation is not high. Probably the rate differs little in skilled hands, and may be estimated at about 5 to 8 per cent. for the total operation and somewhat less for supravaginal amputation. Yet it is not by comparison of the immediate death rate that we can settle this question. The cases in which the lower portion of the cervix only is affected may be cured by supravaginal amputation; but the surgeon must always feel regret, if recurrence takes place, that he did not remove the whole organ. No case should be claimed as a cure until at least three years have been passed from the date of the operation without recurrence of the disease. Yet, even if we can only delay the fatal termination and free the patient from her sufferings for a time, the possible operation mortality should not be considered. The disease is inevitably fatal if left untreated; the only radical treatment is free removal. So that it is not a question of election, it is our duty to recommend operation when this can be done.

A few cases of complete excision of the cancerous vagina have been effected; but the circumstances justifying this must be very exceptional (26).

Treatment of Advanced Cases.—By far the larger number of patients come under observation after the disease has so spread

that no radical operation can completely remove the parts affected. Limited extension on the posterior vaginal wall may be treated by removal of part of the vagina, but if the anterior wall is invaded the close relations of the bladder and the frequent invasion of the bladder wall render complete removal almost impossible. Invasion of the broad ligaments by the disease negatives the hope of cure by operation. When the uterus is fixed, the vaginal walls and the broad ligaments infiltrated, all we can do is to treat the case palliatively. Rectal examination may show a slight projection arising from one or both sides of the uterus and following the course of one or both ureters, even when there is no other sign of spreading of the disease beyond the uterus. Entire removal of the disease in such a case would result in wounding the ureters; were this not done part of the growth would necessarily be left behind. When one finds the inguinal glands affected, the disease has spread too far; but there may be sympathetic, not malignant, inflammation explaining the adenitis. No precise set of rules, therefore, can do more than afford a general idea whether a cancer of the uterus is operable or inoperable, any more than one can always determine wisely whether hysterectomy or cervical amputation should be performed (27).

If the bladder and rectum appear to be unaffected, considerable good may be gained from the employment of the thermo-cautery or of certain caustics. Opinions are divided regarding the best means of treating inoperable uterine cancer of the cervix. It is held by some that anything further than removal of all redundant tissue by scissors and the subsequent application of the thermo-cautery is apt to do more harm than good. In cancer which has spread to the corpus the thermo-cautery or the ordinary cautery may be employed, but in many instances there are risks and difficulties with these. Cauteries are for the most part reserved for cases in which it is necessary to arrest free hæmorrhage, and in which a tampon cannot be applied or is insufficient; and when on account of the patient's condition, or some special condition of the parts, curetting is impossible. Moderate bleeding may be restrained by the application of liquor ferri chloridi and tamponing with iron wool. For more profuse hæmorrhages, or if the seat of disease is mainly in the corpus uteri, curetting and the application of ferric chloride or, preferably, of zinc chloride is employed.

If the internal orifice is blocked up, it may be found necessary to dilate the cervix so that the fundus uteri can be reached, and thorough curetting effected, and subsequent special tamponing and

efficient drainage made practicable. This can be done very carefully with Hegar's dilators, which, however, may cause rents between the cervix and corpus uteri, or may perforate the diseased tissues and enter the bladder, rectum, or peritoneal cavity. Use a pair of long-curved scissors; cut away all the cervical granulations which obstruct the canal, restrain bleeding by the use of hot water, a tampon, or the point of the thermo-cautery. If the tissues are very friable, after partial dilatation with vulcanite or metal dilators, Vulliet's (28) method of gradual dilatation, *viz.*, introduction of small pieces of absorbent cotton wool saturated with iodoform-ether (one part iodoform, twenty ether), dried, and secured by silk strings, may be employed. The cotton wool is carried up to the fundus with narrow long-bladed forceps. In forty-eight hours the canal will have dilated enough to permit of curetting. When the inside of the uterus can be reached the flushing or dredge curette of Jessett should be used to remove all removable tissue (fig. 37). Oozing is arrested by sponges from very hot water, or, if this fails, tincture of

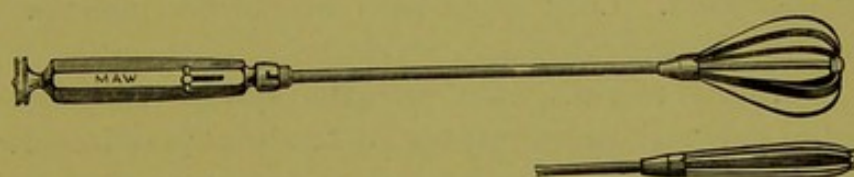


FIG. 37.—Bowreman Jessett's Dredge Curette.

matico may succeed. Wool which has been soaked in a 50 per cent. solution of chloride of zinc, and then dried, is used as an intra-uterine tampon. The "kite-tail" plan of attaching these tampons will render their removal easier. Chloride of zinc paste or a crayon of chloride of zinc may be used instead of the tampons. The size of the cavity after the curetting and the probable thickness of the walls should determine the exact means of conveying the zinc and also its chemical strength. A thin piece of guttapercha tissue maintained in position over the uterine opening by an indiarubber ring pessary, will ensure the action of the caustic on the vaginal edge and prevent the caustic running into the vagina. A dry wool tampon is applied over the guttapercha tissue, and then the vagina itself is packed with cotton-wool tampons soaked in a saturated solution of carbonate of soda. The vaginal tampons may be removed next day, and the uterine caustic tampons on the third day after their introduction. The slough caused by the caustic comes away in ten days or a fortnight. It may be necessary to repeat the packing.

Jessett writes : " All that can be claimed for this form of treatment at present is that the patients' lives are prolonged ; they are relieved of much suffering and from the horrible offensive discharge and bleeding. They gain flesh, and are in every respect improved in health " (29).

Unless care is observed, the action of the caustic may cause perforation into the rectum or bladder.

Another plan of treatment for inoperable cases consists in injecting the cancerous masses with various medicaments. Chromic acid, salicylic acid (6 per cent. prepared with alcohol), pure alcohol, erysipelas toxins, etc., have been thus employed. Fafius, of Moscow, advocates salicylic acid, and claims good results. The injections cause considerable pain, which however does not continue long.

Alcohol is used in two ways : Tauffer, of Budapesth, injects as much as five grammes at each sitting. Vulliet, of Geneva, injected only five drops in several places, and this seems preferable. The injections may be given every day for a week or more, and then gradually decreased. Only slight pain follows the injection, and it is of short duration.

The treatment of malignant growths by the injection of the toxins of the streptococcus of erysipelas has been practised considerably. It has been known, clinically, for a long time that, in exceptional cases, an attack of erysipelas has improved and even removed certain malignant tumours. Billroth, Fehleisen, Janicke, and Neisser, Biedert, Kliebath and others have afforded testimony showing that beneficial results have attended the appearance of erysipelas in malignant disease. On the other hand, it appears that in certain instances an accidental or intentional attack of erysipelas has caused increased activity of cancer, besides which there are in some instances late symptoms of toxic systemic infection. Coley, of New York (30), has devoted special attention to the treatment of malignant tumours with active and sterilised cultures of the erysipelas streptococcus. He has observed eighty-four cases thus treated over a period of four years, and claims that he has obtained excellent results in cases of inoperable sarcoma. Of forty-three such cases, eleven have been successful. One of these has since had a return; one has gone nearly four years; two more than two years; and two one and a half years, without relapses. In carcinoma he has seen improvement, but says, " I have never advocated the toxins in carcinoma except as a matter of experiment ". Senn, of Chicago, (31), has tried treatment by toxins in nine cases of inoperable malignant disease, one of which was cancer of the uterus ; " so far it

has resulted uniformly in failure". Czerny (32) has seen no good effect after spontaneous erysipelas; but relates that after using injections of mixed erysipelas and prodigious toxins after Coley's method he has had a markedly favourable, if not specific-like, result in sarcoma. He concludes thus: 1. The injection of toxins causes fever, etc., and always local inflammation. 2. These symptoms disappear in a few hours, but after several injections, anorexia, wasting, and other constitutional results follow. 3. The injections have a specific action upon sarcomatous growths, and may even effect a cure. 4. As the results are uncertain, therefore the injections should never be substituted for cases in which operation is possible. 5. In carcinoma, only a retardation of the growth, not a cure, can be hoped for.

So far as I am aware no good result can be obtained from Chian turpentine, methyl violet, pyoktanin, condurango, or any of the other vaunted cancer specifics. And the same may be said regarding the "electrical cures". The instances in which electricity seems to have done good can be explained by the cauterising action exerted on the growth.

With regard to dressing uterine cancers, much comfort may be afforded patients by keeping the affected parts clean. Syringing with 1 per cent. solution of creolin through a tubular speculum, and wiping out loose debris with cotton wool held on forceps, and thereafter using terebene on a cotton-wool tampon, or an ointment of acid carbol. glac., gr. x., sanitas oil and vaseline, of each one oz., will be found useful in many ways. The smell of iodoform is very trying to some patients; for those we may substitute aristol as a vaginal suppository. Have no scruple in giving opium in full doses; it is the one drug which relieves the pain of cancer effectually.

Malignant Disease of External Genitals.—These growths are less common than uterine malignant affections. Epithelioma develops on the lower part of the inside of the labium majus in the nodular form; the nodules are small, round and hard, projecting above the surface of the mucous membrane and feeling rough and uneven. The growth is slow and at first painless. Ulceration takes place, and the growths may assume the papillary form. The disease spreads to the labium minus and finally attacks the perineum and thigh, the inguinal glands become affected, and deep ulceration results. Death is usually the result of septic infection. The disease may last two or three years or more. Carcinoma and sarcoma may occur in the labium majus. Carcinoma has been observed to originate in the clitoris and in its neighbourhood. It is just possible that local irritation from masturbation may account

for the beginning of some cases. Sarcoma may originate in the nymphæ. Soft sarcoma has been noted to grow from urethral caruncles.

Professor Ehrendorfer records a case in which the patient was aged fifty-two. She had observed a swelling at the meatus urinarius for a year and a half. The growths protruded from the urethra, pushing apart the labia minora. They were excised; they resembled caruncles; but on microscopic examination were found to be made up of small round nucleated cells in an indefinite stroma (33). The symptoms of epithelioma, carcinoma and sarcoma of the vulva are very much alike, except that the first named is far slower in its growth and less painful. Pruritus, increased vaginal discharge, and pricking, tearing or lacerating pains are experienced. Bleeding is apt to occur. Treatment consists in free excision with knife or scissors and uniting the edges with deep sutures, or the thermocautery may be used. Many cases of extensive involvement only admit of palliative treatment.

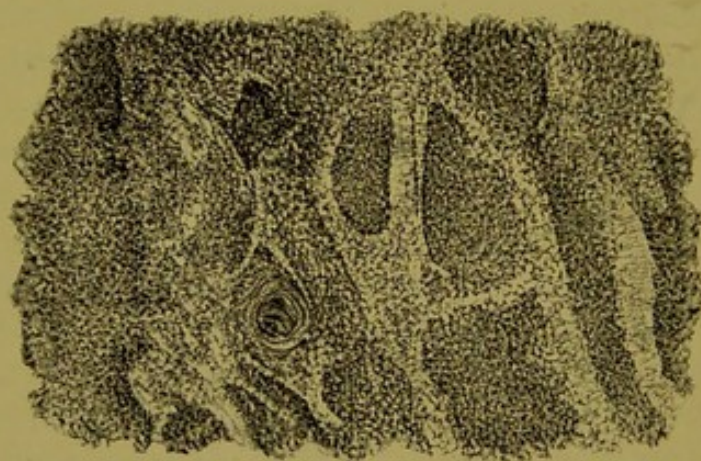


FIG. 38.—Canceroid of the Vagina (Winter).

The vagina is not infrequently the seat of primary sarcoma; epithelioma and carcinoma (fig. 38) are usually secondary to cervical disease. Bartholin's glands have been found to be the primary site of cancer (34). Sarcoma of the vagina may be either nodular or diffuse. The posterior vaginal wall is most commonly affected, pain especially at night, ulceration and hæmorrhage are observed. In the carcinomata, hæmorrhage with watery and ichorous discharges are prominent features. Treatment should aim at total removal when possible, and at palliative treatment as mentioned in the former chapter when the radical cure is impossible.

The Fallopian tubes are occasionally the site of papillomatous growths which may rupture the tube and infect the peritoneum.

Carcinoma or sarcoma may occur primarily in the tubes, but is nearly always secondary to uterine or ovarian malignant disease. The symptoms are observed about the time of the menopause. A blood-stained vaginal discharge occurs; there is distinct enlargement of the tube; and if there are no signs of uterine or vaginal cancer an exploratory section will determine the diagnosis.

The ovary may also be the primary seat of sarcoma or carcinoma. Sarcoma may happen at any period, but for the most part is an affection of early life. It is commoner in children and young girls than in adults over forty. Carcinomata, on the other hand, belong to adult life. Cancer may either attack a previously healthy ovary or invade a benign ovarian cystoma. Any variety of cystic ovarian tumour or dermoid may become malignant. Post-climacteric women who are the subjects of ovarian cystomas seem most apt to the cancerous transformation of the tumours. But primary cancer is also met with. In February, 1892, I operated on a patient of Dr. Walter Rigden's, who had long passed the climacteric; she had primary malignant disease of both appendages. There was no ovarian cyst. The uterus was closely adherent to the appendages on both sides, but was evidently not the originating site of disease. The cervix and corpus uteri were not affected. In this case the parts were adherent, and the bowel was also invaded, so that removal was impracticable. The patient recovered well from the operation, but died in a comparatively short time after from exhaustion.

Malignant Disease of the Bladder is invariably fatal. Epithelioma is more common in women than in men. It is generally met with after forty-five. Villous tumours are not uncommon; they originate in the mucous membrane as warty growths, and frequently attain a large size. Carcinoma in the bladder is usually due to an extension of uterine cancer. The patient dies in about a year. Cancer of the bladder may spread to the ureter and by blocking it cause hydronephrosis and uræmia. The ureters also become involved in cancer of the body of the uterus, death resulting from uræmic poisoning.

The anus is not an uncommon site of epithelioma in women aged over forty. If these cases are not treated radically, death usually results in about a year; but if it is possible to remove the diseased parts freely, life may be prolonged for several years—from five to eight years may be hoped for.

Malignant Disease of the Mammæ is, as we have seen, most prone at the menopause or shortly after it.

The terms scirrhous and encephaloid are obsolete. The former

was used by Galen, and applied by him and his disciples for many generations to all varieties of hard tumours; later, the term became restricted to the class of tumours which, commencing in induration, then ulcerated; and finally the name was reserved for the fibrous variety of cancer. Encephaloid (or brain-like) cancer was applied to the less common variety—the rapidly infiltrating and ulcerating soft cancers.

The pathology of to-day, which is based upon Billroth's original suggestion, now refers breast cancers to one of two types—the acinous and the duct cancers. The former begins in the epithelium of the acini, the conglomerate glands making up the *mammæ*.

It usually originates as a small hard nodule which, while partially movable, is evidently connected with the parenchyma of the breast. The growth may be of stone-like hardness, quite justifying the old clinical name *scirrhus*. It increases slowly and often painlessly; some patients experience very acute darting, shooting pain from an early period of invasion. Depending on the position of the growth being near the areola, retraction of the nipple is noticeable. The skin becomes closely adherent over the growth, and then ulceration occurs. The ulcer eats its way slowly, but progresses without improvement or remission. The tumour spreads inwards as well as outwards, so that the pectoral muscles, the ribs, the pleura, and the lungs eventually become involved. At a comparatively early stage, even before superficial ulceration is threatened, the lymph glands in the axilla become invaded. Painful swelling of the arm on the affected side from lymphatic œdema is one of the frequent consequences. The left breast is more frequently attacked than the right. The histology of the disease is given with great clearness by Roger Williams in his recent work (35), to which I would refer my readers for full details.

Duct cancer, although much less usual than acinous cancer, may be regarded as the special variety of mammary cancer at the menopause. In consequence of climacteric glandular atrophy of the breasts, the breast glands shrivel up and disappear until little but the ducts and skin covering is left. As the result of coalition of these ducts and liquefaction of the tissues, cysts are formed. Inside these cysts there is a special tendency to the formation of papillomatous growths. These may be single or multiple. They cannot be regarded as malignant, for they do not cause local infection, nor affect the contiguous lymphatics, and when wholly removed, these intracystic papillomata rarely or never recur. But cancer may attack the degenerated cystic cavities, and thus we have duct cancer. Williams applies the name tubular cancer to these duct

cancers; and describes tubular cancer as a distinct variety. He figures two forms, the solid and hollow—the former from Labbé and Coÿne, the latter from Bryant. Lymphatic infection is less common than in the acinous type. It occurred in five out of eighteen of Williams's cases.

Clinically, these duct or tubular cancers are always found to be softer than the more common glandular (acinous) variety. The nipple is not retracted to the side of the growth, but may be drawn in. In a considerable proportion of cases there is a watery, blood-stained discharge extruded from the nipple, but this cannot be accepted as an undoubted symptom; I have seen such discharges occur in menopausal women who had no more serious condition than an exacerbation of a chronic adenitis which never became malignant. Duct cancer rarely disseminates itself, and if freely removed, rarely recurs. The growth is very slow. It may be regarded as a much less malignant disease than acinous cancer.

Treatment.—In all probability breast cancer is at first purely a local disease. If this is so, early and thorough removal constitutes the only reliable cure. Showing that even a late operation may be successful, I may, without egotism, be allowed to relate the following brief particulars. A lady, aged forty-eight, came to England from abroad in the end of July, 1891, suffering from a recurrent tumour in the left mamma. In the early part of 1891 a rapidly growing hard tumour had been excised from the breast. The specimen was sent home to the Middlesex Hospital, and pronounced to be malignant. In six months after the partial operation, the growth had become much larger than before the first operation. On seeing the patient on 4th August I found the breast generally very hard, and the greater part of the skin covering it adherent; the cicatrix of the former scar was ulcerated. The axillary glands were enlarged, and there was distinct swelling in the left supraclavicular region, although no hardened glands could be felt. I advised thorough removal of the whole breast and of the axillary glands as affording the only possible chance. The patient at first strongly objected to so radical an operation. On 11th August I had the advantage of a consultation with Mr. Jonathan Hutchinson, who agreed with me that total amputation of the mamma and excision of the glands was the only course. At the same time Mr. Hutchinson told me, privately, that he did not think the patient had more than six months to live. I operated on 13th August, being assisted by Mr. Wainewright. The growth had deeply invaded the pectoral muscles, which I consequently removed; the axilla was thoroughly cleared out; the supraclavicular region was explored, but no separate

enlarged glands were felt. The large wound was brought together, and two decalcified chicken-bone drainage tubes were inserted. Healing took place kindly. The growth was examined by Dr. Montague Murray, Dr. Shaw Mackenzie, and other pathologists, and in the reports I received it is stated that the form of cancer was exceedingly malignant, and almost certain to recur.

On 22nd June, 1893, Mr. Hutchinson again saw the patient, and pronounced her quite free from recurrence—to quote his own words: “by all the rules of surgery, one would have expected her to have been dead long ago”. Up to this date (June, 1896) there has been no recurrence. The patient has good use of the left arm; her general health is very good. She has thus satisfied Volkmann’s law that if no recurrence has taken place in three years radical cure is almost certain, and her case may be added to those happy results which are now obtained by many operators who remove freely and antiseptically all the affected areas of disease.

Mr. Watson Cheyne, in his lectures at the Medical Society of London, 1896, records twenty-one cases operated on at least three years before the date of his lectures. There were no deaths from the operation. Twelve cases were well for more than three years. In nine cases there was recurrence, five being external, with metastatic deposits in addition; one recurrence (?) external, three metastatic deposits without external recurrence. Therefore the percentage of cures was 57·2 per cent.; of recurrences, 42·8 per cent. Mr. Cheyne believes from a study of sixty-one of his own cases that the chance of recurrence is very slight if a patient is absolutely well after a year.

While I am an advocate for complete removal, I think it very important that one should establish a clear diagnosis of malignancy before recommending or adopting it. It is certain that not a few patients have been subjected to the risks of operation who should not have been thus treated. A recent experience of my own will illustrate my meaning. A patient attended at hospital on account of a hard breast tumour. She was about forty-seven years of age, and was at the menopause. There was a firm, circumscribed, hard nodular swelling nearly midway between the areola and periphery; there was no feeling of softness either deep or superficial; the skin was tight over the swelling, but was not adherent; the nipple was not retracted; there was no lymphatic enlargement in the axilla. The patient stated that she had stinging, darting pains in the breast, but that at times she had no inconvenience. I advised the application of equal parts of liniments of iodine and belladonna to be painted on night and morning; and prescribed bromide and

iodide of potassium as a mixture. I did not see the patient again for over a year, when she came to my house to thank me. Her breast tumour (menopastic glandular hypertrophy) had disappeared. She also then informed me that before taking my advice a distinguished general surgeon, who had carefully examined her at his own house, had pronounced her case to be one of cancer, and had advised immediate operation. For obvious reasons I refrain from mentioning this gentleman's name; yet not only his high reputation at his own great hospital, which he serves so well, but my personal knowledge of him, are guarantees that his opinion was given conscientiously and deliberately; if such men err, then others with less opportunity may be forgiven. It is unfair to ourselves and our clients alike to assume that it is always possible to avoid mistakes. In certain doubtful cases an exploratory operation is as warrantable on the breast as it is in abdominal surgery. Some cystic adenomata, cystic sarcomata, even lipomata, or diffuse mastitis, with cyst formations, may easily enough be confounded with localised hypertrophy or with cancer.

Sarcoma of the female breast is distinctly rare when compared with cancer. The mean age for sarcoma is forty-five. Adeno-sarcoma arising in the connective tissue in close proximity to the small gland ducts is the more common form. Cysts with intracystic growths are met with. In other adeno-sarcomata no cysts are observed. Microscopically, both round and spindle-celled sarcomas are seen; the growths may structurally be wholly composed of one or the other variety, but most often both are present, although one predominates. The spindle-celled tumours here, as elsewhere, are less malignant, and grow slowly, attaining the size of an average apple in a period which may extend over two or three or many years. The cystic growths may attain a very large size. R. Williams mentions one that hung from the right mamma as low as the iliac crest (36). The spindle-celled sarcomata may be the seat of irregular fibrous stroma, fatty or cystic changes, calcareous or cartilaginous or bony deposits. But many of these are merely pathological curiosities.

True primary sarcomata arising in the connective tissue of the breast, and devoid of glandular structure, have been noted, but these are still rarer than adeno-sarcomata. These might be confused with fibro-sarcomata, or even true fibromata of the breast. Fibro-adenoma is sometimes non-malignant; according to some observers it may exist over thirty years, and it is alleged that such tumours may disappear spontaneously. That they often undergo degenerations which tend to their elimination is generally admitted.

Other cases cannot be separated from sarcomata. And in any case it seems advisable to treat them as though they were malignant, the only difference being that enucleation of the growth, if small, instead of total removal of the breast may be practised.

I cannot refer to this subject of treatment without again reiterating my strong conviction that those who rely on any other means of treatment of a malignant growth than free removal when such is possible, are likely to bring nothing but death to their patients and discredit on themselves. No caustics nor electrical treatment nor hypodermical injections of alcohol nor toxins nor anything else can be compared for a moment with the results obtained from early and thorough removal.

The risk of attempts to cure breast cancer by the application of strong electrical currents is considerable. I know of a fatal result following the employment of a strong current used over the cardiac region in an effort to electrically treat a cancer of the left mamma. The operator was not unaccustomed to the management of the apparatus, and there seemed to be no other explanation of the death beyond the fact that cardiac paralysis was produced by electricity.

For cases beyond operation the various methods of injections already alluded to may be practised. Injections of sterilised serum of the toxins or of alcohol or pure carbolic acid may be practised. The injection of methyl violet seems to have no specific action, but of this I can only write from hearsay, as I have no personal experience of it.

The strictest cleanliness will afford the incurable patient much comfort. Lotions or ointments of terebene, sanitas, izal, aristol, iodoform, or such like drugs may be employed.

- (1) *Lectures on Cancer of Uterus*, London, 1894.
- (2) *Die Neubildungen des Uterus*, Stuttgart, 1885.
- (3) *Annali di Ostetricia e Ginecologia*, p. 45, 1895.
- (4) *Diseases of the Breast*, p. 405, London, 1894.
- (5) *British Medical Journal*, p. 233, 30th July, 1887.
- (6) R. Williams, *op. cit.*, p. 279.
- (7) *Ibid.*, p. 280.
- (8) *Ibid.*, p. 283.
- (9) *Reports of Registrar-General for England for 1888 and 1889*.
- (10) Middleton Michel, *Medical News*, 8th October, 1892.
- (11) *Geographical Distribution of Heart Disease, Cancer, and Phthisis in England and Wales*, London, 1892.
- (12) Vide Marchand, *Monatschrift f. Geburt. u. Gynäk.* Bd. i., Ht. 5. Kossmann, *ibid.*, Bd. ii., Ht. 2. Ruge, *Berliner Ges. f. Geb. u. Gyn.*, 14th June, 1895. Fränkel, *Archiv f. Gyn.*, Bd. xlix., Ht. 3, pp. 481-514. *Brit. Gyn. Journ.*, part xlii., p. 414, 1895.
- (13) Roger Williams, *lib. cit.*, p. 234.

- (14) Vide Sir J. Williams, *Trans. Obstet. Soc.*, vol. xxvii., p. 300.
- (15) "On the Microscopical Diagnosis of Benign and Malignant Growths of the Cervix Uteri," *British Gynaecol. Journ.*, Nov., 1895.
- (16) Vide papers by Dr. Ruffer and Mr. Plimmer in the *Journal of Pathology and Bacteriology*, 1893.
- (17) *Traité de la Menstruation*, p. 357.
- (18) Vide Jessett, *loc. cit.*; Pozzi, *loc. cit.*, p. 388.
- (19) Vide Byrne, *Brooklyn Medical Journal*, vol. vi., p. 741.
- (20) *Die Adenome und Cystadenome der Uterus und Tubenwandung, ihre Abkunft von Resten des Wolff'schen Körpers*, Berlin, 1896, v., Ss. iii., 155, 185, etc.
- (21) *Lect. on Cancer of Uterus*, p. 38.
- (22) Whitridge Williams, *Amer. Journ. of Obstet.*, vol. xxix., No. 6, 1894.
- (23) *Lib. cit.*
- (24) *Brit. Gyn. Journ.*, Feb., 1896.
- (25) *Ite. Bd. der Arbeiten aus der Königlich. Frauenklinik in Dresden*, 1895. Translation by A. E. Giles in *Brit. Gyn. Journ.*, Nov., 1895, p. 420.
- (26) Leibenstein, Olshausen, and Dührssen, *Schmidt's Jahrbuch*, Jan., 1896.
- (27) Since the above was written I have learned the further history of this case through the kindness of my friend Dr. Halliday Croom, of Edinburgh, who writes me to the effect that Miss B. came under his care in 1895 (eight and a half years after my having last seen her) on account of rapid post-climacteric growth of the tumour. Abdominal section was performed, and it was found that extensive malignant changes had attacked the tumour, uterus, ovaries and other pelvic viscera. The parts could not be removed. The patient died of shock. It is of interest to add that Professor A. R. Simpson, who saw the mother of this lady in 1888, wrote to me recently regarding her case: "Her mother (i.e., Miss B.'s grandmother) died of cancer".
- (28) Vulliet et Lutaud, *Leçons de Gynécologie Opératoire*, p. 75. Paris, 1890.
- (29) *Lectures on Cancer*, p. 76.
- (30) *Journal of American Medical Association*, vol. xxx., No. 4, p. 134, 27th July, 1895.
- (31) *Ibid.*, p. 133.
- (32) *Münchener Med. Wochenschr.*, 3rd Sept., 1895.
- (33) *Centralb. f. Gyn.*, No. 17, 1892.
- (34) Schweizer, *Archiv f. Gynäk.*, Bd. xlv., S. 322.
- (35) *Lib. cit.*, p. 156.
- (36) *Lib. cit.*, p. 432.

CHAPTER XII.

OVARIAN TUMOURS AT OR AFTER THE MENOPAUSE.

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(For other and fuller references see end of chapter.)

THE relation of ovarian tumours to the menopause is probably only of trivial importance, still it cannot be passed over in silence. The biology of ovarian cystic disease shows that, although simple cysts may be found at the extremes of life, the period of sexual activity is the most prolific in determining the growth of these neoplasms. Of 145 (1) cases of ovariectomy, thirty-eight were operated upon after the menopause. Sixteen of these thirty-eight were aged from sixty to seventy-five. The remaining twenty-two were operated on after the climacteric, but had probably developed before cessation of menstruation.

There is no reason to specially connect the development of true ovarian cysts with the menopause, except that, there being an increased tendency to malignant disease with advancing age, if an ovarian cystoma should become subject to malignant changes it is more likely to do so at the climacteric period than at an earlier age.

The proportion of cases of malignant ovarian cystoma has been variously estimated. Pozzi (2) records that of 658 cysts removed by Schröder, Cohn found 100, or 15·1 per cent., malignant. Leopold has counted twenty-six out of 116, or 22·4 per cent. These figures are believed to be higher than the average, but it is probably not an over-estimate to regard from 10 to 12 per cent. of all cases as subject to malignant changes.

It would be of great importance to be able to determine from a pathological examination of a large number of specimens whether post-climacteric growth of ovarian cysts is or is not due in the majority of instances to a malignant or semi-malignant change in

the affected organs. Clinically, however, there is no difference of opinion that an ovarian cyst, at whatever age it is diagnosed, should be operated on. It is not improbable that cystic degeneration of a non-malignant character is at times associated with instances of ovarian cyst development occurring about the menopause, and that cystic tumours which develop at a more advanced age might properly be attributed to malignant disease. But the material available at present does not seem to warrant any definite observation. From a case of my own, in a younger woman (the specimen from which was exhibited at the Obstetrical Society of London in November, 1893) (3), it is clear that sarcoma may affect the wall of ovarian cysts. I have mentioned in an article on Ovariectomy (4) that the subsequent history of this case demonstrated a rapid secondary recurrence, although the original growth was small, at the time of operation was wholly within the cyst, and there seemed little probability of recurrence.

We know that malignant uterine disease is frequently of sarcomatous nature, beginning either in the endometrium or uterine parenchyma. It is, therefore, by no means improbable that these post-climacteric ovarian cysts should be referred to the class of malignant adenoma, adeno-sarcomatous cystic degenerations.

Dermoids which have remained quiescent for a life-time may be found to assume increase of size, and cause pressure and other symptoms after the climacteric. I have operated on such cases, but have not been able to justify my suspicion of their probable malignancy. Another possibility suggests itself, *viz.*, that as the blood supply to the genitalia is no longer normally directed, the existence of an abnormal ovarian condition, such as a cystoma, or dermoid, may cause increased vascularity and consequent development of such a growth after the menopause.

As to the proportion of cases of post-climacteric ovarian disease, we have comparatively few data. In 500 cases, in which the menopause had occurred at least one year previously, Neumann of Vienna (5) found twenty-five cases of ovarian cyst; the average age was sixty, and the commencement of the menopause showed a mean of forty-seven years of age.

Unlike fibromyomata at the menopause, ovarian cysts do not often cause hæmorrhage. Of the twenty-five cases referred to, four women whose average age was fifty-four, and in whom the mean climacteric age was 45.5, had hæmorrhage; the remaining twenty-one, whose age averaged fifty-eight, and in whom the mean climacteric age was forty-seven, did not have uterine hæmorrhage. But despite the non-activity of the sexual system, and the non-appearance of

hæmorrhages, the increase of ovarian cysts is fraught with such undoubtedly serious consequences that operation is always indicated, if the patient's general condition will permit it. The prognosis is almost as favourable for ovariectomy, *cæteris paribus*, in elderly as in younger women.

Operations at advanced ages, *viz.*, in women from seventy to ninety, have been successfully performed. Dr. John Homans (6) records operations on twelve women over seventy for removal of appendages or tumours; of these, nine recovered; of the three who died, one was an incomplete operation in a cancer case; the second was a very adherent cyst which had been tapped four times, and the third woman was in her eighty-third year; the operation was long and difficult. Mr. Paul Bush (7) operated successfully on a patient aged eighty-four, Dr. Remfry (8) on one of the same age, Dr. Spencer (9) on one aged eighty-three, and Mr. Matthews Owen's (10) patient was over eighty-six. Knowsley Thornton's (11) patient was ninety years of age.

In event of great feebleness, or grave co-existent disease, it may occasionally be permissible to adopt the palliative operation of aspirating the cyst, should pressure symptoms render interference obligatory.

Post-climacteric changes in uterine tumours may be atrophic, degenerative, or malignant; in ovarian tumours the change of life cannot be expected to influence the tumour beneficially; and in a considerable but inexactly ascertained proportion there is little doubt that malignancy occurs.

The facts we have already cited regarding post-climacteric cysts do not seem to warrant the former belief that the climacteric is materially hastened by these growths. For the women who had hæmorrhage had a mean climacteric age of 45.5, and in those who had no hæmorrhage the mean age was 47. It is still more fallacious to believe that ovariectomy in women under forty is attended with higher mortality than in post-climacteric cases.

Recklinghausen (12), in discussing the pathology of Gärtner's duct cysts, parovarian cysts, etc., gives a valuable and in many respects novel account of the pathological factors. Adenomyoma and cystadenoma are defined as uterine tumours, containing true glands or cysts derived from such glands. He divides these into—

- I. Voluminous adenomyomata.
- II. Smaller tumours of the corpus uteri.
- III. Tumours of the uterine cornua.
- IV. Tumours of the tubes (*tubenwinkel*).

Of these varieties twenty-seven cases in all are given as follows :—

CLASS I.

Reference page.	No. of case.	Age of Patient.	Patrus.
4	I	39	o
10	II	43	—?
17	III	51	o
20	IVA	49	v + j
23	IVB	56	o

CLASS II.

29	VA	40	o
29	VB	72	Multipara
32	VI	42	Do.
36	VII	Old	Do.
36	VIII	Do.	Do.

CLASS III.

41	IXA	44.5	o
43	IXB	37-40	o
49	X	60	Yes
50	XI	31	Do.
52	XII	60	Do.
53	XIII	33	iii
56	XIV	61	—?
58	XV	47	iii
61	XVI	44	ii
63	XVII	82	Yes
65	XVIII	69	—?
70	XIX	Old	—?
71	XX	61	Yes

CLASS IV.

74	XXI	57	—?
76	XXII	55	i
78	XXIII	40 (?)	—?
79	XXIV	71	o
81	XXV	39	o
84	XXVI	56	o
88	XXVII	80	—?

It will thus be seen that several of these cases, which unquestionably would have been classed as ovarian cysts in former years, were found at advanced periods of life, and this is an important clinical fact which we must not ignore.

The account given of these tumours is, briefly, that they are confined to the uterus and tubes; when small they preferentially affect the peripheral layers. They may have a single large centre, and form large masses in the vascular stratum and in the peripheral layers; or if on the other hand there are multiple centres scattered without limitation through the walls, a central tumour may be formed by these coalescing.

The gland tubes of adenomyomata are regarded as derived from the Wolffian bodies. The arrangement and structure of the gland tubes accord in all particulars with the glandular structure of the Wolffian bodies. Arguments are advanced by Recklinghausen against the derivation of adenoma from the glands of the uterine mucosa (13).

The growth of adenomata and their relation to myoma are given with perspicuity (14).

There are some cases of metamorphosis of adenoma and its association with carcinoma given. In Freund's case the patient was aged forty-four; she had adenoma and cystadenoma with epithelial tubercles affecting the whole circumference of the uterus, principally the posterior aspect of the fundus (15). In another case there was myoplastic cylindrical epithelial cancer, infiltrating the middle layers of the corpus uteri; in a third there was cylindrical epithelial cancer, infiltrating the middle uterine layer.

Such cases might have been referred to in previous chapters, but as clinically the degeneration of fibroids after the menopause, and especially rapid malignant degenerations, are not infrequently regarded as new cystic formations, it has seemed to me justifiable to direct special notice to these observations in this place.

Neumann's (5) paper on "Post-Climacteric Bleedings," which I have had occasion to refer to previously, contains an interesting bibliography which students of the subject should refer to.

- (1) Mangiagalli, *Ann. di Ostetricia e Ginecologia*, p. 45, 1895.
- (2) *Traité de Gynécologie*, p. 757, Paris, 1890.
- (3) *Transact. Lond. Obstet. Soc.*, vol. xxxv., p. 408.
- (4) *Brit. Gyn. Journ.*, vol. x., p. 217.
- (5) *Monatschrift f. Geburtsh. u. Gynäk.*, Bd. i., Ht. 3, March, 1895.
- (6) *Boston Medical and Surgical Journal*, vol. 128, No. 21.
- (7) *British Medical Journal*, 14th July, 1894.
- (8) *Transact. Obstet. Soc. of Lond.*, vol. xxxiii.
- (9) *British Medical Journal*, 9th December, 1893.
- (10) *Lancet*, 2nd March, 1895. Also *vide* Table in Surgical Diseases of Ovaries and Fallopian Tubes (p. 220) by Bland Sutton. Of twenty-two cases, aged over seventy, by various operators, twenty recovered.
- (11) Neumann, *loc. cit.*
- (12) *Die Adenomyome und Cystadenome*, Berlin, 1896.
- (13) *Loc. cit.*, p. 155.
- (14) *Loc. cit.*, p. 170.
- (15) *Lib. cit.*, p. 188.

CHAPTER XIII.

TREATMENT OF VAGINAL AND UTERINE DISPLACEMENTS IN
ELDERLY WOMEN.

WOMEN at the menopause, and more especially during the climacteric period of life, are often subject to very inconvenient, if not serious, conditions of genital displacements.

I have formerly alluded to certain uterine displacements in association with increased hæmorrhages (chap. viii.), so that I shall not again revert to this.

The most common genital displacements are cystocele, rectocele and procidentia.

Cystocele, or prolapse of the bladder, comprises two varieties of displacement. These may be described as true cystocele and colpo-cystocele. True cystocele is a hernia of the posterior bladder wall through a fissure made by the longitudinal separation of the muscular fibres of the anterior vaginal wall; the sac consists of vaginal mucous membrane. This is an exceedingly rare condition; few, if any, of the systematic treatises on gynæcology mention it.

Colpo-cystocele, or, as it is usually called, cystocele, signifies a prolapse of the anterior vaginal wall, combined with prolapse of the posterior wall of the bladder. This is very common, but when the prolapse is small and intravaginal it occasions comparatively little discomfort. Vesicovaginal prolapse is often associated with uterine prolapse. In some cases the former depends on previous downward displacement of the uterus, but in many other cases cystocele precedes uterine descent. The displacement of the bladder is more commonly combined with uterine descent than is rectocele, *i.e.*, prolapse of the posterior vaginal and anterior rectal walls. In 108 cases of prolapsus uteri, cystocele was observed fifty-four times, rectocele but thirty-three.

The effects and consequences of bladder prolapse comprise: discomfort from feelings of downward pressure, incontinence of urine, dysuria, retention of urine, cystitis, formation of bladder concretions, various reflex symptoms, *e.g.*, renal pain, nausea, anorexia. Neglected cases may originate nephritis, hydronephrosis, uræmia.

Etiology.—Cystic catarrh and prolonged retention of urine have been regarded as likely causes, but parturition is one of the most important causes of cystocele, as it frequently produces separation of the vesicovaginal walls from each other. The vagina is in many cases driven before the advancing occiput, and is thus peeled off from its anterior connections, *viz.*, the anterior cervical lip, the bladder, the pubes, and the triangular ligament; less usually it is detached from its posterior relations with the posterior cervical lip, Douglas's pouch and the sacral wedge. The detachment from its anterior relations now concerns us. This involves separation of the anterior vaginal wall from the anterior cervical lip, and from the base of the bladder. The point of vaginal attachment to the cervix in front is very important, as here the vesicovaginal connection is very firm. Here rests the *point d'appui* of the uterus, bladder, and vagina. When, as a result of the passage of the foetal head, vaginal peeling happens, this will usually be arrested at the firm transverse ridge which is formed by the triangular ligament on the vaginal wall. As a consequence the anterior fornix becomes a loose sac hanging away from the cervix, into which the heavy, distended bladder falls; the tissues shortly become relaxed, and then the bladder, full or empty, permanently occupies the vacant space.

Symptoms usually date from a confinement. The patient will tell us that she noticed a "falling down of the womb" since shortly after her convalescence from childbed. Then repeated births may have occurred, and the displacement have become gradually worse, until finally a swelling—it may be as large as the foetal head—is extruded from the vulva. Cystocele is often mistaken for uterine displacement, and it is indeed very frequently associated with uterine prolapse. Still, one frequently meets with very large cystoceles in women who have passed the menopause and have senile uteri. In the majority of cases of cystocele associated with uterine prolapse, cystocele is the initial lesion. Procidentia uteri is seldom or never combined with so large a bladder prolapse as we find in true colpo-cystocele. Either a swelling coming outside the vagina is accompanied by much downward pressure, and generally more or less leucorrhœal discharge, or this with trouble on micturition. Sometimes retention, sometimes incontinence, drives the patient to consult a medical man, but many poor women content themselves with trying to keep the swelling inside the vagina as best they can by wearing pads over the vulva.

On examination we find that when the patient is lying on her back the whole extent of the displacement is not seen. A con-

siderable anterior swelling of the vaginal mucous membrane occupies the front part of the vagina and extrudes from the vulva. On introducing two fingers into the vagina we may feel the uterus to be in normal position and of ordinary or senile dimensions ; or the uterus may lie in the vaginal axis and be partly prolapsed. The posterior vaginal wall may be normal or be partially prolapsed. On asking the patient to cough or strain down, the true nature of the case is at once apparent. I have often been surprised at the size of the swelling thus extruded.

Treatment.—In minor degrees of cystocele, relief may be obtained and even cure effected by the use of astringent douching of the vagina, and the employment of pessaries. The douches I generally order are composed of alum or of sulphate of iron, one dr. to the pint ; in others, vegetable astringents, such as decoctions of oak bark or of quebracho, one to two oz. to each pint of water, are used. Hot douching with two drs. of boracic acid is useful for soothing the catarrhal irritation frequently complained of. If there are patches of erosion, nitrate of silver or sulphate of copper should be applied before the douching is used. The pessaries which give most satisfaction are the soft rubber rings. A Hodge's pessary with transverse bars, or in private patients a carefully fitted silver or vulcanite pessary, with a perforated diaphragm, may be ordered. A rubber ring pessary, with a rubber diaphragm, soon becomes unwearable, the smell from the retained vaginal secretions being abominably offensive. Any pessary which prohibits free cleansing of the vagina daily should be eschewed, whatever its apparent merits may be. Nor can one rest content with simple replacement of the vaginal wall, the insertion of a pessary, and the prescription of an astringent injection.

Cystitis, subacute or chronic, is a common complication. The appropriate treatment depends on the condition of the lining of the bladder. If the urine is alkaline and offensive, and be found to contain epithelium, phosphates, and, as it probably will, albumen and pus, we should order free purgation, milk diet, and rest. An acid mixture should be given, such as :—

R̄	Acid nitrici dil.	-	-	-	-	-	-	3ii.
	Tinct. bellodonnæ	-	-	-	-	-	-	3ii.
	Tinct. hyoscyami	-	-	-	-	-	-	3ss.
	Decoct. tritici repens (conc.)	-	-	-	-	-	-	3ii.
	Aquam q. s. ad	-	-	-	-	-	-	3viii.

Ft. mist. ; an eighth part thrice daily.

The cystitis will, however, be much more rapidly relieved if we employ local treatment by injecting the bladder morning and even-

ing with a solution of *mi.* of dilute nitric acid to each *oz.* of hot water.

Should the urine be acid, and there be no marked evidence of phosphatic concretions, a mixture of benzoate of ammonia, with tincture of hyoscyamus and decoction of couch grass or of buchu, will be found sufficient. The benzoate corrects the alkalinity to which there is usually a tendency. In very obstinate cases it may be necessary to form a vesicovaginal fistula, through which the bladder can be thoroughly washed out.

Urethral caruncle is another possible complication which must not be overlooked. On examination, one sees a red-coloured swelling varying in size from a small pea to a strawberry, apt to bleed and often very tender and irritable, projecting from the meatus urinarius. The dilatation of the external orifice of the urethra, and free application of Paquelin's thermo-cautery, or of the actual cautery, used with circumspection, is most likely to effect a permanent cure.

Operative Treatment.—A considerable portion of chronic cystoceles can be far better treated by operation than by less radical measures. Patients may wear many varieties of pessaries half a lifetime without more than temporary relief, and some cases never derive more than partial relief. With but few exceptions, operators have not hitherto regarded plastic operations on the anterior vaginal wall with much favour. Little wonder, when we find a recent edition of a leading text-book on surgery recommending that the denudations should consist of "freely paring opposite portions of the vaginal wall and bringing together the freshened surfaces. The dissection is to be carried well up posteriorly, two or three deep, and as many superficial sutures to be used." If this is not confusion and inexactness, what is it? Several gynæcologists expect to cure uterine prolapse and cystocele by perinæorrhaphy, and are satisfied when they find that by this measure the prolapse is, at any rate for a time, kept within the vagina.

As we shall shortly mention, complementary operations are frequently advisable. Many anterior colporrhaphies have doubtless failed to effect permanent cure on account of either the cervix or the perinæum being untreated. But it is irrational to expect to cure a large bladder prolapse by suturing the split cervix or the deficient perinæum. It is perfectly true that after perinæorrhaphy a pessary may retain a cystocele in place better than it was possible to hope for without the perineal repair, and as rectocele often is found in conjunction with, and sometimes at any rate as a concomitant cause of, cystocele, the true explanation of the benefit gained may

be misinterpreted. But as the operation here recommended is neither difficult nor attended with risk, it seems important to state plainly that anterior colporrhaphy is as much the correct operation for cystocele, as posterior colporrhaphy is for rectocele.

Many operations have from time to time been suggested or practised on the anterior vaginal wall for the relief of cystocele. All of these have been more or less inspired by Marion Sims' original procedure. Emmet's anterior colporrhaphy is only an enlarged Sims' operation. Winckel's method differs in detail, but the principle is similar, and the same may be said of Dieffenbach's and A. T. Reamy's operations. I, also, have formerly described an operation for the relief of uterine prolapse complicated by anterior vaginal prolapse. Now, with extended experience, and I trust a juster recognition of the proper procedure in treating cystocele, I have abandoned all these methods. I know that for uterine prolapse, incurable except by operation, ventro-fixation is vastly superior to any variety of colporrhaphy, and I believe that for anterior vaginal prolapse Stoltz's operation remains as the only reliable method of cure. I have been unable to ascertain when Stoltz, of Nancy, first practised this operation. In 1875 Dr. Heywood Smith published the account of a case successfully treated in this way; he relates that he operated on the personal advice and in the presence of Dr. Stoltz, who was then on a visit to England. Years passed, and although isolated gynæcologists may have occasionally operated in this manner, the wave of gynæcology rolled on, occupying itself with seemingly greater things, and this most simple yet highly useful operation never came into general use.

General history repeats itself, so do operative histories. In 1890 Dr. Paul Mundé (1) described Stoltz's operation as "the best operation for cystocele," and elucidated his description by an excellent coloured illustration. Mundé mentions that he has been unable to find Stoltz's original communication, but says he read an account of it in a French journal several years ago, in which the circular suture operation was attributed to Stoltz. He further goes on to say: "It is easy of execution, simple and perfectly certain in its results".

I have modified Stoltz's original method of operating as follows:—

Method of Operation.—Having the patient placed in the dorsal position, with the knees well flexed, and the labia separated by assistants, I introduce a sound within the bladder and displace the viscus as far downwards as possible. I then seize the anterior vaginal surface with vulsella or catch forceps, and drag it down-

wards. A superficial circular incision varying with the size of the cystocele is marked out. A large Hagedorn needle held in holder, and bearing a stout silk thread or sulpho-chromic catgut ligature, is introduced half an inch below the meatus and slightly to its right side, the needle is carried round outside the marked line of incision, and the suture is kept as much buried as possible; it finally emerges to the left side of the point of entrance. The denudation is then made with a scalpel, commencing usually at the margin nearest the meatus, and terminating at the line nearest the cervix. When the tissues are non-cicatricial and loose, the handle of the scalpel or finger will easily separate the greater part. Should there be any threatening of hæmorrhage, slight tightening of the ligature by raising the ends of the thread, not drawing on them, controls it. It is very rarely necessary to apply catch forceps, and inadvisable, unless really requisite, as I think it lessens the chance of accurate adhesion of the denuded surface. After finishing the denudation, the sound is withdrawn from the bladder, and having thoroughly bathed the raw surface with perchloride of mercury solution, a clean sound presses the denuded part upwards and inwards. The circular ligature is pulled tight and firmly tied. Should there be any puckering at the edge of junction showing raw surfaces, two or three fine chromicised catgut stitches are introduced, the silk thread is left *in situ* ten or twelve days, when it is removed, or may then be cut short near the knot, and allowed to come away of itself. In some cases of cystocele I have supplemented Stoltz's operation by a plastic operation on the posterior vaginal wall and perinæum.

For operators unaccustomed to Hagedorn needles, a handled needle curved on the flat, and with posterior notch for reception of the thread, will be found more manageable. Still the two ordinary needles used by Mundé may answer equally well. The important point in my modification consists in introducing the circular suture before denuding the vaginal wall. The first time I operated in this manner, I accidentally cut the silk thread near its point of exit when denuding. I picked up the cut end, and drawing it through, rethreaded the needle, and repaired the error. This little *contretemps* may easily be avoided by exercising a little care.

The advantages of this modification of Stoltz's original operation are: 1, The amount of tissue to be removed can be more accurately determined; 2, no hæmorrhage obscures the field of operation; 3, no retraction of tissue occurs, as happens when denudation is effected before introduction of the ligature.

In patients who have had previous operations which have resulted in the formation of cicatricial tissue, the introduction of

the suture first is a great advantage ; in simple cases, except for the risk of obscuring hæmorrhage, it is less necessary.

As to the results of the operation, Mundé says : " In no case have I seen the cystocele return after this operation ".

I first operated in this manner in 1891, and published the case in a paper contributed to the *British Medical Journal* for 8th April, 1893 ; since then I have had frequent opportunities of repeating the procedure, and have had no reason to change the views I then expressed that the circular denudation is unquestionably the best variety of anterior colporrhaphy. An important point which I have recently had an opportunity of verifying, is, that should the operation fail to produce sufficient contraction it can be repeated with the assurance of ultimate success. The case I refer to was that of a patient who had undergone a Stoltz's operation, performed by another operator as a complementary operation to ventro-fixation and perinæorrhaphy, and who had a strong objection to wear any pessary. The uterus was well fixed behind the anterior abdominal wall, the perinæum was sufficient, and the degree of cystocele far from important, but the patient (like many hospital cases, a lover of operations) was anxious to feel absolutely independent of pessaries and to have her cure complete. I was asked by one of my colleagues to undertake the case. There was very little room in the vagina, and the modified prolapse hardly required an operation. Still it was satisfactory to find that the method described could be quickly and easily repeated, and, I understand, has been attended with complete success. So far as I can learn the bladder has never been wounded, and if in any future case it should be, a few interrupted or a thin continuous chromicised catgut suture would ensure its healing speedily.

Rectocele signifies prolapse of the posterior vaginal wall which drags with it the rectum. It is most commonly associated with deficiency of the perinæum, more particularly that pad of tissues described in books as the perineal body. Minor degrees of rectocele occasion little discomfort, and may be left alone unless co-existent with other conditions requiring treatment.

Etiology.—It will be found that the same cause to which we attributed cystocele as most common—parturition—is the greatest factor in the production of rectocele. But it may be observed that the method of causation differs. We remarked that it was the vigorous continuous forward twisting of the occiput within the vagina which effected the division of the anterior vaginal layer from the posterior bladder wall ; on the other hand, it is generally a traumatic lesion of the perinæum caused during the childbirth

either naturally or instrumentally, which is the first cause in producing rectocele. In cystocele a lingering labour with a large child ; in rectocele the relatively rapid termination of labour will be most frequently at fault. Further, once a minor degree of rectocele is established, it is easy to understand that straining at stool due to constipation will ere long greatly increase the prolapse. During defecation there is a direct downward pressure which until the sphincter ani is relaxed will undoubtedly tend to stretch the weakened posterior vaginal and anterior rectal walls.

In elderly women who have lost the adipose tissues in the genital regions, or in others with lax perineal and rectal muscularity, there is little resistance to the frequently recurring aggravating cause. We, therefore, would be prepared to believe theoretically what is a clinical fact, that rectocele is a commoner condition than cystocele, although as a complication of uterine descent, as we have previously observed, cystocele occurs nearly twice as often.

Symptoms are less urgent than those of cystocele. The patient complains of a feeling of weight and dragging, and generally refers the "bearing down" to a displacement of the womb. The size of the prolapse may be considerable ; as large as an orange is not uncommon. On separation of the vulva we note that there is generally some laxity or deficiency of the anterior perineal structures, a swelling bulges from the posterior vaginal wall—it may extrude wholly beyond the vulva. If we pass a finger into the rectum, we find that the swelling is occupied by it. There may be co-existent cystocele or uterine prolapse ; the former is fairly common—some degree of uterine descent very common.

Treatment.—The measures adopted for relief must depend mostly on the condition of the perinæum, and, secondly, on the co-existence of uterine prolapse and cystocele. Astringent douches alone are of very little value. Pessaries may effect cure if the perinæum is tolerably good. Difference of opinion exists as to the best pessary. My own practice teaches that Hodge's form of pessary made of block tin or vulcanite and modified according to the individual requirements of the patient acts better than oval celluloid or rubber ring pessaries in cases of rectocele. Should there be downward and backward uterine displacement, we must try a well-fitting pessary. But in such cases it is not improbable that the rectocele is secondary to the uterine descent. If the perinæum is deficient we cannot expect much benefit from pessary treatment until after the deficiency has been rectified.

Operative Treatment.—Finding from clinical experience that rectocele seldom attains great size if the perinæum is intact and of

good tone, many surgeons content themselves by performing perinæorrhaphy. This operation need not be described except in so far as it bears on the operations of colpo-perinæorrhaphy. The two methods most in favour are the flap-splitting operation of Tait, and the paring or denuding operation. In the latter, two methods of suturing are used, *viz.*, the interrupted and buried suture, and the so-called "purse string" suture. These three operations are so well known and described in all recent text-books that we need only mention them. Lawson Tait's operation is excellent when the rectum is not torn into; should this be the case, the application of separate rectal sutures of chromicised catgut greatly strengthens the prospects of permanent success. It seems also an advantage to run the upper suture through the lower edge of the flap of tissue dissected up. A combination of the "purse string" and "buried interrupted" suturing is better than either of these methods by itself.

Colpo-perinæorrhaphy ended perinæorrhaphy in which the denudation is carried for two to three and a half inches up the posterior vaginal wall. Many methods have been described, but we shall only now concern ourselves with three: Hegar's, Martin's, and Doléris'. The two first named are extended and modified from the "interrupted buried" suture perinæorrhaphy, the latter is based on the "flap-splitting" method.

Hegar's operation consists of a denudation of the posterior vaginal wall made of the shape of an isosceles triangle, from three to three and a half inches broad at its base, beginning close to the fourchette, and meeting about three inches up the vagina. In some cases of large prolapse a still larger denudation will be required. There are two or three points of importance in the management of the operation. Raise the anterior wall with a Sims' or Simon's speculum, fix the centre of the posterior wall at the point where the acute angle of the triangle is to be formed, also fix the edges of the base with forceps at each side, and let the middle of the side lines likewise be marked off with forceps. The labia are held apart by the assistant's fingers, and when the forceps are drawn on, the space to be dissected off is made tense. In lining out the triangle it should be made concave at its base and slightly convex inwards on the two sides. Different methods of suturing may be employed to bring the said edges into apposition—either deep interrupted silver and superficial silkworm gut, or continuous catgut sutures in layers.

Martin's operation aims at preserving the vaginal mucous membrane, and, further, is accompanied by less hæmorrhage; as

the raw surfaces, while equally large, are in three different portions, and are finally sutured without loss of tissue. This operation consists of two parts, the first being a double denudation of two narrow flaps ; the second, the formation of a raised surface, which becomes lozenge-shaped after being pulled on. " Two small lateral flaps are marked out in the vertical axis of the vagina ; these reach to within an inch of the fourchette, and extend some two or more inches up the vagina. After freshening the surfaces they are sutured with continuous catgut in superposed layers." The second stage is rather less easily described. " A transverse incision is made a little above the fourchette, cutting through the column of the vagina and reaching on each side up to the vaginal ring. From the end of this incision one starts making another concentric incision, going off at an acute angle from it towards the base of the labia minora, where it joins the vertical incisions previously described. In this way there is obtained a transverse flap, shaped as a crescent, with its concavity upwards when it is in a state of rest, and which, when it has its extremities pulled on, takes the shape of a lozenge." (Operators who know Duke's method of perinæorrhaphy will follow this.) " The flap has to be dissected if the wound is united by continuous catgut sutures in layers."

This operation, like many other plastic procedures, can be much more rapidly understood by one demonstration than by the most lengthy explanations.

Dolérís' operation is essentially Tait's " flap-splitting " carried higher, and the flap cut off.

A modification of this which has given me excellent results consists in removing only part of the flap, passing a catgut suture through the lower edge of the flap and then through the rawed surface deeply ; and denuding the vagina by a separate denudation above the flap. I have frequently effected a rounded denudation and employed a singular circular suture, as in Stoltz's operation for cystocele, for the upper rawing, and find it occupies less time and effects better narrowing.

It is important to note that if rectocele is associated with uterine prolapse we can seldom expect a permanent cure, unless we do something more than strengthen the perinæum and narrow the vagina.

Combined Operations for Rectocele and Cystocele.—As vaginal prolapses are often associated with uterine prolapses and as the latter frequently seem to be a result of the former, and further, as we have seldom a marked rectocele without some degree of cystocele, or *vice versa*, it is often necessary to operate on both vaginal

walls simultaneously, and it may be to perform an operation on the cervix or uterus which we will hereafter consider. For cystocele or rectocele we may advantageously use Stoltz's operation and a colpo-perinæorrhaphy, such as Hegar's or Doléris', at one sitting. In the majority of marked cystoceles the perinæum is found lax, but except that perinæorrhaphy may make it practicable to derive benefit from the use of a pessary, the operation of itself is here of insignificant value.

Complete closure of the vagina in elderly women, suturing the lowest point of the anterior vaginal wall to the upper part of its posterior wall, and various other proceedings of like nature have been employed. Léon Le Fort has devised a simple and intelligible method of dealing with conditions of cystocele and rectocele complicated with procidentia uteri.

Le Fort's operation requires reduction of the size of the prolapsed uterus; this is attained by rest in bed and other suitable treatment. Before operation the uterus is made to protrude from the vulva, so as to determine the extent of the surfaces to be rawed. At the time of operating the uterus is reduced, the vulva separated, two transverse incisions made on the anterior and posterior walls at the lowest point where they are then in contact—these incisions form the lower limit of the two raw surfaces. The incisions are now rawed for two and a-half inches or more vertically, and about an inch in breadth. One should not make the rawed surfaces too broad, otherwise it will be difficult to get them into exact apposition. No great depth is needed; nothing more than a bleeding surface should be aimed at. The sutures are passed; the first one goes through the middle of the raw surface nearest the uterus. When tightened, this reduces the vaginal prolapse. When the extreme upper and lower ends are brought into contact the edges are sutured. Le Fort used silver wire sutures. The suture inserted through the mucous membrane in the direction of the wound on one of the vaginal walls passes out through this wound, and then into the other wound, to come out again through the mucous membrane on the opposite side of the vagina. Sutures are left in for fifteen days, or even for twenty-one days. Personally, I have had no experience of this operation. Of forty cases thirty-five are claimed as successful, thirty-one after one operation. Coitus and parturition are not prevented. One of the patients operated on was delivered at term; the septum had to be cut at the time of the confinement. Modifications have been proposed as follows: About three inches of surface between the cervix and the vulva is freshened, and catgut sutures are used instead of silver. Le Fort's opera-

tion is not wholly free from risk; the peritoneum has been wounded posteriorly, and Tillaux reports one death resulting from this.

After Treatment.—In the vast majority of cases the less after treatment the better. An early purge, say on the second day, is advisable. The bowels should be opened, and the motions kept rather lax, every day or at least every second day thereafter, during the next ten days. Vaginal douching is seldom or ever necessary; when employed, great care should be taken lest tender tissues or stitches are pressed on by the tube. If, in consequence of leucorrhœal discharges or premature post-operation menstruation, a disinfectant is deemed advisable, a vaginal suppository of iodoform, or still better, aristol, may be inserted morning and evening for a fortnight. The patient should rest in bed for at least a fortnight, wear a vulvar antiseptic pad, and be kept on easily digestible food.

The results of plastic operations for vaginal prolapses, as regards the danger to life, so far as my own experience, and knowledge of the work of my colleagues and other friends go, are perfect. I know of no death, or even serious accident or illness, having occurred in consequence of any of the operations I have recommended. Hitherto operators have been somewhat sceptical as to the durability of the cures effected by plastic vaginal surgery. Three years has, somewhat arbitrarily, been assigned as the period during which the cure must be maintained before it can be claimed as complete. If space allowed, I might detail several cases complying with this testing requirement.

Procidentia.—In procidentia uteri in elderly women, the effect of plastic operations is less satisfactory than in younger women. If a patient, who has passed the menopause, suffers from complete extrusion of the uterus, or even if there should not be total procidentia, if there is return of hæmorrhage, and any hardening of the organ, I believe that vaginal hysterectomy should be performed. It is a very easy operation, and with reasonable care, as safe as it is easy.

In the *British Gynæcological Journal* (2) I have recorded a case thus treated. The patient was aged sixty-five years—the uterus had been procident for nearly twenty years. Shortly before she consulted me, uterine hæmorrhages had recurred. The uterus was enlarged and thickened. No pessary treatment was beneficial. As the clinical symptoms were suggestive of early malignancy, and as the procident organ was a source of great inconvenience, I advised its extirpation. This was agreed to, and I wholly removed

the uterus per vaginam. The recovery was free from any untoward symptom. The patient has since remained in excellent health.

A recent paper by Dr. J. Woff gives an admirable account of "total extirpation of the uterus with removal of large vaginal flaps for total prolapse of the uterus," as practised at the Dresden Poliklinik. In ten years the operation was done eighteen times. The oldest patient was seventy-eight, the youngest thirty-nine. The average age was 52·8.

"In these cases there was a higher mortality than necessarily pertains to this method, *viz.*, 16·6 per cent. But the deaths—three of eighteen cases—can hardly be all attributed to the operations. One case, operated on by Leopold's assistant, died of pneumonia, with stenosis of the sigmoid flexure, through adhesions.

"Of the seventeen cases operated on by Leopold, two died. One of these died from sudden heart failure on the sixth day. She was the subject of cardiac hypertrophy and dilatation, and had emphysema of the lungs. Deducting this, there were sixteen cases with one death due to operation—a mortality of 6·6 per cent. But this is hardly a fair statement, as Leopold's mortality after the same operation for malignant disease was only 5 per cent.

"We must bear in mind that, if the danger of any operation is greater than the danger to life from the condition which the surgical proceeding is likely to cure, we have no right, except under special circumstances, to run such risks.

"In these cases, however, there is no danger to life arising from the prolapse; yet the serious inconvenience, the continued discomfort, and the chronic incapacity for work which the condition often engenders, may be such that the surgeon is justified in acceding to the wishes of the patient who desires to be freed from her trouble at one stroke, even if this involves risk" (3).

In my judgment, neither a plastic operation, such as colporrhaphy or perinæorrhaphy, nor shortening the round ligaments, nor ventro-fixation is likely to prove so curative as vaginal hysterectomy for total prolapse in elderly women.

Our constant aim should ever be to cure our patients when possible; and in many of these cases this can only be done by total uterine extirpation per vaginam.

The seeming necessities for success cannot be summarised in a few words; but among those most prominent may be mentioned absolute asepsis, so far as possible; as little removal or bruising of

tissues as practicable ; the free employment of absorbable sutures which do not require removal ; and a close attention to the individual requirements of each case.

(1) *American Journal of Obstetrics.*

(2) Part xli., p. 28, May, 1895.

(3) *Geburtshilfe und Gynäk.*, II. Bd., *der Arbeiten aus der Königlichen Frauenklinik in Dresden*, by Prof. Dr. G. Leopold, Leipzig, 1895. Translation by A. E. Giles in *Brit. Gyn. Jour.*, Nov., 1895, p. 431.

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