CHAPTER VI.

AMENORRHEA.

Definition.—Amenorrhea, or absence of the menstrual flow, is a symptomatic condition accompanying a variety of affections. It may be broadly divided into two classes: one in which menstruation fails to appear at the usual age, and one in which it ceases after it has been established. The first of these is known as primary amenorrhea, or *emansio mensium*, and the second as secondary amenorrhea, or *suppressio mensium*.

CAUSES OF PRIMARY AMENORRHEA.

The non-appearance of the menstrual flow at the customary age is always a matter for serious consideration. There are two different conditions from which it may arise: (1) failure of development (aplasia or hypoplasia) on the part of the reproductive organs; (2) atresia, causing obstruction of the genital tract of some sort. The second class is not, strictly speaking, an amenorrhea at all, but a retention of the menstrual fluid; it is convenient, however, for practical purposes, to consider such cases under this head.

Maldevelopment.—Amenorrhea due to failure of development is really a rare condition, although its existence is often assumed. It is to be suspected in the case of a young girl in her teens, who has never menstruated, and is easily demonstrated by a local examination, when the uterus will be found to have a characteristic shape, the cervix being large and disproportionately long, while the fundus is small and infantile in type. The following case is of this kind:

Miss McC., age nineteen (San. No. 2396), March, 1907. The patient had had complete amenorrhea for three years; before this date menstruation had been regular and painless, but always scanty, lasting only one day. The abdomen was opened for the purpose of removing the appendix; the right kidney was also suspended. On examination the external genitalia, vagina,

and cervix uteri were found normal, while the uterus, ovaries, and tubes were infantile in type. The ovaries were elongate, white, smooth, and sclerotic. The right ovary measured $4 \times 1\frac{1}{2} \times 1\frac{1}{2}$ cm. No corpus luteum was present.

In cases where there is aplasia of both uterus and ovaries there will be no attempt at ovulation, and therefore no symptoms of menstruation. If, on the other hand, there is aplasia of the uterus while the ovaries are healthy and functionally active, ovulation will take place as usual and will be accompanied by the customary menstrual molimena, namely, pelvic pain, headache, and nervous manifestations of different kinds, recurring at intervals of about four weeks. As the uterus is incapable of responding, no relief is afforded by the customary discharge, and the patient's sufferings often increase until her general health is impaired.

Cases in which amenorrhea is associated with the absence of one or more of the organs of generation must be included in this class, as well as those in which diseased conditions have caused sufficient degeneration of the ovaries to destroy their function before puberty. A case of this kind, in which, as sometimes happens, the patient was to all appearance perfectly developed physically, is given by W. B. Chase (*Amer. Jour. Obst.*, 1898, vol. 38, p. 512).

The patient was a married woman, twenty-four years old, of fine physical development, and apparently in good health, although she had never menstruated. She had been married about two years and had had no prospect of children. When she was about eighteen she began to have attacks of pelvic pain, accompanied by headache and nervous excitability, which recurred regularly every four weeks. These attacks gradually increased in severity until her sufferings, especially from headaches, became so severe that she and her family feared insanity. During the preceding year she had perceived an abdominal enlargement and could clearly define a tumor. On examination the growth was easily perceptible, though the abdominal walls were fat; it was as large as a five months' pregnancy. All the rational indications pointed to a uterus distended with menstrual fluid from atresia of the cervix, but the uterus, which was pushed up under the pubes, admitted the sound to the usual depth. As the patient was anxious for any operation which offered a prospect of relief from her sufferings, the abdomen was opened, when the pelvic contents were found to be almost completely walled off by peritoneal adhesions, although the patient was never conscious of having had peritonitis. Two tumors were found, one a multilocular ovarian cystoma attached to a smaller growth containing a shrunken ovary the size of a large lima bean, within which was a corpus luteum. The other tumor was a dermoid cyst, containing hair and sebaceous material, which had entirely usurped the place of the right ovary. Neither of the uterine tubes could be found. It was plain that the futile attempts at ovulation with its attendant suffering, as well as the womanly development, had been occasioned by the presence of the small amount of ovarian tissue left in the cystoma.

Atresia.—In primary amenorrhea arising from atresia of the genital tract, the obstruction may exist at any point, that is to say, there may be an imperforate hymen, an atresia of the vagina, or (rarely) an atresia of the cervix. In such cases ovulation, when it begins, is accompanied by menstruation, and as it is impossible for the menstrual flow to escape, it collects behind the point of atresia, causing distention first of the vagina, then of the uterus, and finally of the uterine tubes. The customary menstrual molimena are present and are sometimes accompanied or followed by bleeding from the nose, or some other mucous membrane. At first the suffering is slight, but with each recurring period it increases until the patient's general health is, in some cases, considerably impaired.

FIG. 55.—A CASE OF ATRESIA OF THE VAGINA. The tip of the index finger rests at the vault of the vagina showing great shortening.

A congenital atresia, with absence of the vagina above the point at which the tip of the finger rests, is shown in Figure 55. Figure 56 shows the depth to which a shallow vaginal pocket can be thrust into the pelvis by blunt pressure from without. This patient was married and came to me to consult me for sterility. Atresias of the genital tract resulting in primary amenorrheas were not long ago considered to be always congenital, except in the rarest instances; within the past twenty-five years, however, it has been shown that most of them are really the result of infectious inflammatory processes, originating for the most part in the acute infectious diseases, especially typhoid and scarlet fevers. This subject is more fully discussed in Chapter X; I cite here,

however, one illustrative case related by L. Pincus (*Monatsschr. f. Geb. u. Gyn.*, 1903, vol. 17, p. 751).

A young girl, seventeen years of age, who had never menstruated, had been ill for some weeks with a mild attack of typhoid fever, when she suddenly

FIG. 56.—THE SAME CASE OF ATRESIA. The examiner is pushing in the index finger and showing the potential lengthening of the vagina under strong blunt pressure from without.

complained of severe pain over the symphysis. An area of resistance about the size of a fist had already been discovered in that locality. The pain now complained of was at first ascribed to an effort at menstruation, and this idea was confirmed by the patient's having a discharge of thick, brownish blood from the genitalia a few hours later. Shortly after this occurred she became worse, and within twelve hours she died, with every indication of peritonitis due to perforation. No autopsy was permitted, but an examination of the external genitalia, made shortly before death, showed a slight tear in an otherwise closed hymen. The patient's mother said that her daughter had been in the habit of having attacks of abdominal pain resembling colic for the past few years; she also stated that about four and a half years before her daughter had had an attack of scarlet fever, and, for some time after her illness, there was a discharge from the vagina. It was clear that the scarlet fever had set up an inflammatory process in the vagina inducing an atresia retrohymenalis,

with imperforate hymen, and this resulted by degrees in hematocolpos, hematometra, and probably hematosalpinx. The typhoid fever induced a menstrual flow, or an atypical metrorrhagia, and resulted in a rupture of the tubes and of the closed hymen.

The atresias of childhood are, for the most part, of a harmless character, consisting of a conglutination of the labia in their inner surface. This cohesion is continued up to and above the level of the urethra, where there is an opening, through which the urine escapes freely and by which the menstrual dis-

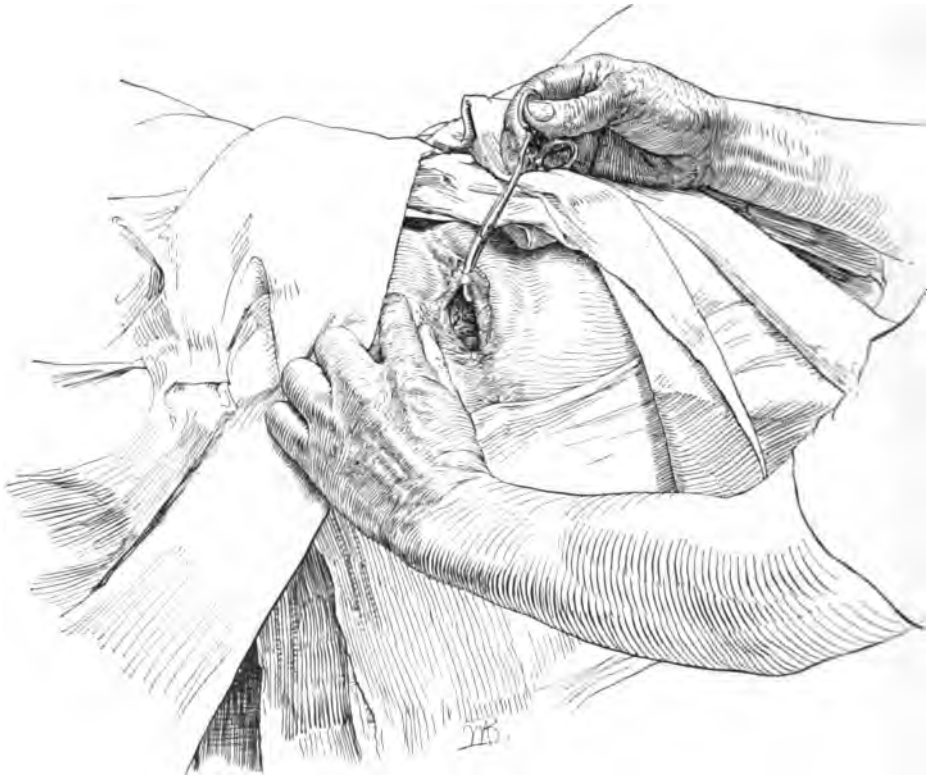

FIG. 57.—A CONGLUTINATION OF THE LABIA MINORA JUST BELOW THE CLITORIS AND ABOVE THE LEVEL OF THE URETHRA. This is quite certainly the remains of an extensive adhesion in childhood, of which the lower part has been ruptured, while the tell-tale bridge, in a protected situation above, lingers to tell the story of the original condition.

charge may escape, later on, without difficulty. I take it that the origin of the adhesion of the nymphæ in the case of a woman who had borne children (see Fig. 57) is susceptible of no other explanation. Here the marital relation and labor have destroyed all the lower part of the cohesion, leaving only this tell-tale bridge behind.

J. C. Nott in 1843 called attention to a form of atresia of the vagina arising in young infants without any demonstrable cause (*Amer. Jour. Med. Sci.*, 1843, vol. 5, p. 246). He cites two cases of infants, perfectly normal at birth and healthy in every respect, who were found several months later to have

a closure of the vagina. In neither case was there any history of inflammation; and in both the vagina opened spontaneously in the course of a few months.

In addition to these two distinct classes of primary amenorrhea, every physician is familiar with cases where absence of menstruation at the usual age is occasioned by general backwardness of development, arising from constitutional weakness or else following an acute disturbance of some kind. These cases are usually recognizable from the history, as well as from the general appearance of the patient. In considering this group it must always be borne in mind that in some families puberty is unusually late, without any definable reason for the delay.

CAUSES OF SECONDARY AMENORRHEA.

Secondary or acquired amenorrhea may arise from a variety of causes, which can be classified as physiological, mechanical, constitutional, and, what may be called for want of a more definite name, functional.

Physiological Amenorrhea.—The great physiological cause of amenorrhea is pregnancy, a fact which should always be borne in mind; for, unless it is kept first on the list of possible causes, disastrous mistakes will be made, especially by those who undertake a course of active local treatment. Amenorrhea is usual, though not invariable, during lactation, and it should cease with its conclusion. Prolonged lactation, however, as Vineberg points out, sometimes results in atrophy and consequent amenorrhea which persists after lactation is over. The other physiological causes of amenorrhea are childhood and the menopause. During childhood the whole organism is undergoing those changes which eventually express themselves in ovulation; while the menopause represents the physiological relief from the cyclic changes which follow the exhaustion of the reproductive system.

Mechanical Amenorrhea.—This form includes cases of character similar to those just described under the primary amenorrhea due to atresia. Obstruction of the genital canal may occur after the establishment of menstruation as well as before its appearance, resulting in like manner in the suppression of the flow. Imperforate hymen is the only atresia of the genital tract belonging exclusively to the class of primary amenorrheas. Obstruction at points above the hymen may result from an infection, although the fact that infectious diseases are so much more frequent in childhood makes this factor less frequent than it is in primary amenorrhea. There are other causes, however, which can arise only after sexual maturity, or even in some instances, after parturition. Not a few cases of atresia of the vagina or cervix are due to necrosis following difficult labor, while the prolonged or injudicious use of pessaries is another cause. Jacobson (*St. Louis Courier of Med.*, 1906, vol. 34, p. 58) has seen several cases of atresia from this cause. Under the head of mechanical amenorrhea we must also include those cases

in which there is a failure in development of the genital organs sufficient to render menstruation infrequent and scanty, appearing in some instances only a few times during the whole period of reproductive activity, although it is not enough to suppress the function altogether.

It may also be caused by burns, scalds, or by the application of too strong caustics to the vagina or the cervix. Sir J. Y. Simpson has reported a case in which atresia of the cervix was occasioned by the application of the actual cautery to the edges of a vesico-vaginal fistula, caused by extensive sloughing of the upper part of the vagina after childbirth ("Diseases of Women," 1872); and Veit mentions a case in which cicatrization took place in a short time from the application to the vagina of a tampon soaked in a fifty per cent solution of chloride of zinc.

Constitutional Amenorrhea.—This form is found in almost all diseased conditions, acute or chronic, which make heavy demands upon the vital forces. Such a repression has always been regarded as a conservative effort on the part of nature to preserve the patient's strength; in a few instances, however, it has been shown that the morbid condition is associated with an atrophy of the genital organs. Thorn (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 16, p. 57) considers that in all exhausting diseases there is a temporary atrophy of the uterus and ovaries which is the immediate cause of the amenorrhea, and he cites a number of cases to establish his point.

Chlorosis.—The commonest constitutional cause of amenorrhea is chlorosis. W. Stephenson in 1889 (*Trans. Obst. Soc.*, London, 1889, vol. 31, p. 104) called attention to the fact that this disease was too much neglected by gynecologists and the same accusation might be made to-day. As a constitutional disorder, chlorosis falls under the domain of general medicine, but, owing to the disturbances of menstruation, whether amenorrhea or menorrhagia, which are among its distinguishing features, it has certainly a claim upon the attention of the gynecologist.

Chlorosis, as defined by Stengel (*Twent. Cent. Med.*, vol. 7, p. 326), is "primarily a blood disease dependent upon disturbances of the hematopoetic system"; "not a disease resulting from blood destruction, but rather from imperfect hematogenesis." The ultimate causes of the imperfect blood development are obscure. The disease is characterized clinically by a deficiency in the hemaglobin of the red blood corpuscles greatly in excess of the diminution in their number; a peculiarity first pointed out by Duncan in 1867. In the early stage of chlorosis the number of red corpuscles may be hardly below normal, even though the hemoglobin is extremely reduced, but, as the disease progresses, the number of the corpuscles diminishes, while the striking disproportion between them and the percentage of hemaglobin persists. The reduction in the hemoglobin, as Stengel says, is primary, the reduction in the corpuscles secondary. The shape of the red corpuscles is often changed, and the specific gravity of the blood is usually reduced in proportion to the diminution of the hemaglobin. The total amount of blood is not diminished and some

observers claim that it is increased. No special changes are observed in the white corpuscles and they are not increased as in other forms of anemia.

The causal relation between chlorosis and disturbances of menstruation is not yet understood. Virchow in 1872 showed that it was associated with an imperfect development of the heart and large arteries and also, in many cases, with imperfect development of the sexual organs. He considered that the defective development of the circulatory system was primary, while that of the sexual organs was secondary. Rokitansky, on the other hand, believed that chlorosis was necessarily associated with imperfections in the development of the sexual organs. Fränkel (*Arch. f. Gyn.*, 1875, vol. 7, p. 465) showed that in certain cases of chlorosis there was an imperfect development of the genital organs while the heart and other organs were normal. Stephenson (*loc. cit.*) insisted that the imperfections in the evolution of menstruation observed in chlorosis constitute as constant a feature in the disease as imperfections in the evolution of the red blood corpuscles. He also agreed with Virchow in believing that a special diathesis or peculiarity of constitution predisposing to the development of the disease was present in most cases.

The general trend of opinion in the present day is to the effect that the amenorrhea almost always present in chlorosis is the result of the impoverishment of the system, as in simple anemia. It is difficult, however, to reconcile this view with the intimate relation between chlorosis and the sexual system. The fact that the disease is hardly ever met with in childhood or after the menopause and that it makes its appearance at periods corresponding to epochs of special significance in the sexual life of women, speak strongly in favor of a direct relation between it and the reproductive organs, of which the menstrual disturbance is but the outward expression. The majority of cases of chlorosis occur between the ages of fourteen and twenty-one, which is the time when the sexual function is established; while there is a small number of cases in which it occurs (or recurs) between the ages of twenty-four and thirty-five, the period of full sexual maturity and greatest reproductive activity.

Complete amenorrhea is not common in chlorosis. In most cases the flow appears at long and irregular intervals and is extremely scanty. In sixty-five cases examined by Hayem, menstruation was diminished in thirty-six, and completely suppressed in twenty-four, while in four it was normal or a little increased. In a few rare cases chlorosis is accompanied by profuse menstruation, and both Virchow and Fränkel have pointed out that in such cases the ovaries are hypertrophic instead of being of the usual infantile type (see Chap. VII). Contrary to expectation, the establishment of menstruation is early rather than late in chlorotic patients.

Constipation is so often a marked feature in chlorosis that Sir Andrew Clark believed the disease was really due to a copremia from absorption of ptomaines and leucomaines from the lower intestine. Emotional and nervous disturbances are sometimes well marked and some writers have held the disease was a neurosis. Disturbances of the heart and cir-

culation leading to syncope, breathlessness, and, possibly, cyanosis, are present.

Tuberculosis.—A frequent cause of constitutional amenorrhea is tuberculosis. The disturbance of the function dates from the earliest stages of the disease, and the patient and her relatives not infrequently regard the amenorrhea as the cause instead of the result of the tuberculosis.

Acute diseases of all kinds, infectious or otherwise, are frequently accompanied by amenorrhea, which usually lasts through convalescence until health is re-established.

Anemia, both primary and secondary, is usually attended by suppression of menstruation, more or less complete, and it also occurs after loss of blood from any cause, especially after post-partum hemorrhage, when the patient may not menstruate for months after she has resumed her normal habits of life. Malaria is an occasional cause of amenorrhea and should always be suspected in districts where it prevails.

Syphilis, chronic nephritis, and diabetes mellitus and insipidus are all occasionally accompanied by amenorrhea.

Chronic digestive disturbances which impair nutrition may be associated with cessation of menstruation, especially gastric ulcer.

In the various maladies now held to be caused by disease of the glands concerned in the internal secretions, amenorrhea is often a symptom, but whether in these cases it is simply a conservative effect or whether there is some direct connection between these disorders and the sexual organs is not yet known. Atrophy of the uterus is often noted in acromegaly according to Veit. Kleinwächter has shown that in Basedow's disease there is a general atrophy of the genitalia both external and internal (*Zeitschr. f. Geb. u. Gyn.*, 1889, vol. 16, p. 144), and his observations have been confirmed by Theilhaber (*Arch. f. Gyn.*, 1895, vol. 49, p. 57).

Obesity is an occasional cause of amenorrhea. In a case reported by Lomer (*Centrbl. f. Gyn.*, 1893, vol. 17, p. 641) the patient gained fifty pounds in six months and became so corpulent that she could hardly move. She complained of dizziness, flushes of heat, and bleeding at the nose. Scarification and blood-letting at the external os uteri relieved the symptoms. Whenever a young woman who complains of amenorrhea is much above the average weight for her age and height, especially if the increase coincides with the cessation of menstruation, the physician will do wisely to turn his attention to the vices of nutrition which are responsible for the obesity. The increase of weight is considered to be akin to that often seen at the menopause, both being associated with a repression in the activity of the uterus and ovaries. H. C. Coe (*Med. Rev. of Revs.*, 1906, vol. 12, p. 506) suggests that an amenorrhea associated with obesity may be nothing but an early symptom of the obscure disorders arising from disturbances of internal secretions, and that the recognition of this fact may be of service in making an early diagnosis. He cites an illustrative case in which amenorrhea, accompanied by a marked

increase in weight, preceded acromegaly, and further the case of another patient, under treatment for Hodgkin's disease, where irregular and scanty menstruation ending in complete amenorrhea lasting for some time preceded the glandular enlargement. There was a little anemia present in the last case, but not enough to account for suppression of menstruation.

Chronic poisonings, particularly of lead, occasion amenorrhea. The habitual use of opium or morphin induces in time a more or less complete cessation of menstruation. The use of alcohol at first increases the menstrual flow, but eventually it may check it, in consequence of degenerative changes in the tissues.

Attention has been called by W. H. Baldy to the possibility of amenorrhea arising from the uric acid diathesis (*Phil. Med. Summ.*, 1903–4, vol. 25, p. 239) which it is well known may occasion dysmenorrhea.

Functional Amenorrhea.—The term functional is used to define that form of amenorrhea in which a patient with normal generative organs and in average health, ceases to menstruate without any apparent objective cause, local or constitutional. Excitement, shock, or sudden fright will act to cause menstruation to be delayed or missed altogether. I have known a case where a period was missed from no other apparent cause than the loss of several nights' sleep just at the time its appearance was expected. The mere expectation of pregnancy sometimes acts to prevent the flow in the case of unmarried women who have exposed themselves to the risks of it. It often happens in such cases that the next succeeding period appears normally. Again, an intense desire for children may focus the attention upon menstruation and so control the function as to suppress it entirely, leading to the confident hope that pregnancy has taken place. Haultain (*Edin. Med. Jour.*, 1900, vol. 2, p. 339) advances the idea that amenorrhea of the kind known as functional is the effect of an impairment of controlling nerve centres.

Another form of amenorrhea is that due to changes of climate. It is a matter of common observation that differences of climate or altitude occasion disturbances of menstruation, a change to the seashore being generally accompanied by an increase in menstrual flow, while that to a higher altitude may be attended by the reverse. Tilt says that he was once consulted by a lady, who had shortly before established a large boarding school for girls near London, because so many of her scholars who came from a distance suffered from amenorrhea that she feared there was something unhealthy in the location. This class of cases, as well as those arising from shock, fright, or excitement, are explicable on Haultain's theory. Over-study and exhaustion of the nervous system are also frequent causes of functional amenorrhea. Exposure to cold during a menstrual period with a consequent sudden stoppage of the flow, which may or may not return next time, is usually classed as a functional amenorrhea.

Besides the causes of amenorrhea cited, there are certain cases in which menstruation occurs at irregular intervals for which no definite reason can be

assigned. Could we follow the evolution of the corpus luteum in these cases we should probably be able to understand better the causal nexus; the first step is to determine whether Fränkel's theory as to the relation between menstruation and the corpus luteum can be established.

SYMPTOMS AND DIAGNOSIS.

Amenorrhea in itself is only a symptom common to a variety of conditions, and in many cases where it is the sole clue the physician must follow the various possible causes until he discovers the particular condition which is effective in the case under observation.

In a case of primary amenorrhea the first question to be considered is whether there is maldevelopment of the pelvic organs, or an obstruction at some point in the genital tract, or whether it is merely an expression of general backwardness of development. The doubt can be set at rest at once by a local examination, but the conscientious physician will hesitate to take this step in the young and unmarried until he is sure it is indispensable. The crucial point is the presence or absence of menstrual molimena. If no such symptoms have appeared the case is either one of backwardness of development or of maldevelopment (aplasia of the reproductive organs). Under these circumstances the physician is justified, if the girl is not more than sixteen or seventeen, in waiting, in the hope that nature and a little attention to general hygiene will remove the difficulty.

If menstruation does not appear within a reasonable time a bimanual rectal and abdominal examination may always be made under anesthesia, when, if

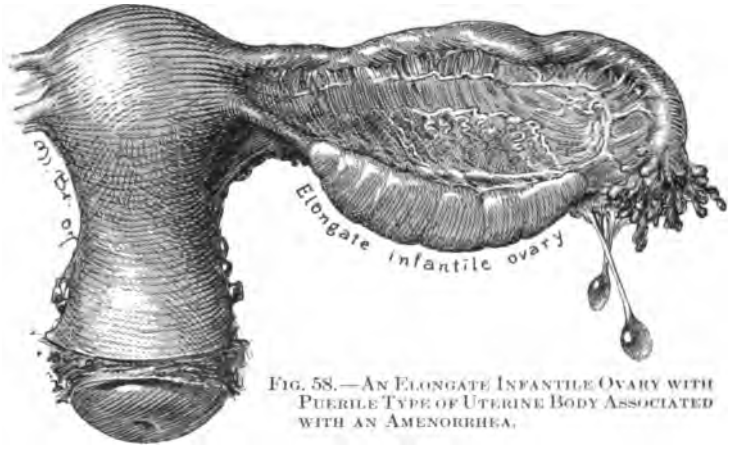

FIG. 58.—AN ELONGATE INFANTILE OVARY WITH PUERILE TYPE OF UTERINE BODY ASSOCIATED WITH AN AMENORRHEA.

the case is one of faulty development, the uterus will be found to be of an infantile type with a small undeveloped fundus and a disproportionately large cervix, while the ovaries are elongate, smooth, and smaller than at puberty (see Fig. 58).

If, on the contrary, the patient gives a history of recurrent attacks of pelvic pain, headache, dizziness, and nervous excitability, accompanied, it may be, by bleeding from the nose or some other mucous surface, the case is either one of maldevelopment with ovaries functionally active, or of an atresia in the genital tract. Here an examination must be made at once to obviate serious consequences, namely the formation of hematocolpos, hematometra, and hematosalpinx, with rupture and consequent peritonitis.

What harm may arise in such cases from neglect is shown by a case of Gebhard's (Veit's "Handbuch der Gynäkologie," 1898, vol. 3, second half, p. 60). A girl of seventeen with a primary amenorrhea consulted a physician on account of a severe colicky pain in the abdomen. The physician made no inquiry into the menstrual function nor did he suggest any local examination. Inspection of the abdomen showed a painful diffuse tumor above the symphysis extending towards the right, which he took for a perityphilitic exudate; for the relief of this he made an incision in the ileocecal region "to evacuate the pus." Instead of an abscess he found a large circumscribed dark red swelling, looking like an ovarian tumor, which he did not attempt to remove. The patient then entered the clinic where the diagnosis was apparent on the first inspection of the genitals and the tumor was seen to be a large hematocolpos due to an atresia of the hymen. It was relieved by an incision.

Imperforate hymen is at once recognized by the marked bulging tumor of a livid or dark brown color, which fluctuates distinctly upon palpation, protruding between the labia; posteriorly it is limited by the perineum, laterally by the inner surface of the labia, and anteriorly it reaches to the posterior margin of the urethra. If the growth is sufficiently large to fill the lower abdomen, rising as high as the umbilicus, the wave of fluctuation is readily transmitted from above downward to the tumor at the vulva. A rectal examination reveals an elongate sac filled with fluid, occupying the position of the uterus and vagina and conforming in its general direction to the axis of the pelvis. Great care must be taken in the examination not to rupture the thin tubal sacs lest a fatal hemorrhage or an attack of peritonitis should be induced.

Pregnancy must be considered in every case of amenorrhea, coming on in women who have menstruated regularly up to the time of the sudden onset of the suppression, if the patient is still within the child-bearing period. It must also be considered in atypical cases where the menstruation has been irregular. The examiner does not insult his presumably chaste patient by bearing this condition in mind and proceeding at the first step he takes in his diagnosis to exclude it from the category of possibilities in any given case. Pregnancy is diagnosed by recognizing the rotund enlargement of the uterus, sometimes soft and boggy, sometimes firm, but almost always more or less globular. In some cases, it feels as if jointed onto the cervix which may be mistaken for the uterus itself, while the body above, containing the fetus, appears to be a tumor attached to it by a pedicle (see Fig. 59). Hegar has

shown that softening of the uterus caused by pregnancy is not symmetrical; the neck retains a certain resistance, when the body has already become soft, and the upper part, which contains the ovum, is tenser than the lower empty part which may be pressed together between the fingers like a soft membrane. This sign is of great importance in the early diagnosis of pregnancy. Anyone

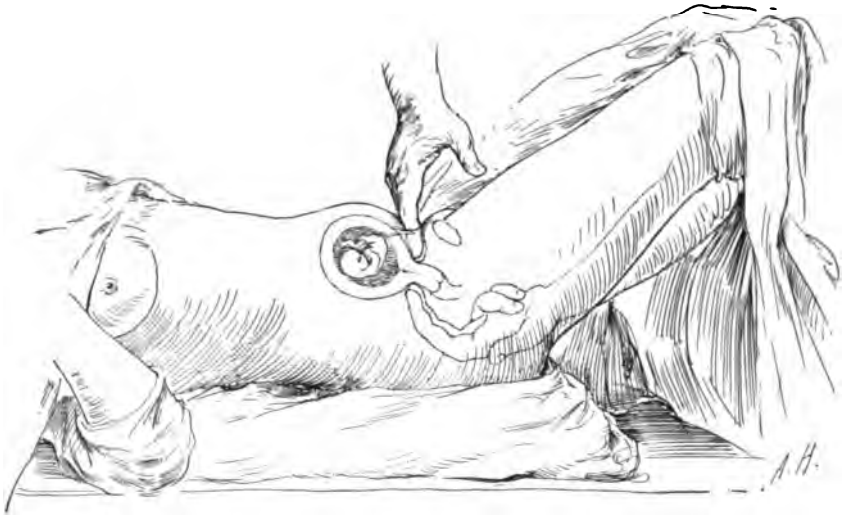

FIG. 59.—AN EARLY PREGNANCY SHOWING THE GLOBULAR ENLARGEMENT OF THE UTERINE BODY. The cervix is often flexible at the point under palpation and may feel like an organ detached from the semi-fluctuant mass above.

acquainted with the extraordinary relaxation of the lower segment in the second or third months will avoid the not uncommon mistake of taking the cervix to be the whole uterus and the pregnant body for a loosely attached tumor, a pregnant tube, cyst of the ovary, etc.

In amenorrhea of women over forty, there is always a possibility of the menopause. Women are prone to assume that "the change of life is working" as early as thirty-five or even earlier, but a cessation of menstruation before forty-one or two is rare and the physician should accept it as a diagnosis only after he has failed to find any other cause and after the lapse of some months. The physiological amenorrheas of childhood and lactation require no comment.

Secondary amenorrheas of the mechanical variety are easily recognized by the existence of menstrual molimena without a regular occurrence of the habitual discharge, and examination shows the nature and seat of the obstruction. There are certain cases of secondary amenorrhea, caused by faulty development, when the defects are not sufficient to cause primary amenorrhea, but menstruation is so far affected that it takes place at infrequent intervals, it may be only a few times in the whole course of the sexual life. The history of such cases is very suggestive and examination makes the diagnosis clear. In patients of this class the physical development as well as the general health is sometimes

excellent; on the other hand, the patient may be poorly developed and of a manifestly feeble constitution.

In constitutional amenorrhea the history will generally supply the clue to diagnosis. Chlorosis is the commonest cause and here the appearance is so characteristic as to suggest it at once. The complexion has a peculiar, transparent, waxy, greenish hue, from which the disease derives its name, unlike that of other forms of anemia. The conjunctivæ are unnaturally white and clear and there is usually a disturbed heart's action, manifested in shortness of breath, palpitation, and great fatigue on exertion. When the disturbance of the circulation is marked, there is apt to be more or less congestion of the terminal blood vessels so that the skin has a muddy cyanotic look, which to some extent masks the typical greenish hue. Menstruation is disturbed by a more or less complete amenorrhea; the flow is of a peculiar, characteristic, pinkish color. The age of the patient is a point which must be considered, since the majority of cases occur between fourteen and twenty-one, with a smaller proportion between twenty-five and thirty.

An examination of the blood is always necessary to complete the diagnosis; its appearance as it flows from the body is characteristically thin, pale, and watery. The hemaglobinometer shows that the percentage of hemaglobin is reduced, while the hemacytometer demonstrates that the number of red corpuscles is not diminished proportionately. In a series of ninety-four cases investigated by Dr. C. E. Simon, the average hemoglobin value was forty-two and a half per cent, while the lowest in the series was seventeen and a half per cent. There are certain rare cases of great reduction in the number of red corpuscles. One is mentioned by Hayem, where only 937,360 were counted, and three by V. Limbeck in which the red corpuscles were 1,750,000, 1,850,000, and 1,930,000 respectively.

In the amenorrhea of tuberculosis, patients usually complain of phthisical symptoms, although among the ignorant classes the cough, loss of weight, and other early symptoms of phthisis may escape the recognition of the patient and her family and she may complain of the amenorrhea and nothing more. The suppression of menstruation following acute diseases offers no difficulty in diagnosis. In some chronic conditions the whole body must be carefully examined, as well as the lungs, the sputum, and the blood.

Obesity associated with amenorrhea suggests some vice of nutrition which must be carefully investigated, and the suggestion made by Coe as to disease of the glands employed in internal secretion deserves to be borne in mind.

TREATMENT.

Primary amenorrhea, due to atresia with accumulated menstrual secretions above, is the only form in which there is any necessity for immediate action, and this form of amenorrhea is not really a true amenorrhea at all, although it is conveniently considered under this head. If the general

practitioner has convinced himself that an atresia of the genital tract exists he should send the patient without loss of time to a gynecologist. A form of obstruction which may claim the attention of the general practitioner is an imperforate hymen. It is better to refer this class of cases as well as those in which the atresia is situated higher up to a specialist, but as circumstances may arise in which the general practitioner is obliged to deal with this condition himself and as the operation itself is a simple one if performed with extreme antiseptic precautions, I give the details of its execution.

Operation for Imperforate Hymen.—Once more I earnestly insist upon the most rigid asepsis at every step. Lives have been repeatedly lost from sepsis coming on rapidly after opening such accumulations, especially where the tubes have been dilated. The blood adhering to the sac and the thin walls, together with the sudden change in the pressure in the blood vessels, affords material for sepsis, as well as a ready avenue for the invasion of the neighboring peritoneal cavity through necrosis of the thin tubal walls. This danger can be avoided, however, by a thorough cleansing of the field, by care against infecting the tract while operating, and by a thorough packing with iodoform gauze so as to protect the field for some days after the operation. After the external genitals are cleansed and the operator has put on sterile rubber gloves, the bulging membrane is opened by a crucial incision, dividing it into four triangular flaps at its base. The thick tarry fluid is allowed to escape slowly and on no account must it be hastened by pressure from above, for fear of rupture. The canal is then washed out for from five to ten minutes with a warm saturated boric acid solution introduced under low pressure through a long, curved, glass douche nozzle. Pains must be taken to empty the vaginal and uterine cavities of all the accumulated blood. An abundance of iodoform and boric acid powder (1:7) is dusted into the vagina and iodoform gauze loosely laid is packed into the uterus and the vagina down to the vaginal outlet. The urine is drawn, the powder sprinkled on the outside, and a pad of sterilized cotton is laid on and held in place by a sterilized T-bandage. The internal dressings may be left in place for from four to five days or even longer, provided everything is going on well and they do not become saturated sooner. Whenever they are wet and secretions are found to be escaping at the vulva they must be changed by bringing the patient to the edge of the table or bed under a good light, withdrawing the pack with forceps and reinserting it by means of a packer, thus using every precaution to avoid infection by keeping the gauze from all contact with the fingers, the buttocks, etc. By this method sepsis is avoided and the one great danger eliminated. The patient should be kept in bed for from one to two weeks.

Cases where there is maldevelopment of the reproductive organs should also be referred to a gynecologist, although there is not the same need for immediate action as in the case of an obstruction of the genital tract. When the ovaries are able to perform their function while the uterus is too imperfectly developed to respond, there is usually no relief from the constantly

recurring suffering except in the removal of the ovaries, but this should only be done in imperative cases, where the suffering is extreme. Galvanic stem pessaries laid within the uterus have been recommended for puerile organs as well as for those cases where menstruation occurs at infrequent, long, or irregular intervals, but without, in my opinion, any reasonable claim. Moreover, as Herman has shown (*Med. Press and Circ.*, London, 1893, vol. 55, p. 269), they often irritate the endometrium, as shown by resulting hemorrhage and leucorrhea, and set up an infection which may spread along the uterine tubes to the peritoneum, setting up a fatal peritonitis. The value of the galvanic current in this form of amenorrhea has been much praised by some writers, the negative pole being applied inside the uterus (Apostoli). I am not prepared to utter a sweeping denial of these claims and I am willing to concede that it is perhaps worth trying for a few months. The cathode shaped like a sound is introduced into the uterus, while the positive pole, a long dispersing electrode, is placed on the abdomen. Treatments of ten minutes' duration are given three times a week; the strength of the current should be twenty to thirty milliampères.

In the amenorrhea of young girls, whether primary or secondary, the treatment should first of all be directed to diverting the patient's attention from the pelvic organs by assuring her and her relatives that a little time and patience will regulate the function. Anemia, often present, must receive consideration. Iron is beneficial in most cases, but there are a certain number in which cod liver oil appears to do more good. Nourishing food and plenty of fresh air and exercise are essential elements in the treatment. In schoolgirls the question of over-study should receive earnest attention. No night study whatever should be allowed, and the amount of work done in school hours reduced to a minimum. In any case where the amenorrhea is obstinate or of long standing and the patient's health is manifestly below normal, it is the wisest plan to take her out of school altogether for some months or a year. The worst that can result from such a course is the delay of a year in graduation, and the disappointment attendant on this is a trivial matter compared to her physical welfare. Great attention must be paid to keeping the bowels open, as constipation is closely associated with amenorrhea. The prescription for constipation given in chlorosis is of use in all forms of amenorrhea (see p. 143).

Secondary amenorrhea due to constitutional causes must be treated by attention to the particular cause in each individual case, when the relief of the underlying condition will almost certainly be followed by the re-establishment of the menstrual function.

In chlorosis the great indications for treatment, as Herman has said (*loc. cit.*), are fresh air, light, food, iron, and laxatives, to which might be added another item of great importance—intervals of rest. It is a matter of common observation that chlorosis is most prevalent in unhealthy surroundings; indeed, there seems much to favor the theory of Virchow and Stephen-

son that the disease depends upon a constitutional predisposition, engendered by damp, darkness, unhealthy food, and general want of hygiene. Sunlight and fresh air form an essential part of the treatment. The character of the food must be nutritious, and as Stanley has pointed out (*Birmingham Med. Rev.*, 1906, vol. 59, n. s., p. 102) the diet should contain a large proportion of such foods and vegetables as yield a considerable amount of minerals, especially iron. As Stanley remarks, the diet of working girls, among whom chlorosis is most prevalent, sometimes consists largely of meat and is always particularly deficient in the class of foods just mentioned. Milk, eggs, and any nutritious easily digested foods are suitable, and it must be remembered that when the appetite is poor and capricious, as it is in all forms of anemia, especially chlorosis, any article of food not absolutely injurious will be of service, if the patient has a fancy for it.

Of all remedies employed in the treatment of chlorosis, iron has always held the first place, although exactly how it works is not known. Carbonate of iron in the shape of Blaud's pills, is the preparation considered most efficacious by authorities in general. The formula is:

℞ Ferri sulph., } āā ..... gr. ij
Potassi carb., }
Mucil. trag., q. s.
M. et ft. pil. j. Mitte tales 100.

It is best to begin with one pill three times daily, after each meal, and increase the dose gradually up to three. Hayem recommends the oxylate of iron, as less irritating to the stomach than the carbonate, in pill form, in doses of one to five grains. The tincture of the chloride of iron also gives excellent results, in doses of two to thirty drops, well diluted with water; an old well-seasoned preparation should be used. Reduced iron is another useful preparation, in pill form, the dose varying from one to five grains after each meal. Herman (*loc. cit.*) recommends the ammonio-citrate of iron combined with an alkali carbonate and made up with spirits of chloroform to make it palatable. The following formula is effective:

℞ Ferri et ammon. cit. 3j
Potassi carb. ..... gr. xxiv
Spts. chlorof. f3j
Aq. dest., q. s. ad..... f3vj
M. S. One dessert-spoonful after each meal.

When the stomach is too irritable, as it sometimes is, to allow of iron being given by the mouth, it must be administered hypodermically. Dori, cited by Pratt (*N. Y. Med. Times*, 1905, vol. 33, p. 77), considers the ammonio-citrate of iron best for hypodermic use. He finds that patients are able to tolerate large doses of iron given in this way when the administration by mouth is out of the question. The daily dose is three centigrams

(about one-half of a grain) dissolved in a gramme of water (about half a teaspoonful) injected into the interscapular region.

Next to iron, arsenic gives the best results in the treatment of chlorosis. It may be given as Fowler's solution (liquor potassi arsenitis), dose two to five drops three times a day; or as a pill in the form of arsenious acid, dose one-thirtieth to one-fiftieth of a grain. In some cases it is best to give arsenic hypodermically, and for that purpose I have found a French preparation, the *cacodylate de soude*, give excellent results.

Manganese, so highly recommended in the treatment of all forms of amenorrhea, is considered by Stengel to be useless in chlorosis. If it is tried it should be in the form of the dioxide, dose two to five grains in pill three times a day. A good prescription in which arsenic and manganese are combined with iron is the following:

℞ Ferri sulph. ..... gr. ij
Acidi arsen. ..... gr. $\frac{1}{40}$
Mangani diox. ..... gr. iij
Mucil. trag., q. s.
M. et ft. pil. j. Mitte tales 100.
S. One pill three times a day.

A course of chalybeate or arseniate waters is sometimes useful.

Forchheimer finds the best results in the treatment of chlorosis by combining an intestinal antiseptic with a blood preparation. He gives five grains of hydronaphtol and salol before each meal and five grains of hemogallol after it. If the latter preparation cannot be obtained, large quantities of beef juice may be substituted, or any preparation which contains blood, care being taken to make sure that it really measures up to its claims. It is certain, according to Pratt (*loc. cit.*) that in some cases of chlorosis antiseptics succeed where iron fails. The success of this plan of treatment seems to agree with Clark's theory that chlorosis is caused by the absorption of poisonous products, ptomaines, etc., from the large intestine.

The constipation, which almost always accompanies chlorosis, requires constant attention. Salines are the best form of laxative, and if anything stronger is required to start the bowels, calomel may be administered in broken doses of one-eighth to one-sixth of a grain, at intervals of half an hour, until one grain has been taken. The following prescription recommended by Hart and Barbour is excellent even if somewhat bitter:

℞ Magnesii sulph. ..... ℥j
Quin. sulph. ..... gr. xxiv
Acidi sulph. dil. ..... f℥iij
Aq. dest., q. s. ad. ..... f℥vj
M. S. One tablespoonful three times daily.

The bitter is really a valuable adjuvant to the purge.

Gastric symptoms must be met according to the indications. When there is an excess of hydrochloric acid, large quantities of an alkali may be given before meals. In some cases, where the glands of the stomach are atrophied, Pratt (*loc. cit.*) recommends stimulating the small intestine by the administration of the ferment of the pancreas or by papain. The dose of pancreatin is five to fifteen grains in powders, while that of papain is two to five grains in the same form.

Vomiting, according to Stengel (*loc. cit.*) is best treated by minute doses of calomel combined with a local sedative, such as cocain, one-fortieth to one-twentieth of a grain; dilute hydrocyanic acid, one to two drops; creosote, one-quarter to one-half drop; or carbolic acid, one grain. An excellent prescription for this purpose is the following:

℞ Hydrarg. chlor. mit. ..... gr. j
Acidi carbol. ..... gr. vj
Bismuthi sub-nit., q. s.
M. et ft. pil. no. viii.
S. One pill every hour until relieved.

Nervous symptoms, when they are present, must be treated according to the indications. In cases combined with chorea, which are not infrequent, arsenic is the best remedy. For the severe headache which sometimes accompanies chlorosis, the various coal-tar preparations may be tried, or the bromides.

Finally, one most important remedy in chlorosis is rest. Hayem insists strongly upon this point, as well as Taylor, cited by Pratt (*loc. cit.*), who says that the classical treatment of chlorosis with iron and purgatives is not assisted, but rather counteracted by the accompanying prescription of exercise. "Against fresh air," he says, "I have nothing to say, as long as it does not involve exercise either by walking or riding. It is, of course, partly a question of proportion; the worse the case, the more absolute should be the rest. In a slighter degree of anemia, or in one already recovering, carriage exercise may be allowed, while in the severer forms the patient may with advantage be kept in bed entirely, the most certain means of keeping her absolutely at rest. An intermediate prescription is that the patient shall only get up for three or four hours in the afternoon."

Edgecombe has shown that under normal conditions there is a fall in the percentage of hemaglobin during the day with a rise at night. Moreover, the daily diminution is increased by exercise. His observations were made upon healthy persons, but they are significant of what rest may do in building up hemaglobin. Hayem has shown that when chlorotic patients are allowed to walk about, the blood pigment present in the urine is greatly increased over the amount present during rest. It is safe to say that the routine prescription of fresh air and exercise in chlorosis is one which should be modified. Fresh air is important, but active exercise should be proscribed. In well-marked

cases absolute rest in bed should be prescribed until there is a decided increase in the percentage of hemoglobin. After this point is reached, the patient should have passive exercise in the open air, with massage. In milder cases it is enough to insist upon rest in the recumbent position for several hours every day, and the absence of active exercise. In the treatment of chlorosis it must always be remembered that relapses are frequent, and therefore the treatment should always be kept up for some time after the patient is apparently restored to health.

In amenorrhea occurring during the course of tuberculosis, attention should be directed to the tubercular affection. Should the primary condition be arrested and the general health restored, menstruation will return, while if the disease progresses, the absence of the menstrual flow should be regarded as a benefit.

The amenorrhea which accompanies or follows severe illnesses should also be looked upon as a blessing, since the absence of the menstrual flow is nature's effort to conserve strength. No treatment is necessary beyond attention to the general health, and the patient and her relatives can be assured that with the return of health the function will almost certainly be re-established.

A functional amenorrhea, as a rule, requires no treatment. In cases where it arises from shock, alarm, or nervous disturbance, the physician can only counsel patience until the nervous system has had sufficient time to recover. In cases where there is a sudden stoppage of menstruation from exposure to cold, the treatment should be calculated to restore the circulation to its normal rhythm, for the causes at work probably act mainly through the vaso-motor system. The patient should have a hot tub or hip bath and be put to bed, warmly covered up, with hot-water bottles, and a hot poultice over the hypogastrium. I have myself cured one case of over a year's standing by feeding large amounts of the fresh corpus luteum. The patient sometimes suffers from attacks of headache, dizziness, and flushes, recurring at intervals corresponding generally to the expected menstrual periods. In such cases as these the discomfort can often be relieved by scarifying the cervix until a few ounces of blood have been removed. W. L. Burrage has successfully treated cases of this kind by the application of leeches to the cervix.

Emmenagogues.—I do not myself recommend the class of medicines known as emmenagogues. Their action is extremely uncertain, and should menstruation appear while one of them is in course of administration, its appearance is probably due to causes apart from the drug. In amenorrhea due to unsuspected pregnancy, the use of emmenagogues has been followed by most disastrous consequences. The principal remedies falling under this head are:

Manganese.—This is best given in the form of dioxide, two to five grains three times daily in the form of a pill. The permanganate of potash may be substituted, dose one-half to one grain three times a day, also in pill.

Apiol (Garden parsley).—The dose of this remedy is three to six minims, administered in capsules, after each meal. The administration should be begun several days before the flow is expected.

Aloes.—This should also be begun several days before menstruation is due, in the form of purified aloes, dose one grain; or aloin, one-half of a grain, both in pill form three times daily.

There is one other variety of amenorrhea which cannot be included under any of the classes just discussed, and that is the amenorrhea due to the superinvolution following severe labor. It is fortunately rare, but it must always be borne in mind whenever a persistent amenorrhea is noted after labor. Nothing can be done to relieve it.

VICARIOUS MENSTRUATION.

Vicarious menstruation is a term used to describe a condition in which in the absence of the regular menstrual flow a substitutive hemorrhage occurs from some other part of the body. There is some disagreement among the members of our profession as to whether a vicarious menstruation really exists, some persons contending that the cases reported will not bear analysis (Wilks, *Brit. Gyn. Jour.*, 1886–7, vol. 2, p. 177); others maintaining that there is a sufficient number of authentic cases to establish the reality of its existence (R. Barnes, *ibid.*, p. 151).

As Withrow has pointed out (*Amer. Jour. Obst.*, 1892, vol. 25, p. 164), this disagreement arises partly from a lack of exactness as to definition. Menstruation has been usually defined as a periodical discharge of blood and endometrial débris from the uterus, and if the presence of endometrial débris is considered essential to the definition, a discharge from any other organ than the uterus cannot constitute menstruation, therefore under such a definition vicarious menstruation does not exist. It has been suggested as more appropriate that the term vicarious hemorrhage should be substituted for vicarious menstruation.

The term, as used here, is intended to signify a discharge of blood taking place from an organ other than the uterus, at intervals corresponding in a general way to those existing between the menstrual periods, menstruation being at the same time wholly or partially suppressed. Under this definition, vicarious menstruation is of two different kinds: one in which the regular menstrual flow takes place as usual and is accompanied by hemorrhage from some other organ (supplemental); another in which the menstrual flow is absent and its place is taken by hemorrhage elsewhere (substitutional).

The nose is the most frequent situation for vicarious hemorrhage, but there is hardly a mucous surface in the body from which it has not been observed to take place: the stomach, the intestinal tract, the lungs, the bladder, the vagina, the eye, the ear, the tonsils, and the gums have

each in turn been reported as the seat of the flow, as well as the nipples and the umbilicus. It has also been observed to take place from the surface of old cicatrices, and, in a few rare instances, from the skin, representing, it may be, the "bloody sweat" long classified among medical curiosities. One special form of vicarious hemorrhage is the discharge of blood from the bowel which sometimes takes place at long intervals after operations for the removal of the sexual organs, and represents the absent menstrual periods. A discharge of this kind rarely continues after a few months.

The efficient underlying cause of vicarious menstruation is not yet understood. It is manifestly a part of the ovarian function, probably of the corpus luteum in process of formation, to stimulate a vasomotor congestion, which in some cases is general, as shown by the throbbing full feeling in the head accompanied by pain before the appearance of the menstrual flow; and when the blood is once discharged the tension elsewhere is reduced. We do not know, however, by what cause this local congestion followed by discharge of blood from the uterus is determined. If the possibility of relief through the natural channels is taken away, the efferent impulse is diverted and concentrates itself upon the spot in the body at which the vessels can be most readily dilated and ruptured. The impulse instead of being reflected from the ovaries back to the uterus is reflected to whatever vascular area responds most readily to it. The reasons for this selective action in a given case, however, are obscure.

Withrow (*loc. cit.*) mentions an interesting instance of heredity in connection with vicarious hemorrhage, in which there were two sisters, neither of whom had ever menstruated, although their genital organs were normal. One of them never showed any signs of menstruation, but the other had attacks of epistaxis occurring at intervals which corresponded in a general way to what should have been menstrual periods. The attacks began at puberty and continued up to the age of forty-one. A niece of these women, the daughter of an older sister, resembled them in never menstruating, her pelvic organs, like theirs, being normal. She also had attacks of epistaxis at intervals of about four weeks for a number of years, the bleeding taking place always at night. All of the women were married and all remained sterile.

The treatment of vicarious menstruation must depend upon the nature of the case. The causes of the accompanying amenorrhea must first be ascertained and, if possible, removed, for when menstruation is re-established, the vicarious hemorrhage will, in all probability, cease. Seeligman (*Centrbl. f. Gyn.*, 1893, vol. 17, p. 642) advises the use of a hot douche during the time supposed to correspond to the intermenstrual periods, for the purpose of inducing the menstrual flow. In cases where normal menstruation cannot occur, the vicarious hemorrhage is often a safety-valve which it is not well to shut down. If the relief from the vicarious hemorrhage is not sufficient to relieve the headache, flushing, and dizziness it is sometimes a good plan to scarify and deplete

the cervix. In rare cases the vicarious hemorrhage is so profuse as to require measures for its control. Under these circumstances the usual remedies for checking hemorrhage should be tried, adapting them to the situation from which the hemorrhage proceeds. The application of ice is of service, and where the hemorrhage is from the stomach Küstner recommends gastric lavage with iced water.

In exceptional instances radical measures are indicated. Webster ("Text-book of Diseases of Women," 1907, p. 114) mentions two cases of vicarious hemorrhage under his care in which he was obliged to remove the ovaries (in both instances diseased) because life was endangered by the repeated hemorrhages. He does not state the situation of the vicarious hemorrhage. Fischel (*Prag. med. Wochenschr.*, 1894, No. 12) has been obliged to resort to the same radical measure in a case of rudimentary uterus accompanied by vicarious menstruation in the form of hematemesis.