AN ADDRESS

ON

PREGNANCY REGARDED AS AN EXPERIMENT ILLUSTRATING GENERAL PATHOLOGY.*

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THE light that the study of a pregnant woman under the influences of menstruation and pregnancy can throw upon general pathology has been very inadequately considered. The special or fragmentary manner in which medicine has of late years been studied and practised, although it may produce greater technical or so-called practical skill, has this unquestionable drawback : that, by splitting up the grand unity of physiology and pathology into isolated parts, it scatters, distorts, or extinguishes the light which each part should reflect upon the others, and which should unite in one beam of natural truth.

A better theme for inquiry could hardly be started than the relations of menstruation and pregnancy to pathology. Ever so little observation and reflection cannot fail to show that, in menstruation and pregnancy, there are conditions which, although physiological in design and in general issue, touch closely upon the domain of pathology ; that, in many cases, the physiological phenomena pass by almost or quite imperceptible steps into pathological states ; that, where a new physiological task is imposed upon a subject bearing some latent infirmity, the healthy execution of that task may be thwarted and new manifestations of the underlying morbid defect will be brought out.

Reasoning upon this basis, let us look upon menstruation and pregnancy as experiments instituted by Nature ; testing the powers of resistance or reaction ; evoking new phenomena ; exalting certain functions ; giving new life and development to certain organs ; throwing heavy strain upon other organs ; modifying the constitution of the blood ; affecting its dynamic conditions ; modifying the nervous system ; in short, producing a remarkable revolution or change in the entire organism that can hardly fail to display new facts for pathological discussion.

The actual or achieved conditions of many pathological states or so-called diseases that we meet with in hospitals or in private life may be obvious enough ; but, when we try to trace back to their origin and through their progress the processes or causes out of which those achieved states have come, all is obscurity, uncertainty, speculation. The beginning is too often lost in the myths of history ; the progress is often a confused tumult of complications either defying analysis or, where analysis is attempted, betraying into error. Even dissection, so indispensable to a correct and full knowledge of disease, is a test that has often led astray. What the scalpel and the microscope reveal is either the product of disease, or is largely compounded of the direct or indirect products of the disease and of accidental or intercurrent factors.

Now, in the case of a woman falling pregnant, the conditions are nearly as simple as any pathological problem can be. We start with a healthy woman. In this strictly physiological subject, we induce a new function and observe the phenomena that are developed. In many instances, perhaps in the majority, nothing more than physiological reactions are produced ; but even these are of the highest interest, if we regard them as the groundwork of potential pathology, if we watch the transitional steps by which they drift into morbid conditions. Let me illustrate this by convulsion. The forms of convulsion are various ; but several of the most important forms receive striking elucidation from the observation of pregnancy. Take especially that form of eclampsia which is associated with albumen in the urine. In the ordinary cases in men and women in which albuminuria is connected with organic disease of the kidney, convulsions only break out in a certain proportion, or they only occur in the last or moribund stage. Convulsion is an occasional accident marking the advanced or culminating point of a long series of complicated processes. For example, it was long thought that, whatever the causes, the essential seat of the disease was the kidney, whose structure was invariably found to be changed when the opportunity of examining it arose. But of late the theory has gained ground that the changes in the kidney are, if not secondary

or even more remote, at any rate only concomitant expressions of a general degeneration of the circulatory apparatus. How does this case compare or contrast with the so-called uræmic eclampsia of pregnant women ? In the latter case, the whole experiment is carried through in a brief period of time ; it is free from many or from all of those fallacies which gather around a long protracted disease. The constituent elements seem to admit of analysis. And the results so obtained from this more simple case may be applied to the elucidation of the more complex cases.

In men and in non-pregnant women, we have a slowly marching disease, in which the blood-vessels and the kidneys undergo progressive degeneration which gradually unfits these organs for their function, and which, thus disabled, induce or aggravate—for the first factor is hard to trace—a degraded condition of the blood and consequent impaired nutrition of the nervous and all other tissues. At a certain stage, and under certain accidental influences supervening more or less suddenly, convulsion may break out. On the other hand, in the pregnant woman, we begin with a perfectly healthy subject ; and perfect health may continue until the approach of the natural term of gestation, so that, if the experiment be cut short by bringing the gestation to a premature close, no albuminuria, no convulsion appears. But let the experiment go on ; then, within the space of two or three weeks, or even less, the whole morbid chain is completed ; the disease begins, culminates, and vanishes. Convulsions the most terrible set in like a sudden storm. Only now, perhaps, retrospective inquiry elicits the fact that some slight anasarca had been noticed, or that the woman had complained of some disturbance of sight, hearing, or other nervous distress ; and now the urine is found loaded with albumen, and the blood conversely is found charged with urinary constituents. Presently, labour being provoked and the uterus emptied, the kidneys recover their function, the albumen disappears quickly and completely, the convulsions cease, there is no trace of organic disease, and the subject has quite recovered. Here, then, we have a brief but violent storm, through which the subject may ride unharmed, to compare with the water-logged and sinking wreck caused by Bright's disease. To what is this difference due ? In both cases, there are albuminuria, uræmia, convulsion. In the chronic case of Bright's disease, the convulsion, however, is not nearly so constant. This may be explained in two ways : the very slow and gradual progress of the disease admits of a corresponding process of accommodation ; and, secondly, there is no special or independent central nerve-irritability. The conditions are widely different in the acute albuminuria of gestation. There is no time for accommodation. It is a constant condition that the nervous centres are in a state of extreme tension. In both, there is highly increased vascular tension ; but, in gestation, this is rapidly induced. In gestation, the mobility—if one may use the metaphor—of the sympathetic, cerebral, and spinal systems is enormously exalted. The sympathetic nerves presiding over the dilatation and contraction of the blood-vessels generally seem also to be the agents which determine those sudden fluxes of blood to particular regions or structures, of which we see so many striking examples in the female economy. For example, we have the familiar rush to the capillaries of the face and neck under the emotion that causes blushing, the sudden rush to the breasts and rapid secretion of milk under the emotion of maternal feeling, the sudden rush of blood to the uterus often revealed in flooding under various emotions of joy or fear.

Now, this nerve-mobility, which may at any moment divert a large proportion of the blood-mass to a particular region, may be conceived as acting in this way in producing or evoking convulsion. An emotion is derived through the sensual organs or through the more subtle process of thought ; an increased amount of blood is suddenly turned on to the uterus ; this blood is overcharged with deleterious matter, uræa, carbonic acid, and other excrementitious matters which have the property of exciting contraction of the unstriated muscular fibre. Here, then, is a double source of reflex irritation at work. The emotion, in many cases, is enough by itself ; the eccentric uterine irritation, the sufficiency of which may almost at any time be demonstrated by the simplest experiment. Thus we see commencing uterine contraction, immediately followed by a fit ; oftentimes, touching the vulva, as to pass a catheter or to make an examination, produces the same result.

It is worth while to analyse these phenomena a little further. In the ordinary condition—that is, in freedom from albuminuria—the like emotions will not produce convulsion, nor will uterine irritation do more than bring back from the spinal cord a force that will cause the uterine fibre to contract. This, indeed, in its full development, is in some features analogous to a convulsion ; but it is a healthy physiological convulsion concentrated upon one organ and its associated muscles. But where there is a poison circulating in the blood, the convulsion is no longer directed to a definite physiological end ; it

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affects the whole system; the nervous energy breaks bounds; there is universal perturbation.

We have, then, these three factors in the production of puerperal eclampsia:—1. An exalted physiological central nerve-tension, the immediate consequence of pregnancy; 2. A poisoned blood which irritates the nervous centres, and also increases the peripheral or eccentric excitability; 3. Eccentric or emotional excitation, the immediate provocative of the fit. Where the first two factors exist, an explosion may not occur; but it is always imminent. The slightest cause may provoke it. Now, if we eliminate the second factor, the poison, and reduce the conditions to those ordinarily present in pregnancy, we still have the exalted central nervous irritability and the high arterial tension; then convulsion of the kind under consideration is not likely to occur. But, suppose that the nervous centres have acquired or inherited some peculiarity of structure or nutrition, such as entails a proclivity to epilepsy, chorea, ague, then a lesser degree of eccentric or emotional irritation may call forth the latent disorder, which declares itself by convulsion. Thus it may be said that pregnancy is a test of the soundness of the nervous system.

In illustration of this, we may appeal to the history of chorea. I believe this form of convulsion very rarely occurs for the first time in pregnancy. It will almost invariably be found that the subjects had suffered from the disease in childhood. Bristowe (*Treatise on the Theory and Practice of Medicine*, 1876) correctly states the general opinion that "the recovery from chorea (putting cardiac disease out of the question) is generally in the long run complete". And so it is, to all appearance, unless pregnancy supervene. In this case, the disease presumed to be eradicated, but really only latent, breaks out afresh and with tenfold intensity, perhaps developing into insanity and causing death. It is an interesting illustration of the analogy between pregnancy and menstruation, that a girl lately under my care had suffered from chorea when five years old, and was apparently cured, but had a renewed outbreak at thirteen, when menstruation set in.

The comparison of cases of chorea complicating pregnancy with chorea independent of that condition enabled me to disprove the embolic theory of the cause of the disease: a theory since destroyed on other evidence by Ogle and Dickinson and rejected by Bristowe. This corrective or controlling observation, then, shows that the condition upon which the latent disposition to chorea depends is some change of nutrition or of structure of the nervous centres, unimportant under the ordinary conditions of life, but liable to be called out into renewed activity under that special increase of central nervous development which is the constant attendant upon pregnancy.

Many analogous facts confirm this view. Thus women born of epileptic or other morbidly nervous parents may manifest no marked similar disorders until the advent of menstruation—a mimic or abortive pregnancy—or of true pregnancy. In such subjects, convulsion truly epileptic, that is, unaccompanied by albuminuria, is determined under the central nervous development and the increased reflex irritability. A similar history may be traced in the study of ague. Women who have been the subjects of ague, or whose constitutions have been affected by malarial influences, may be apparently cured, and so remain for years until pregnancy overtakes them. Then back come the ague-fits, again the spleen shows enlargement, and it will not be easy to subdue the disorder whilst the pregnancy lasts. It is interesting to remember that, in this case, there is not only an apparent rekindling of the central nervous fault, but that the spleen, which is specially attacked in ague, is also the seat of normal increase of functional activity, and probably also of structural increase during pregnancy.

The development of insanity under the trial of pregnancy is another proof of the proposition that pregnancy is a test of the soundness of the brain. This is one of the most familiar facts in the history of women. But for pregnancy, the latent proclivity to insanity might never be suspected. It is enough for our immediate purpose to specify this relation. I will, however, mention a singular case that lately came under my knowledge. The wife of a medical friend had been insane before marriage. The mental disorder was suspended during two pregnancies, and recurred afterwards. May we explain this by supposing that the function of pregnancy, demanding a special nerve-force, diverted to this physiological channel that which would otherwise have found a pathological expression?

Pregnancy further supplies most interesting examples of general nervous shock and of shock more especially limited to the brain or spinal cord, shown in prostration or sudden death in the one case, and in paraplegia or other form of paralysis in the other.

I must refrain from loading this paper with illustrative cases; but I cannot doubt that appeal to your memories will bring up abundant examples. I have cited several in my Lumleian Lectures on the Convulsive Diseases of Women (1874). But I may be excused for making a

few more observations upon this topic. It may be assumed that physiology consists in the perfect adjustment of organs working harmoniously to the accomplishment of natural functions. Now, this perfect adjustment and correlation are liable to disturbance. When a new function, notably that of reproduction, is started, a special organ, the uterus, is called from the reserve into active and leading service. It cannot be fitted for this leading service without suppressing to a great extent the ovary, which hitherto was the chief sexual organ, without taxing other organs, without raising unwonted supplies. Amongst the earliest, if not the first conditions observed, are increased blood-flux to the uterus, increased arterial tension, and increased nervous irritability. As the uterus grows in response to the developmental stimulus of the ovum, these phenomena become more accentuated. As the nutrition of the embryo proceeds, the wants, recremental and excremental, of a new organism are added to the similar wants of the mother; that is, her organs of assimilation and of elimination have to do double duty. This call is met in two ways, perhaps in more. The organs increase in bulk—that is, in working capacity; and in activity—that is, by doing more work in a given time. Thus the increased work thrown upon the circulation demands an increase in driving power. The addition of an enormous area of blood-supply, involving more blood and a larger system of vessels to carry it, necessarily compels an addition to the effective moving power of the circulation. Hence, as the vascular system of the pelvis extends, so the work of the heart increases. The heart undergoes a normal muscular hypertrophy, and it beats more quickly than in the non-pregnant state. I believe it is not necessary, in order to account for this growth of the heart, to invoke the influence of pressure of the gravid uterus upon the iliac arteries. In many cases, this pressure is never great; and in many the increased power and action of the heart are manifested at so early a stage of gestation, that mechanical pressure is inappreciable.

These conditions of the circulation are marked by a rise in the arterial tension. And this pressure is exerted upon the chief organs of functional activity. The liver, the spleen, the kidney, the lung, the skin, the uterus, and the nervous centres, feel the unwonted impulse. The liver and the spleen certainly enlarge and become more vascular; probably the kidney is affected in the same manner; the condition of the uterus is obvious enough; the skin also becomes more active; its glands, sebaceous and sudatory, work more. So vast an increase of circulatory, nutritive, formative, and excretory force implies a corresponding increase of the nervous force, without which these functions could not be kept going under the ordinary conditions. That there is, then, in all physiological probability, a tissue-increase of nerve, and especially of the sympathetic and spinal systems, it is reasonable to assume. The bare anatomical fact might be determined by a series of comparative observations of animals in the pregnant and non-pregnant states. I will not reopen the controversy as to the development of nerves in the uterus and heart. I will only remark that, even granting the insufficiency of anatomical proof, the presumptive or *à priori* evidence that increase of work demands increase of material is hard to resist. But of the relative activity of the nervous function there can be no doubt. Apart from the greater activity of the circulation and of the glandular organs, proofs of exalted central nervous irritability are constantly forced upon our observation. The increased emotional mobility and the intensification or perversion of the intellectual and moral qualities under the influence of pregnancy have been recognised in all ages and in all countries. Of the development of central spinal irritability, I will cite a few examples. It will be useful to turn first to the ultimate function of the spinal cord in the accomplishment of the function of reproduction; viz., that of parturition. In this final act, we see the culminating effort of the excitomotor or diastaltic system. The force generated and stored up to supply the uterus and its auxiliary muscles to effect the expulsion of the mature ovum is now expended with a rapidity and energy for which there is hardly a parallel. Certainly, I am justified in repeating that, for most of our delicately nurtured daughters of luxury, the only day's hard work they ever know is that on which they fall in labour. If we accept the dictum that Nature does nothing in vain, we must admit that this accumulation of nerve-force expended upon a determinate purpose is a special provision. Now, although this expenditure or explosion of nerve-force during labour is more or less sudden and limited to a short period of time, there are not wanting manifestations of the generation of this force beforehand in preparation for the coming struggle. Thus it is not uncommon to witness during pregnancy twitches of the legs, involuntary, so that it is painful for the sufferer to be in society. These movements may be regarded as a mode of discharge of superfluous nerve-force not yet wanted. They exert a regulating or balancing function.

I have seen instances of periodical fits of *smearing* during pregnancy in subjects quite free from colds, and not liable to similar attacks at

other times. These attacks occurred in the morning, and seemed to replace the morning-sickness.

This morning sickness is the most remarkable and the most familiar example of the nervous disturbances induced by pregnancy. It has been too narrowly regarded as simply due to uterine reflex irritation. Undoubtedly, irritation proceeding from the uterus is the chief immediate or exciting cause of the vomiting. But we must presuppose an excitable condition of the nervous centres, especially of the spinal cord. Under ordinary circumstances, equal or greater uterine irritation will not produce the same effect. But during pregnancy, especially during the early months, and at the very end of gestation, when labour is at hand, the local irritability is enormously intensified. Commonly, at the end of two or three months, the vomiting ceases. Accommodation has been established. There is a just correlation between the newly developed nerve-force and the uses to which it is applied. But sometimes the physiological adjustment is disturbed; and pathological phenomena are manifested. Nutrition is impeded; the nervous centres are unable to recover their equilibrium; what, for want of more accurate knowledge or expression, may be called a habit of vomitive convulsion is acquired; this is now excited by the slightest causes, and special uterine irritation is not the only cause; smelling or seeing, or even thinking of food, or the smallest mental or physical effort or shock, will evoke an attack. And every attack produces a shock, which adds to the general prostration. But when, or perhaps before, things have arrived at this point, another complication has been introduced. There is blood-poisoning; and thus the situation resembles that of uræmic eclampsia. When nutrition from ingested food is arrested, the process of absorption of tissue acquires intense activity. This is seen in the rapid and extreme emaciation. Now this absorption of tissue, attended as it is by defective excretion of waste material, implies the retention and circulation in the blood of noxious matter, and, further, an absolute degradation of the blood. The vessels then carry a poison to the spinal cord, a poison which probably, as in the case of uræmia associated with albuminuria, increases its excitability.

But the poisoned blood acts in another way. The function of respiration being imperfectly exercised, the blood carries, not only excess of waste material, but an undue proportion of carbon. Now, carbonic acid certainly, as Marshall Hall and Brown-Séquard have sufficiently shown, excites contraction of the unstriated muscular fibre. Hence the disposition to abortion brought about by a double process; first, the direct action of the poisoned blood exciting the uterus to contract; secondly, the reflected stimulus to contract derived from the spinal cord. Thus it is that occasionally abortion is induced under the influences of obstinate vomiting; that it is induced still more frequently under the influence of uræmic eclampsia; because, during the fits, oxygenation of the blood is so impeded that a large accumulation of carbonic acid takes place. Thus it is also that, in apoplexy occurring during pregnancy, abortion is induced. Of this I have seen remarkable examples. Thus it is, again, that, in the moribund from any cause, abortion often precedes death. Thus it is that, in cases of rapid poisoning from inhalation of carbonic oxide or carbonic acid gases, abortion is very constant. It is true that, as Marshall Hall observed, when the influence of the cerebral centre is eliminated, as by anæsthetics, of which carbonic acid is not the least effective, or by extirpation, the reflex activity of the spinal cord is augmented. But this factor is an addition to those to which I have referred.

In these cases, we cannot help seeing evidence that abortion is salutary, at least in design, and not seldom in effect. It is a natural conservative process. The uterus, casting out the ovum, casts out the *fons et origo mali*. The nerve-force, directed to the uterus and expended upon this process, finds a safe employment; and, in some cases entirely and in others to a certain extent, obviates the aberrant and dangerous explosions in convulsion. In addition to this mode of relief, the cause of the augmented nerve-tension removed, the disposition to convulsion and other mischief is at once lessened. And more than this; the attendant hæmorrhage acts beneficially, by diminishing the arterial tension. The dangerous experiment is at an end; the economy, finding itself unequal to the trial, brings it to a premature termination.

It may, on the other hand, be affirmed that, whereas abortion is the natural mode of relief when the resisting or accommodating forces are overpowered, these nervous explosions in vomiting, sneezings, twitchings, are, in the majority of cases, means of discharge of excessive nervous energy, by which abortion is averted.

It would lead us too far to trace, with any detail, the changes wrought in the constitution of the blood under the influence of pregnancy. I will simply recall the leading facts that have been ascertained: the diminution in the number of red corpuscles, the relative or absolute increase in the number of white corpuscles, the relative increase of fibrin and water. These changes no doubt exist, in very various degrees, in dif-

ferent cases; and, where they are extreme, the transition to pathological conditions is easily made. If the secreting and excreting organs be not in good working order, there will be added some foreign matters of a positively injurious character; and thus the fall into disease will be precipitated.

Another point, to which brief reference must be made, is the change in the dynamic condition of the circulation. The chief features are briefly these. Under the new developmental stimulus in the uterus, a sudden and powerful special determination of blood takes place to the pelvic vascular region. This vascular region undergoes rapid and enormous extension. It, therefore, holds and transmits a larger mass of blood. Under the double duty of nourishing the new organism, as well as maintaining that of the mother, and preparing her for the ulterior processes of parturition, childbed, and lactation, the whole mass of blood made is greater. The heart has more work to do; it is compelled to drive more blood at a higher speed. Hence, as we have seen, the heart undergoes a normal hypertrophy; the greater projectile force it exerts implies a higher arterial tension, demonstrable by the sphygmograph. This, in its turn, implies greater strain upon the liver and kidneys, and indeed upon the capillary system generally. There is a tendency to capillary fulness in every part of the body. This capillary fulness is increased by the retardation of the blood in the veins. Venous retardation is especially marked in the veins of the pelvis and lower extremities; and this may, to some extent, be due to the pressure of the gravid uterus upon the iliac veins and inferior cava. But I think this cause is secondary, not essential, and rarely of chief importance. This pelvic venous hyperæmia is, perhaps, the earliest sign of pregnancy. It is seen in the dark-violet colour of the vaginal mucous membrane, a condition sometimes so exaggerated that the veins present a prominent tortuous appearance, forming masses of venectasis actually projecting into the vagina and outside the vulva. This venous repletion is extended more or less, as might be expected, to the veins of the thighs and legs. These may show distinct varicosities, and the frequent oedema of the legs is further evidence of this condition. These conditions of general and local hyperæmia or plethora, and of increased vascular tension, like the increased nervous tension, may easily exceed the physiological equilibrium; and certain provisions must be made for regulating or controlling them. This accommodation is sometimes successfully accomplished by the increased action of the secreting and excreting glands. The vomiting, already referred to as a means of discharging excess of nerve-force, acts also in the direction indicated—that is, the fluid thrown off by the glands of the stomach lessens *pro tanto* the vascular tension. The skin-transpiration is also increased, so is the quantity of urine. If these means be insufficient—that is, if the secreting and excreting glands be not in good working order—not only is the dynamic fault unremedied, but *effete* material accumulates in the blood. At this point, the danger is imminent. Sometimes Nature restores the balance by setting up diarrhoea, by increase of vomiting, by the comparative abstinence from ingesta thus enforced. But if the balance be not so restored, we may see organs, hitherto doing no more than routine duty, excited to astonishing activity. As an example of this, I may instance profuse salivation. I have known cases where the daily quantity of saliva was measured by pints. I saw one such case with Dr. Williams of this town. This excessive salivation also acts as a means of carrying off excess of nerve-force; for profuse glandular secretion implies unusual derivation of nerve-force. As in other cases, salivation, salutary within certain limits, may pass into predominant importance and attain pathological significance.

If excessive vascular tension be not moderated by increased glandular action, the vessels may give way, the blood bursts through; we have hæmorrhage. This is a very interesting feature. It is almost certain that the mucous membrane of the alimentary tract is subject to hyperæmia, like the skin of the inferior extremities. The same may be predicated of the mucous membrane of the respiratory tract and of the urinary tract. Thus we occasionally see oedema of the lungs (independently of albuminuria, in which this condition is very frequent), and occasionally hæmoptysis and epistaxis. In other cases, the eruption takes place from the intestinal canal in the form of hæmatemesis, melæna, or bright blood from the anus. In other and rarer cases, we have hæmaturia, the blood coming either from the kidneys or from the bladder. I have interesting clinical illustrations of all these varieties of what we may call the regulating hæmorrhages of pregnancy. In the typical cases, the hæmorrhages have entirely ceased after labour; in some, similar hæmorrhages have recurred in subsequent pregnancies. But there is a safeguard much more frequently brought into action than these devious or displaced hæmorrhages. I refer, of course, to abortion. The uterus is the seat *par excellence* of blood-determination. The delicate vessels connecting the ovum and uterus give way more easily than do the vessels of any other part of the body. Like a chain

under tension, the circulation gives way at its weakest point. And, unlike a chain, the tension is greatest at this particular point.

No other vascular region is equally exposed to those sudden or rapid flows which so sorely try the resisting force of the vessels. There is abundant reason to conclude that ovulation, or at least an attempt at ovulation, proceeds during pregnancy. Hence is explained the fact that abortion and the bleedings associated with placenta prævia mostly occur at menstrual epochs. It seems a happy provision of Nature that the break-down happens at this place. The system, unable to bear the burden of pregnancy, saves itself by rejecting the ovum. If hæmorrhage do not take place from the uterus, abortion attending or not, or from some other mucous membrane, thus obeying the physiological law of hæmorrhages, extravasation would be the more likely to take place either into a serous cavity, as the peritoneum, into the parenchyma of the internal organs, or into the brain, producing apoplexy.

Depending partly upon the altered dynamic conditions of the circulation, and partly upon the altered constitution of the blood, various inflammations are apt to arise during pregnancy, but more especially soon after labour. These I can only glance at. But it must be obvious that this rapidly developed proclivity to inflammations must illustrate the causes of inflammation in the non-pregnant. Upon the same conditions depend essentially the phenomena of thrombosis and embolism. Indeed, in no other state do we find so many or such instructive examples of this blood-disturbance as in pregnancy. Did time permit, I could adduce evidence to show that, for the production of thrombosis, arterial or venous, the addition of a third factor, the entry of poisonous matter into the blood, is at least generally necessary.

What is the mode of genesis of that singular disease, *acute yellow atrophy of the liver*? Conjecture is nearly all that can at present be offered; but, since a very large proportion of all the recorded cases have occurred during pregnancy, it is surely in the direction to which I am pointing that a solution must be sought. Taking note first of the known modifications wrought in the blood by pregnancy; secondly, of the increased strain thrown upon the large glands, especially upon the liver; thirdly, of the liability of the blood to be invaded and altered in its chemical form by poison; fourthly, of the peculiarly impressionable explosive condition of the nervous centres—we may see dimly looming in the distance the path that shall lead to the synthetic thought that will reveal the truth.

One of the most curious and least understood phenomena of pregnancy is *pigmentation*. Many isolated facts may suggest lines of speculation to account for the production or deposit of pigment in certain cases; but the hope of discovering the combining links that shall produce a true theory of pigmentation must lie in the observation of pregnant women, who present so many examples of the process. That pigmentation is intimately dependent upon blood-conditions, cannot be doubted; but facts are not wanting to show that the nervous system is concerned in the process. In the investigation of this problem, there lies the promise of a rich harvest of physiological and pathological discovery. Here I cannot help citing a most remarkable experiment due to the perils of the sea recorded in the touching narrative (*Blackwood's Magazine*, 1876, by F. Wordsworth) of the sojourn of forty-nine persons for nearly seven months on one of the Crozet rocks, who had escaped from the wreck of the *Strathmore*. After living some time on sea-birds and their eggs, exposed to wet, cold, and fatigue, it was found that the dark-haired persons had grown fair and the fair-haired had become flaxen, with pink and white complexions; and that, conversely, the pristine pigmentation was regained when return was made to the ordinary diet and conditions of life.

In this place, I take the opportunity of calling attention to a clinical fact not previously, at least to my knowledge, recorded. My late resident-assistant at St. George's Hospital, Mr. Lacy, observed in two cases of postpuerperal inflammation that the temperature rose at every menstrual epoch two or three degrees, sinking again on the subsidence of the flow. I have since made other observations in point. It is highly probable that we may in this fact discover indications in the treatment of inflammations in women. An associated fact in one case is very interesting. It was a case of pyæmia with arthritic complications. At the menstrual periods, the temperature rose to 101.5° and hæmoptysis attended. She had never had hæmoptysis before.

But the warning hand of inexorable Time reminds me that I must respect his authority and your patience. The subject I have feebly sketched, or rather pointed to, is inexhaustible in matter for observation and in its theoretical and pathological applications. I shall not have failed altogether if I incite others to work and think in this direction. I will not weary you with any further speculations, but will simply state one or two propositions which may fitly conclude this address.

1. The physiological phenomena evoked by pregnancy must be

studied and grasped as a whole; that is, as forces called into combined action to accomplish a definite object. We cannot arrive at a just idea of the state of any one organ, or system of organs, without taking into consideration the state of all the rest in their absolute and relative conditions. This may seem a somewhat obvious proposition, but I cannot call to mind a systematic treatise on medicine or even on obstetrics in which more than a faint glimmer of the lesson it propounds is manifest.

2. This general law may be stated. Since, in pregnancy, nearly every organ and the whole organism are specially weighted, and undergo extraordinary development and functional activity, so any defect or fault inherited or acquired, howsoever latent, will be liable to be developed or intensified under the trial. Hence pregnancy is the great test of bodily soundness.

3. Whether there be any latent defect or not, but more especially if there be a latent defect, the history of pregnancy supplies illustrations throwing a vivid light upon many problems in pathology complementary to that derived from the ordinary methods of clinical observation and pathological research. Pregnancy is a more luciferous experiment than was ever devised in the laboratory.

TWO CASES OF ADDISON'S DISEASE WHICH ENDED WITH CEREBRAL SYMPTOMS.*

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IT is not necessary before a medical society in England to defend the reality of Addison's disease, or to trace the steps by which our present knowledge of it has been acquired. Here at least pathologists have not been blind to the facts, which no difficulties in explanation can alter, and one might rather complain that this last and most striking discovery of Dr. Addison has diverted attention from his other and no less remarkable services to medicine.†

I may, however, remind you that, in 1855, the original short treatise on the *Constitutional and Local Effects of Disease of the Suprarenal Capsules* was published. Of its eleven cases, only the first six were undoubtedly genuine; but the doubts which reasonably existed on a subject incompletely worked out were, or ought to have been, set at rest by the publication in the *Guy's Hospital Reports* for 1862 of twenty-five genuine cases, with a commentary by Dr. Wilks, in which the characteristic lesion of the adrenals‡ was distinguished from others to which they are subject, and the clinical features of the disease were fully described. In 1866, Dr. Greenhow was able to publish in the seventeenth volume of the *Pathological Transactions* no less than one hundred and twenty-eight cases of morbus Addisonii verus; and the same physician has since added to these about fifty more, and has embodied the results of his investigations in the Croonian Lectures delivered last year before the College of Physicians, and afterwards published in this JOURNAL as well as in a separate form. To these lectures I may refer for a more detailed account of the literature of the subject.

The point to which I desire particularly to direct the attention of this Society is the occasional rapid termination of the disease, when apparently in a very chronic stage, by the sudden access of cerebral symptoms: a mode of death of which the following two cases are examples.

CASE 1. §—A boy, aged 14, came among my out-patients at Guy's Hospital last March, whose appearance had already led the house-physician to a correct diagnosis of the case. Several years before, he had suffered from caries of the tarsus, and Mr. Bryant had removed some dead bone with good result. Though somewhat thin and delicate in appearance, he appeared to be a healthy boy until a few months before I saw him, when his appetite began to fail; he complained of headache and pain in the back, and occasionally vomited. Meanwhile,

* Read before the Hunterian Society.

† Especially his recognition of the disease since known as idiopathic or pernicious anæmia, his classical paper on pneumonia, and his long-forgotten but now accepted doctrines on phthisis.

‡ I venture to use this word, familiar to comparative anatomists, as a more distinctive and convenient term than suprarenal capsule. The organs were described as *glandulæ* by their discoverer Eustachius, in 1564; by Wharton, a century later, as *glandulæ ad plexum* (sc. *solarem*); and it was the Danish anatomist Bartholinus who gave them the doubly misleading title of *capsulæ atrabiliarie*. Since they are neither true (secreting) glands nor lymphoid structures, since they do not form black-bile, and are only capsules when the medulla has decomposed into an apparent central cavity, it is better to use a term which is sufficiently short and characteristic, and does not involve any theory as to their function.

§ This case has already appeared in a paper on Morbus Addisonii, which I published in *Virchow's Archiv* for 1875.