AN ADDRESS ON THE ANALOGIES OF MENSTRUATION AND PREGNANCY AND LABOUR, IN SOME OF THEIR PHYSIOLOGICAL AND PATHOLOGICAL RELATIONS.

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By ROBERT BARNES, M.D., F.R.C.P.,

Consulting Obstetric Physician to St. George's Hospital; Honorary President
of the British Gynecological Society.

THE analogy between menstruation and pregnancy and labour is traceable in detail. The history of the menstrual process is a necessary introduction to the history of gestation. It has long been held that in both cases the *primum mobile* resides in the ovary. Of late years the dominion of the ovary over the uterine phenomena of menstruation has been to some extent challenged. It would carry me beyond the scope of this memoir to investigate minutely the grounds upon which this challenge is founded. For the present purpose I will simply state what cannot be questioned, namely, that the ovary is certainly a necessary factor in reproduction and gestation. The old dictum, "*omne vivum ex ovo*," has not yet been successfully contested.

The first step, then, in reproduction is ovulation, or the ripening of an ovum, and then the depositing it in its proper nidus, the uterus. But the work of preparation begins in the uterus before the extrusion of the ovum from the ovary. There is a process of nest-building. The recent admirable researches of Bland Sutton and Dr. Arthur Johnstone, related in the *British Gynecological Transactions*, vol. ii, 1887, although considerably modifying the hitherto current ideas as to the development of the mucous membrane to form a decidua or uterine element of placenta, are not antagonistic to the theory that there is a special preparation of the endometrium for the reception and grafting of the ovum.

In response to the development of the ovum, nerve-force and blood are attracted to the uterus; the whole organ swells, becomes heavier and more sensitive, softer from the permeation of its walls by fluid; the utricular glands of its cavity enlarge, secrete more freely: the uterine mucosa generally undergoes a marked development. The breasts swell, sometimes secrete milk, preparing to do their part in the work if called upon.

We may, therefore, view the uterus as continually getting itself ready, by a process of evolution, for the reception of an ovum. If no ovum—impregnated, be it understood—is received, and gets attached or grafted, the effort ends in a quasi-abortion and hæmorrhage, the equivalent of labour. The exalted nervous and vascular tension subsides; the force is no longer peripheral or centrifugal. A state of reduced tension sets in, and the force is one of centripetal attraction. The immediate effect is the disintegration of the tissue prepared for the missed pregnancy; its removal partly by uterine or vaginal discharges, in this resembling the lochia of the puerpery; partly by absorption, that is, by endosmosis, or by being taken up by the lymphatics and other vessels. The developed muscular fibre contracts under the influence of the intensified diastaltic function. The mimic labour over, the blood-current and nervous energy are diverted from the pelvis, and for a time the ordinary equilibrium of the economy is restored. The deciduous elements of the mucosa disintegrate, and are discharged with the menstrual fluid; and the uterus returns by involution to its ordinary state. The breasts sympathise with the pelvic molimen; they swell visibly, become firmer, sometimes painfully hard, and often secrete milk. This is especially the case at the onset of puberty. Under the ovarian stimulus, the breasts, like the uterus, actually grow; they assume their full development or evolution. So great is the activity thus provoked that, occasion-

ally, this rapid, almost sudden, action passes the physiological boundary; the glands present nodular masses, extremely tender to pressure; they may even inflame, and run to abscess, just as we see after labour. The formation of abscesses is, indeed, rare; but not seldom we find at puberty nodular, painful swellings in the breasts, which give rise to great anxiety as to their real nature. Howsoever rare and improbable cancer of the breast may be in young girls, it is not always easy to allay the apprehension that it may exist. Mere surgical examination is not always enough to establish a diagnosis. I have known surgeons of great experience at fault in these cases. It was on further consultation that in two instances I rescued the patient from needless amputation of the breast.

The influence of menstruation upon the breasts is also evident during lactation. The menstrual nisis is never wholly suspended, although the menstrual flux is commonly suspended. But in both cases I have verified a marked increase of turgescence of the breasts; and in some instances, carefully watched, I detected colostrum-globules in the milk of suckling women at every menstrual period, suggesting or simulating a new puerperal process.

We see proof of the solidarity of the organs in the often concomitant swelling of the thyroid, parotid, and tonsillary glands. I know several great singers who lose the brilliancy of some of their notes at the menstrual periods.

Parturition is the culminating point in the functional work of the genital system. It is true that in many cases this ultimate aim is not reached. The happy concurrence of atoms necessary to consummation may fail; but it is not the less true that this is the aim which Nature is always striving at. She may fail at any stage of the journey. Every menstrual nisis is truly a mimic or missed pregnancy. The points of homology or analogy are striking.

Ascending from the observation of parturition at term to the observation of premature delivery and abortion, we shall find strictly-related and similar phenomena in ordinary menstruation; and then, passing from the ordinary or healthy type of parturition to the so-called abnormal types, again we shall find reproduced homologous processes in the various forms of paramenia, especially in dysmenorrhœa; and this is so true that the most effective principles of treatment flow from this comparative study.

A few illustrations of the menstrual simulacra of gestation and parturition will follow. I will now simply call to mind that many cases of nervous disorder, as vomiting, convulsion, neuralgia, such as we see in the most definite relation to pregnancy and childbed, have their exact counterparts in some forms of dysmenorrhœa; various blood-diseases, as anæmia, toxæmia, septicæmia, thrombosis, embolism, which we have so many sad opportunities of observing in childbed, are produced in the non-pregnant state from disturbed menstruation, or uterine disease, notably from cancer; blood-poisonings associated with glandular disorder or disease, as glycosuria, albuminuria, jaundice, simple or pernicious, of which the most striking types occur in pregnancy and childbed, find their representation in the history of menstruation.

Amongst the constitutional phenomena attending menstruation we may signalise the following: the flow is immediately preceded by increased nervous tension and mobility, manifested in exalted psychical, emotional, and diastaltic action. Closely following upon the increase of nervous tension is increased vascular tension, manifested by turgescence of the capillary and venous systems. The vascular tension falls quickly when the menstrual blood-flow sets in. Increase of nervous and vascular tension, implying a more active process of nutrition or tissue-change, sometimes entails a rise of temperature. This rise, observed to the extent of 0.5° F. under strictly physiological conditions, may rise to 1° F. or more if any perimetritic inflammatory action is present. Increased nutrition-process entails increased excretion of urea. The quantity of blood is increased; the heart is stimulated to increased activity; this is proved by sphygmographic observations (Marey, Fancourt Barnes, Macdonald, Stephenson); the pulse is accelerated; the capillary or peripheral vessels are congested; the skin is more vascular; nævi become deeper coloured. The effect on pigmentation is often remarkable; the complexion is commonly changed; it loses its clearness, becomes dull or sallow, and a dark, even black ring, especially marked in brunettes, is traced around the eyes. This is often so conspicuous as to reveal to the initiated what is going on. It is similar to the pigmentation wrought by pregnancy. Laycock says excessive pigmentation is brought

about by imperfect oxidation of the carbon, that by imperfect elimination of the carbon in deficient menstruation diseases of the liver and kidneys are produced, and that these conditions are promoted by the excessive production of carbon from the use of highly-carbonised food; but I am convinced that nervous action is intimately concerned. I believe, indeed, that the first effect of ovulation is felt in the nervous centres, and that the increase in the vascular energy is the second response.

In menstruation and in pregnancy alike we see evidence of increased impulse of the heart, and of general peripheral determination of blood. The venous system is universally more turgid. Hence we see occasional outbursts of hæmorrhage from unusual places in subconjunctival effusions, phlebectasis, swollen, even bleeding piles, occasional hæmatemesis, or hæmorrhage from the intestines, or hæmoptysis. The influence of menstruation and pregnancy in the production of goitre and exophthalmos is equally manifest. And I believe that in menstruation, as in pregnancy, albuminuria sometimes occurs, and that this influence accounts for some cases of physiological or cyclic albuminuria.

The nervous phenomena are even more marked. The increased reflex sensibility is often striking. Vague pains, twitching of the legs, shivering followed by sense of heat, yawning, heavy sleep, stiffness in the neck, loss of appetite or bulimia, enteralgia, intestinal meteorism, palpitation, hoarseness, hiccup, vomiting, cramp, frequent desire to micturate, diarrhoea, are often observed. These symptoms, however, if very marked, are more commonly the expression of difficult or impeded menstruation.

The concluding phenomenon of menstruation is involution or return of the uterus and appendages to their ordinary state. The walls of the uterus contract; blood and serum are squeezed out; the menstrual decidua is cast.

I need not dwell upon the symptoms of gestation. It is enough for the purpose of this paper to say that the phenomena described as characteristic of menstruation are reproduced in a more marked degree in gestation. In gestation we witness a similar but more intense exaltation of the nervous and vascular tension and all the attendant phenomena. The fertilised ovum exerts a new, more lasting, and more powerful influence over the system. The embryo, grafted on the mucous membrane of the uterus, sits like a despot on his throne. Its imperious demands tax every tissue and every organ in the body. Hence the basis of the general law, which I have formulated as follows: "In pregnancy every organ and the whole organism are specially weighted, undergoing extraordinary developmental and functional activity, and thus any defect or fault inherited or acquired, howsoever latent, will be liable to be evolved or intensified under the ordeal. Hence pregnancy is the great test of bodily soundness." In a lesser degree the same law holds with regard to menstruation, one difference being that the influence of menstruation quickly subsides.

Passing from the more simple physiological analogies, we may now note some analogies that suggest like pathological conditions.

I have seen many remarkable examples of deafness coming on during pregnancy. The deafness diminishes a little after labour and lactation, but returns in an aggravated form in subsequent pregnancies. In this manner I have seen cases in which deafness appeared to be induced by dysmenorrhœa, increasing during menstruation, being somewhat relieved in the inter-menstrual periods. In one case the dysmenorrhœa being associated with a narrow os externum uteri and retroflexion, the deafness has been mitigated since the os was enlarged by incision, and the retroversion corrected by pessaries.

In like manner we see chorea, epilepsy, and chorea recurring in fits, more especially at the menstrual epochs and in early pregnancy. I described cases of this kind in my Lumleian Lectures at the Royal College of Physicians, 1873.

I wish especially to call attention to those cases of what may be called menstrual toxæmia, in which the clinical observer may trace a close resemblance to some cases of autogenetic puerperal fever. Of course I hardly expect that the facts and arguments telling in this relation will weigh much with those who have so far surrendered the faculty of independent reasoning as to yield submissively to the absolute dogma that puerperal fever is septicæmia and nothing else, and that there is no such thing as autogenetic puerperal fever. I must be content to appeal more especially to minds open to receive more than one idea at a time.

I presume, however, that no one will deny that there is such a thing as absorption of retained menstrual fluid. In minor degrees this is not uncommon in dysmenorrhœa from obstruction, as from a narrow os externum or extreme flexion. Menstrual fluid accu-

mulates in and distends the uterine cavity, and even the tubes. Not finding the proper vent by the cervical canal, under the influence of hydraulic pressure partly, and mainly under the influence of the fall in the nervous and vascular tension which marks the proper end of the menstrual process, absorption sets in, just as it does after labour. Part of the fluid in the uterus is absorbed—the more watery part, and the degraded hæmatin. Hence the sallow, turbid aspect of the skin, the frequent offensive smell emitted from the skin and lungs, suggesting the *gravis odor puerperii*; and the attendant febrile irritation. In some cases we know the system to some extent clears itself by diarrhoea, the intestinal tract being called upon to aid the skin, lungs, liver and kidneys in the task of purification.

This might be called menstrual intoxication of the more common form. Often recurring, it leads to a form of anæmia, and sometimes to amenorrhœa. Sir Andrew Clark, in a very excellent address, insisted that an allied form of anæmia was really induced by the habit of constipation. The long-retained fæces lead to absorption of some of the fæcal elements, and hence to empoisonment and degradation of the blood. Of the fact of this complication I am well assured, and many years ago I proposed the term "copræmia," to describe it. But if, as we cannot doubt, fæcal matters may be absorbed, we cannot deny the possibility of absorption of menstrual fluid. And if this is possible, how can we doubt the occurrence of absorption of lochial discharge and toxæmia, that is, of one form of autogenetic puerperal fever?

The most remarkable examples of autogenetic poisoning from retained menstrual fluid are naturally found in those cases where the obstruction of the natural route of discharge is complete. The most striking are cases of imperforate hymen. But I have seen cases equally well marked where the obstruction was the consequence of cicatricial atresia of the vagina after sloughing.

In these cases of complete retention, the resemblance to gestation is sometimes manifest; but, of course, there are distinctive features. The ordinary course, as I have seen it, is as follows:—Every month, perhaps, with occasional intermissions, pains in one or other iliac fossa are felt; pain in the centre of the pelvis referred to the centre of the uterus follows or precedes, often of a forcing or bearing-down character, such as occurs when the uterus is struggling to expel something from its cavity. Frequently the pain spreads to the abdomen, so that the patient cannot bear to be touched, and suggesting the presence of peritonitis. Flushed face, accelerated pulse, headache, vomiting, pains down the legs, irritation of the bowels and bladder commonly attend. After a few days these symptoms subside, seldom entirely. Not seldom occasional rigors appear; and these are followed by quickened pulse, increased temperature, nausea, muddy complexion—in short, the usual signs of blood-infection. We then get what used to be called irritative or hectic fever, and, of late, septicæmia or pyæmic fever. This is the usual history of what I have called "occult menstruation," in substitution of the old contradictory term "amenorrhœa from retention." In these cases auto-infection is clear enough. The infection arises in the absence of all lesion of the genital tract before any examination is made, and there is no probability of infection of any kind from without. Why should not absorption of retained blood or lochia take place in the puerperal woman without the necessity of assuming that the entry takes place by a traumatic surface, or by convection from without? If it be contended that the casting of the menstrual decidua is traumatic, like the casting of the placenta, the answer is that the infection from retention of stuff that ought to be excreted often sets in before the stage of exfoliation has arrived.

We cannot fail to note other points of similarity between the menstrual process and the puerperal process. The developed mucous membrane undergoes disintegration, and is shed. This is conspicuously the case in the dysmenorrhœa membranosa, in which distinct shreds or moulds of the uterus are cast out. In relation to this, Denman has an interesting remark. "This is not," he says, "the only circumstance in which some women at each period of menstruation have symptoms like those which accompany pregnancy or parturition."

Another point in which we may find resemblance is in the character of the flow. At first it is pure blood, or nearly so. In menstruation, the first blood is mixed with mucus, then with thin fragments of transparent epithelial scales; then the blood-discs diminish, and the mucous elements increase, so that the process often ends in leucorrhœa.

In puerpery, the first flow is sanguinolent, then it becomes

sero-sanguinolent, then the lochia become puriform or watery, merging, it may be said, into leucorrhœa. Both the menstrual fluid and the lochia are apt to give out a peculiar odour. The *gravis odor puerperii* is usually assigned to the lochia. I am sure that in both cases the odour perceived is often not exclusively directly thrown off from the discharges. In some women, I believe in many, the odour is also exhaled by the skin and by the lungs. The odour thus exhaled may be taken as evidence of the absorption into the system. In such cases we note a sallow aspect and a degree of febrility. In puerperal cases it is now usual to inject the uterus or vagina with tepid solutions of carbolic acid, iodine, or bichloride of mercury. A similar indication exists in some cases of post-menstrual cachexia. In both cases it is of serious importance that nothing occur to impede the process of involution. Should this end not be effected, like troubles—in the forms of prolapsus, retroversion, disordered menstruation, and pressure upon the pelvic organs—ensue.

If we study the history of impeded menstrual and puerperal processes under morbid influences, we cannot fail to discern mutual illustrations. In a paper read at the meeting of the Association in Dublin in 1887, I traced some of the relations of puerperal and other fevers to meteorological conditions. I exhibited tables representing the relations of fevers to atmospheric conditions for two series of years—one for thirty years, the second for ten years. The two series corresponded and confirmed each other in a remarkable manner. They proved to demonstration that puerperal and other fevers prevailed most fatally in the cold and wet months, thus enforcing the conclusion that arrested excretion was a powerful factor in the production or evolution of puerperal and other fevers, and thus further proving that puerperal fever may arise in the patient's own system, and thus that all puerperal fever is not septicæmia according to the modern doctrine.

Now, it is not in my power to bring a similar statistical survey to bear upon the disorders of menstruation caused by atmospheric conditions. There is no possibility of obtaining trustworthy figures to show the relation between fatal cases and those which result in complete or incomplete recovery. It might form a very useful subject for research by a committee of the Association. In the meantime, all we have to rely upon is individual experience. It may be taken as a recognised fact that suppressed menstruation is largely, if not principally, due to cold and wet. It is notorious that menstruating women are especially prone to take cold if exposed to fatigue, cold, and wet, and that partial or total arrest of menstruation is often the consequence. When this occurs, febrile reaction is pretty sure to follow, marked by rigors and rise of temperature. And this is so even when there is no distinct mark of inflammation as evinced by tenderness on pressure, or perimetritis, a complication which is, however, not rare. These cases in most of their factors, physiological, etiological, and pathological, offer striking points of resemblance to the autogenetic form of puerperal fever. They might properly be called *autogenetic menstrual fever*. And, recognising this parallel, how can we escape from the conclusion that there is a form of puerperal fever due primarily to suppression of excretion, to the retention in the puerperal blood of the products of involution and of absorption of uterine discharges? If in suppressed menstruation we get fever, without any traumatism, without any infection from without, why should the parallel form of fever in puerperia not arise without traumatism, without infection from without? By strict analogical reasoning, then, it follows that there is a form of puerperal fever which is really autogenetic.

The slavish subjection to the doctrine of septicæmia in its absolute and exclusive sway seems to me one of the most remarkable examples of the evils of specialism. It is a denial of the best established law of pathology; it is opposed to the plainest and most familiar clinical experience. Is it not notorious that many cases of the non-specific forms of fever, of pleurisy, of pneumonia, of rheumatic fever, of gout, are the consequence of disturbed equilibrium between secretion and excretion, and thence of the normal metabolic processes? Whenever this equilibrium is so disturbed by checked excretion, noxious stuff of the patient's own generating is retained in the system and fever results. And in many cases it is impossible to prove or to admit traumatism, or septicæmia, in the absolute sense of these words, or the invasion of foreign poison. The conclusion surely is that many cases of fever and inflammation are autogenetic inasmuch as the noxious fever-producing stuff is generated in the patient's own system, the determining cause often being simply exposure to cold and wet. From this general law why should the menstruating or puerperal woman be

exempt? Is she endowed with immunity from the general laws of pathology? Yet the blind adherents of the dogma that puerperal fever is septicæmia and nothing else are in this dilemma; Puerperal fever is not always septicæmia, or else many diseases occurring in men and women hitherto regarded as primarily due to perverted metabolism and arrested excretion are also septicæmia.

Dr. BRAITHWAITE observed that he had attributed the cases of so-called autogenetic puerperal fever, mentioned by Dr. Barnes, rather to absorption from the bowels. These cases were met with usually in women with foul tongues, constipated bowels, ill-smelling evacuations, and dirty-looking skins. The reason puerperal fever was more common in winter than in summer was that in the former season there was less ventilation, and the air of the house was liable to be drawn from the drains rather than from open windows.—Dr. W. WARREN observed the close sympathy which existed between the bowels and uterus, as he had seen acute diarrhoea of a purulent character due to the retention of a small putrid clot in the uterus. A clean tongue he had invariably observed in these cases, with high temperature, and great tendency to failure of the heart. The abdomen was quite normal, being neither distended nor tender. With the removal of the clot all symptoms disappeared.—Dr. BARNES, in reply, said the main object of his paper was to illustrate by comparison of what was observed in impeded menstruation and some forms of puerperal fever the conclusion that there was no necessary septicæmia in either. Cases of menstrual fever, and of puerperal fever, arose under similar atmospheric conditions. He did not deny puerperal septicæmia, but he did protest against the dangerous and absurd doctrine that puerperal fever was septicæmia, and nothing else.

REPORTS TO THE SCIENTIFIC GRANTS COMMITTEE OF THE BRITISH MEDICAL ASSOCIATION.

REPORT ON THE CONTROL OF HÆMORRHAGE FROM THE MIDDLE CEREBRAL ARTERY AND ITS BRANCHES BY COMPRESSION OF THE COMMON CAROTID.¹

By WALTER G. SPENCER, M.S.,
Assistant-Surgeon to Westminster Hospital,
AND
VICTOR HORSLEY, B.S., F.R.S.,

Surgeon to the National Hospital for the Paralysed and Epileptic: Assistant-Surgeon to University College Hospital: Professor of Pathology in University College, London: Professor Superintendent of the Brown Institution.

(The figures bracketed belong to the references at the end.)
(From the Laboratory of the Brown Institution.)

If cerebral hæmorrhage be looked at for the moment as simply bleeding from a torn vessel, its severity falls into three divisions: (a) so much blood is poured out that death immediately ensues; (b) the hæmorrhage is so small that it ceases immediately; (c) the hæmorrhage continues for a longer or shorter time. The third division is practically the only one in which any active treatment directed towards the arrest of the hæmorrhage is required. The loss of blood being slow, we judge of its amount during life by the local symptoms of the lesion it causes to the brain, and the general symptoms of the intra-cranial pressure which it produces, and that the hæmorrhage is still going on is rendered evident by the increase in severity of these symptoms.

The symptoms in the onset of cerebral hæmorrhage are of two kinds:—

1. *Local*.—Spasms followed by paralysis, resulting from tearing

¹ A few of the expenses of this investigation were met by part of a grant received from the Scientific Grants Committee of the British Medical Association.